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Appendix- A

Description of the math-heuristic used for solving the case of "full demand satisfaction"

As the problem setting for the case of "full demand satisfaction" and the necessity of developing a new algorithm has already been described in the Section 3.5.4. Here, we have only presented the description of the said algorithm along with the required mathematical models. Frist, Model [**M4**] is used to ascertain the minimum number of caregivers required for each patient individually. Model [**M4**] relaxes the compatibility requirement (gender, language and procedure capability) for the selection of caregivers and creates a route for every needed caregiver. Depending on the start and finish time of these routes, model also provides information that if the route can be completed by a staff on the morning or evening shift (or both). Additional sets, input parameters and decision variables along with the mathematical model is as follows.

Model [M4]:

Additional sets, indices and input parameters:

K	Set of caregivers indexed by k; K = {1, 2, 3, 4, 5}
S	Set of shifts indexed by s; S = {1, 2}
$\widehat{W}$	Maximum allowed workload including overtime.

Additional decision variables:

c_{ks}	$\begin{cases} 1, \text{if the assigned schedule of caregiver } k \text{ falls inside the shift } s. \\ 0, \text{otherwise.} \end{cases}$
w_k	Assigned workload for staff k. (in minutes)

Objective function

$$max\ Z_5 = \sum_{k\in K}\sum_{s\in S} c_{ks} \qquad (A.1)$$

Subject to

$$\sum_{i\in N}\sum_{p\in P}\sum_{u\in V}\sum_{j\in N}\sum_{q\in P}\sum_{v\in V} t_{ij} * x_{ipujqvk} + \sum_{i\in M}\sum_{p\in P}\sum_{u\in V}\left(\hat{\pi}_{ipuk} + T_p\right) * y_{ipuk} + \theta = w_k$$

$$\forall\ k\ \in K \qquad (A.2)$$

$$w_k\ \leq \widehat{W} \qquad \forall\ k\ \in K \qquad (A.3)$$

$$\hat{\pi}_k - (\pi_{h00k} + 0.5 * w_k) \leq B * (1 - a_k) \qquad \forall\ k \in K, h \in H \qquad (A.4)$$

$$(\pi_{h00k} + 0.5 * w_k - \theta) - \hat{\pi}_k\ \leq B * (1 - a_k) \qquad \forall\ k \in K, h \in H \qquad (A.5)$$

$$c_{ks}\ \leq a_k \qquad \forall\ k\ \in K, s \in S \qquad (A.6)$$

$$\pi_{h00k} + w_k - (\bar{T}_1 + \widehat{W}) \leq B * (1 - c_{k1}) \qquad \forall\ k \in K, h \in H \qquad (A.7)$$

$$\bar{T}_2 - \pi_{h00k}\ \leq B * (1 - c_{k2}) \qquad \forall\ k \in K, h \in H \qquad (A.8)$$

$$\pi_{h00k} + w_k \leq (\bar{T}_2 + \widehat{W}) * a_k \qquad \forall\ k \in K, h \in H \qquad (A.9)$$

and Constraints (3.6 – 3.9), (3.13 – 3.18), (3.21 – 3.23), (3.27 – 3.60) from Model **[M0]** and Constraint 3.61.

Constraint $(A.2)$ calculates the total route length scheduled for the selected caregivers, which is kept within the maximum allowed workload by Constraint $(A.3)$. Constraint $(A.4)$ and $(A.5)$ are the suitable modification of the Constraint (3.24) and (3.25) respectively and assign a mandatory break based on the start and finish time of the route. As final shift of the routes is not decided at this state,

constraint $(A.6)$ to $(A.9)$ finds all the possible shift assignments for each route. Objective function $(A.1)$ is used to maximizes the possible shift assignment for the generated routes.

Routes generated by the Model [**M4**] are then assigned to the available staff (regular and part-time) by Model [**M5**]. First, a compatibility matrix ($\hat{C}_{rk}$) is developed that uses the preference information (gender and language), procedure capability information and the information of the possible shift assignment from Model [**M4**] for the generated routes. Using the compatibility matrix in the Model [**M5**], each route is then assigned to either a regular or part-time caregiver while minimizing the total staff wages.

Model [M5]:

Additional sets, indices and input parameters:

K	Set of caregivers indexed by *k, l.*
S	Set of shifts indexed by *s;* S = {1, 2}
R	Set of routes indexed by *r.*
E_k	$\begin{cases} 1, \text{ if caregiver } k \text{ is a regular staff.} \\ 0, \text{ if caregiver } k \text{ is a part-time staff.} \end{cases}$
$\hat{C}_{rk}$	$\begin{cases} 1, \text{ if caregiver } k \text{ is capable of performing the jobs at route .} \\ 0, \text{ otherwise.} \end{cases}$
$\vec{T}_r$	Start time for route *r*.
$\overleftrightarrow{T}_r$	Length of the route *r* (in minutes).
$\hat{H}_k$	Daily wage of caregiver *k* (in rupees).
$\hat{O}_k$	Rate of overtime payment of caregiver *k* (in rupees/minute).

Additional decision variables:

α_k $\begin{cases} 1, \text{if caregiver } k \text{ is selected for the route assignment.} \\ 0, \text{otherwise.} \end{cases}$

β_{rk} $\begin{cases} 1, \text{if route } r \text{ is assigned to the caregiver } k. \\ 0, \text{otherwise.} \end{cases}$

o_k Overtime scheduled for staff *k*. (in minutes)

Objective function

$$min\ Z_6 = \sum_{k \in K} (1 - E_k) * \hat{H}_k * \alpha_k \ + \sum_{k \in K} \hat{O}_k * o_k \qquad (A.10)$$

Subject to

$$\sum_{r \in R} \beta_{rk} = \alpha_k \qquad \forall\ k\ \in K \qquad (A.11)$$

$$\sum_{k\ \in K} \beta_{rk} = 1 \qquad \forall\ r \in R \qquad (A.12)$$

$$\beta_{rk} \leq \hat{C}_{rk} \qquad \forall\ k\ \in K, r \in R \qquad (A.13)$$

$$\sum_{r \in R} \beta_{rk} * (\vec{\bar{T}}_r + \overleftarrow{\bar{T}}_r - \bar{\bar{T}}_2 * S''_{k2}) = w_k \qquad \forall\ k\ \in K \qquad (A.14)$$

$$w_k - \sum_{s \in S} (\bar{\bar{T}}_s - \bar{T}_s) * S''_{ks} \leq o_k \qquad \forall\ k\ \in K \qquad (A.15)$$

and Constraints $(A.3)$.

Objective function $(A.10)$ for the mathematical Model [**M5**] minimizes the total wages for regular and part-time staff. Objective function does not include the wages for the regular workload of the regular employees because it needs to paid in full for every regular staff whether or not their services are used. In addition to

this, overtime wages for both type of the caregivers are included in the objective function. Constraint $(A.11)$ assigns exactly one route to every selected caregiver, while Constraints $(A.12)$ and $(A.13)$ finds a compatible caregiver for every route. Finally, Constraints $(A.14)$ and $(A.15)$ calculate the actual workload and overtime based on the shift of the caregiver. Finally, a merge-and-drop heuristic is used improve the objective function value of the solution obtained from the Model [**M5**]. Proposed heuristics uses Model [**M6**] to find the less costly hiring, assignment, routing and scheduling decisions for the merged group. Steps of said heuristic are as follows.

1. Create separate groups for each patient and place the patient and the assigned caregivers into the corresponding group.
2. Calculate a resource utilization value for each group based on the total wage and the number of tasks.

   $$\text{Total wage } = \sum_{k} (1 - E_k) * \hat{H}_k * \alpha_k + \sum_{k} \hat{O}_k * o_k$$

   for the staff assigned to the group.

   $$\text{Number of tasks } = \sum_{i} \sum_{p \in P} \left(P'_{ip} * F_{ip} * R_{ip} \right)$$

   for all the patient in the group.

   $$\text{Resource utilization value } = \text{ (Number oftasks)/(Total wage)}$$
3. Sort the groups based on the resource utilization value in the increasing order.
4. Create a temporary group by merging the elements of the first two groups (groups with worst resource utilization).
5. Check for the termination criteria (time limit); if not met, solve the Model [**M6**] for the temporary group.

6. Check whether the objective value obtained by solving the Model **[M6]** is less than the combined cost of first two groups.

If 'Yes', replace the selected groups with the temporary group and go to step 3.

Else, create a new temporary group with merging the next pair of groups in increasing order of resource utilization and go to step 5.

Model [**M6**] is a suitable modification of the Model [**M0**] to incorporate the calculation of overtime while satisfying all the procedure requests for all the patients. Objective function and constraints for the Model **[M6]** are as follows.

Model [M6]:

Objective function ($A.10$)

Subject to

Constraints (3.6 – 3.23), (3.27 – 3.60), ($A.2$– $A.3$), ($A.5$ – $A.7$) and Constraint $A.9$.

Appendix- B

Complete results obtained for the single-objective home healthcare delivery problem.

Table B.1: Result summary of 5 independent runs of p-GA for the problem instances from Set-1.

Instance ID	Run_1		Run_2		Run_3		Run_4		Run_5	
	Best result	Time taken	Best result	Time taken	Best result	Time taken	Best result	Time taken	Best result	Time taken
HHI 10_20_40_1	35	415.72	32	414.42	36	414.20	33	413.08	35	412.23
HHI 10_30_40_1	46	424.59	49	425.54	48	425.61	48	422.76	45	422.75
HHI 10_40_40_1	51	481.79	52	483.09	52	483.35	50	470.83	47	480.85
HHI 15_30_40_1	40	457.47	40	459.44	37	458.99	39	448.71	39	454.68
HHI 15_45_40_1	56	513.58	52	514.04	51	515.76	50	494.34	54	512.40
HHI 15_60_40_1	73	635.47	68	626.64	65	656.00	68	769.49	67	635.56
HHI 20_40_40_1	36	463.51	38	465.16	35	491.64	35	477.96	35	463.24
HHI 20_60_40_1	60	656.00	59	643.24	55	649.69	58	760.81	60	646.75
HHI 20_80_40_1	99	1056.40	93	1038.81	87	1060.18	92	973.87	97	1072.30
HHI 25_50_40_1	65	813.63	66	758.59	63	835.95	65	802.00	66	865.48
HHI 25_75_40_1	100	1117.97	105	1073.57	103	1099.21	96	1022.37	104	1141.59
HHI 25_100_40_1	101	1224.04	118	1183.04	115	1243.08	119	1152.40	112	1267.80
HHI 50_100_40_1	115	2153.81	112	2147.60	110	2188.03	115	1962.44	114	2216.92
HHI 50_150_40_1	154	2801.57	158	2843.22	148	2821.51	150	2555.30	157	2866.93
HHI 50_200_40_1	174	4454.59	180	4472.31	179	4423.10	177	4024.82	178	4481.83
HHI 75_150_40_1	187	3770.64	181	3796.49	179	3721.73	173	3400.96	188	3809.82
HHI 75_225_40_1	192	6843.44	198	6894.66	207	6941.65	193	6235.20	196	6820.00
HHI 75_300_40_1	220	7200.81	210	7202.72	215	7201.61	231	7203.19	231	7201.50
HHI 100_200_40_1	202	5782.14	213	5852.29	221	5795.55	208	5259.84	213	5832.75
HHI 100_300_40_1	212	7205.37	228	7201.75	210	7205.73	201	7204.85	216	7202.39
HHI 100_400_40_1	224	7204.22	245	7202.80	232	7204.33	243	7206.01	260	7204.09

Table B.2: Result summary of 5 independent runs of p-GA for the problem instances from Set-2.

Instance ID	Run_1		Run_2		Run_3		Run_4		Run_5	
	Best result	Time taken	Best result	Time taken	Best result	Time taken	Best result	Time taken	Best result	Time taken
HHI 10_20_40_2	30	380.78	32	426.16	32	384.02	30	384.64	29	380.66
HHI 10_30_40_2	43	423.20	42	483.60	41	425.42	42	423.84	41	426.13
HHI 10_40_40_2	52	498.81	52	575.81	53	486.57	51	485.72	54	500.35
HHI 15_30_40_2	51	469.84	46	540.16	47	461.93	47	461.05	50	471.44
HHI 15_45_40_2	58	544.37	60	805.06	58	524.10	63	522.07	63	544.31
HHI 15_60_40_2	56	611.31	60	920.02	58	631.10	62	597.19	58	614.85
HHI 20_40_40_2	53	493.04	53	726.21	52	481.83	53	481.07	54	519.77
HHI 20_60_40_2	76	695.27	78	919.93	80	776.05	73	775.17	79	760.29
HHI 20_80_40_2	86	1248.10	80	1617.11	81	1136.29	81	1147.70	83	1264.70
HHI 25_50_40_2	70	895.77	67	992.81	69	847.41	70	867.56	68	937.30
HHI 25_75_40_2	74	1106.36	81	1372.87	78	1039.01	78	1062.70	80	1172.78
HHI 25_100_40_2	105	1343.12	106	1731.66	100	1376.32	102	1380.13	103	1441.10
HHI 50_100_40_2	127	1753.13	130	2234.53	130	1683.48	125	1662.74	128	1784.02
HHI 50_150_40_2	157	2516.58	152	3167.86	153	2315.37	150	2292.76	163	2517.62
HHI 50_200_40_2	179	4684.00	189	5826.47	175	4201.59	184	4202.27	185	4678.62
HHI 75_150_40_2	169	3702.60	167	4443.42	173	3388.42	179	3371.74	176	3684.78
HHI 75_225_40_2	214	6493.72	220	7203.18	222	5856.17	218	5877.79	216	6459.93
HHI 75_300_40_2	212	7204.52	193	7205.35	217	7203.63	222	7204.22	198	7203.48
HHI 100_200_40_2	210	6833.52	203	7202.27	215	6254.07	218	6201.87	207	6894.26
HHI 100_300_40_2	243	7204.04	234	7201.21	267	7201.72	251	7203.85	261	7204.78
HHI 100_400_40_2	238	7208.94	200	7207.67	238	7201.65	223	7206.19	200	7204.66

Table B.3: Result summary of 5 independent runs of p-GA for the problem instances from Set-3.

Instance ID	Run_1		Run_2		Run_3		Run_4		Run_5	
	Best result	Time taken	Best result	Time taken	Best result	Time taken	Best result	Time taken	Best result	Time taken
HHI 10_20_40_3	36	389.43	38	384.88	36	387.64	36	389.80	36	387.08
HHI 10_30_40_3	43	421.13	41	418.42	48	422.61	42	417.21	46	420.93
HHI 10_40_40_3	51	456.16	52	453.03	50	455.62	47	445.94	48	458.99
HHI 15_30_40_3	45	466.79	47	462.30	47	466.77	45	453.09	47	466.59
HHI 15_45_40_3	64	633.33	60	629.78	57	639.55	54	687.18	62	631.42
HHI 15_60_40_3	76	688.27	71	691.55	74	699.62	74	801.87	68	676.58
HHI 20_40_40_3	54	539.89	53	537.59	56	563.95	51	513.44	54	541.88
HHI 20_60_40_3	69	869.96	66	865.46	63	867.68	67	821.34	65	871.72
HHI 20_80_40_3	87	998.87	88	995.69	82	1023.30	91	932.47	84	1000.04
HHI 25_50_40_3	68	857.98	75	856.57	72	897.68	72	816.95	69	862.62
HHI 25_75_40_3	90	1039.53	87	1049.65	81	1083.05	89	964.06	90	1062.53
HHI 25_100_40_3	95	1616.78	98	1653.98	100	1650.79	97	1526.88	93	1652.69
HHI 50_100_40_3	141	2233.84	138	2262.45	140	2271.22	135	2061.94	128	2247.40
HHI 50_150_40_3	148	2555.98	138	2587.90	145	2637.23	136	2409.70	152	2589.75
HHI 50_200_40_3	173	4964.21	177	4978.04	178	5014.66	176	4563.94	182	4982.74
HHI 75_150_40_3	168	3810.21	173	3821.08	179	3870.96	175	3532.62	163	3849.22
HHI 75_225_40_3	213	6447.41	211	6470.29	203	6447.64	217	5884.22	202	6501.28
HHI 75_300_40_3	214	7200.31	227	7205.08	217	7200.73	235	7201.40	216	7200.57
HHI 100_200_40_3	207	5691.66	210	5725.33	202	5689.34	200	5235.70	203	5706.58
HHI 100_300_40_3	229	7205.79	251	7203.66	225	7205.68	229	7205.13	211	7203.48
HHI 100_400_40_3	230	7206.65	240	7200.64	227	7208.09	235	7200.84	225	7204.41

Table B.4: Summary of the result obtained from different algorithms for set_1 instance.

Instance ID	UPPER BOUND	SSD			MSD			p-GA					
								BEST			AVERAGE*		
		Z_1	GAP (%)	TIME (sec)	Z_1	GAP (%)	TIME (sec)	**Z_1**	**GAP (%)**	**TIME (sec)**	Z_1	GAP (%)	TIME (sec)
HHI 10_20_40_1	59	41	43.90	4933	32	84.38	5177	**36**	**63.89**	**412**	35	68.57	414
HHI 10_30_40_1	67	56	19.64	2941	52	28.85	1969	**49**	**36.73**	**423**	48	39.58	424
HHI 10_40_40_1	86	55	56.36	2720	56	53.57	2657	**52**	**65.38**	**471**	51	68.63	480
HHI 15_30_40_1	68	53	28.30	5629	49	38.78	2903	**40**	**70.00**	**449**	39	74.36	456
HHI 15_45_40_1	79	66	19.70	4396	63	25.40	3830	**56**	**41.07**	**494**	52	51.92	510
HHI 15_60_40_1	123	86	43.02	5144	84	46.43	3455	**73**	**68.49**	**627**	68	80.88	665
HHI 20_40_40_1	56	43	30.23	3772	43	30.23	3255	**38**	**47.37**	**463**	35	60.00	472
HHI 20_60_40_1	105	76	38.16	5284	72	45.83	4196	**60**	**75.00**	**643**	59	77.97	671
HHI 20_80_40_1	171	120	42.50	7466	118	44.92	5762	**99**	**72.73**	**974**	93	83.87	1040
HHI 25_50_40_1	107	51	109.80	7342	83	28.92	2900	**66**	**62.12**	**759**	65	64.62	815
HHI 25_75_40_1	185	97	90.72	7448	129	43.41	8003	**105**	**76.19**	**1022**	103	79.61	1091
HHI 25_100_40_1	205	145	41.38	5252	119	72.27	6261	**119**	**72.27**	**1152**	115	78.26	1214
HHI 50_100_40_1	244	_	_	3344	144	69.44	7219	**115**	**112.17**	**1962**	114	114.04	2134
HHI 50_150_40_1	326	_	_	4329	156	108.97	7575	**158**	**106.33**	**2555**	154	111.69	2778
HHI 50_200_40_1	420	_	_	_	_	_	_	**180**	**133.33**	**4025**	178	135.96	4371
HHI 75_150_40_1	_	_	_	_	_	_	_	**188**	**_**	**3401**	181	_	3700
HHI 75_225_40_1	_	_	_	_	_	_	_	**207**	**_**	**6235**	196	_	6747
HHI 75_300_40_1	_	_	_	_	_	_	_	**231**	**_**	**7201**	220	_	7202
HHI 100_200_40_1	_	_	_	_	_	_	_	**221**	**_**	**5260**	213	_	5705
HHI 100_300_40_1	_	_	_	_	_	_	_	**228**	**_**	**7202**	212	_	7204
HHI 100_400_40_1	_	_	_	_	_	_	_	**260**	**_**	**7203**	243	_	7204

Table B.5: Summary of the result obtained from different algorithms for set_2 instance.

Instance ID	UPPER BOUND	SSD			MSD			p-GA					
								BEST			AVERAGE*		
		Z_1	GAP (%)	TIME (sec)	Z_1	GAP (%)	TIME (sec)	**Z_1**	**GAP (%)**	**TIME (sec)**	Z_1	GAP (%)	TIME (sec)
HHI 10_20_40_2	39	36	8.33	2931	38	2.63	2909	**32**	**21.88**	**381**	30	30.00	391
HHI 10_30_40_2	63	52	21.15	2674	51	23.53	2187	**43**	**46.51**	**423**	42	50.00	436
HHI 10_40_40_2	89	59	50.85	3271	56	58.93	3195	**54**	**64.81**	**486**	52	71.15	509
HHI 15_30_40_2	74	59	25.42	7093	63	17.46	3144	**51**	**45.10**	**461**	47	57.45	481
HHI 15_45_40_2	97	74	31.08	3910	72	34.72	6374	**63**	**53.97**	**522**	60	61.67	588
HHI 15_60_40_2	99	70	41.43	4316	60	65.00	1779	**62**	**59.68**	**597**	58	70.69	675
HHI 20_40_40_2	78	68	14.71	5099	65	20.00	4452	**54**	**44.44**	**481**	53	47.17	540
HHI 20_60_40_2	123	96	28.13	5883	94	30.85	3426	**80**	**53.75**	**695**	78	57.69	785
HHI 20_80_40_2	167	105	59.05	5938	117	42.74	5430	**86**	**94.19**	**1136**	81	106.17	1283
HHI 25_50_40_2	115	35	228.57	8634	82	40.24	5317	**70**	**64.29**	**847**	69	66.67	908
HHI 25_75_40_2	159	88	80.68	8668	112	41.96	6246	**81**	**96.30**	**1039**	78	103.85	1151
HHI 25_100_40_2	216	82	163.41	8998	115	87.83	4511	**106**	**103.77**	**1343**	103	109.71	1454
HHI 50_100_40_2	241	_	_	3669	187	28.88	7212	**130**	**85.38**	**1663**	128	88.28	1824
HHI 50_150_40_2	313	_	_	4955	190	64.74	7640	**163**	**92.02**	**2293**	153	104.58	2562
HHI 50_200_40_2	419	_	_	_	125	235.20	6687	**189**	**121.69**	**4202**	184	127.72	4719
HHI 75_150_40_2	_	_	_	_	_	_	_	**179**	**_**	**3372**	173	_	3718
HHI 75_225_40_2	_	_	_	_	_	_	_	**222**	**_**	**5856**	218	_	6378
HHI 75_300_40_2	_	_	_	_	_	_	_	**222**	**_**	**7203**	212	_	7204
HHI 100_200_40_2	_	_	_	_	_	_	_	**218**	**_**	**6202**	210	_	6677
HHI 100_300_40_2	_	_	_	_	_	_	_	**267**	**_**	**7201**	251	_	7203
HHI 100_400_40_2	_	_	_	_	_	_	_	**238**	**_**	**7202**	223	_	7206

Table B.6: Summary of the result obtained from different algorithms for set_3 instance.

Instance ID	UPPER BOUND	SSD			MSD			p-GA					
								BEST			AVERAGE*		
		Z_1	GAP (%)	TIME (sec)	Z_1	GAP (%)	TIME (sec)	**Z_1**	**GAP (%)**	**TIME (sec)**	Z_1	GAP (%)	TIME (sec)
HHI 10_20_40_3	51	38	34.21	7413	42	21.43	5151	**38**	**34.21**	**385**	36	41.67	388
HHI 10_30_40_3	65	48	35.42	3425	54	20.37	1376	**48**	**35.42**	**417**	43	51.16	420
HHI 10_40_40_3	80	61	31.15	3433	57	40.35	2666	**52**	**53.85**	**446**	50	60.00	454
HHI 15_30_40_3	76	56	35.71	5285	57	33.33	2885	**47**	**61.70**	**453**	47	61.70	463
HHI 15_45_40_3	99	69	43.48	4880	65	52.31	2409	**64**	**54.69**	**630**	60	65.00	644
HHI 15_60_40_3	129	75	72.00	4603	82	57.32	3483	**76**	**69.74**	**677**	74	74.32	712
HHI 20_40_40_3	92	45	104.44	9490	61	50.82	8427	**56**	**64.29**	**513**	54	70.37	539
HHI 20_60_40_3	118	81	45.68	6191	75	57.33	3324	**69**	**71.01**	**821**	66	78.79	859
HHI 20_80_40_3	164	116	41.38	6005	109	50.46	5427	**91**	**80.22**	**932**	87	88.51	990
HHI 25_50_40_3	121	35	245.71	8155	90	34.44	4812	**75**	**61.33**	**817**	72	68.06	858
HHI 25_75_40_3	168	106	58.49	7053	116	44.83	7066	**90**	**86.67**	**964**	89	88.76	1040
HHI 25_100_40_3	221	118	87.29	7974	117	88.89	4957	**100**	**121.00**	**1527**	97	127.84	1620
HHI 50_100_40_3	262	_	_	3767	172	52.33	7388	**141**	**85.82**	**2062**	138	89.86	2215
HHI 50_150_40_3	310	_	_	_	142	118.31	7360	**152**	**103.95**	**2410**	145	113.79	2556
HHI 50_200_40_3	423	_	_	_	208	103.37	7289	**182**	**132.42**	**4564**	177	138.98	4901
HHI 75_150_40_3	_	_	_	_	_	_	_	**179**	**_**	**3533**	173	_	3777
HHI 75_225_40_3	_	_	_	_	_	_	_	**217**	**_**	**5884**	211	_	6350
HHI 75_300_40_3	_	_	_	_	_	_	_	**235**	**_**	**7200**	217	_	7202
HHI 100_200_40_3	_	_	_	_	_	_	_	**210**	**_**	**5236**	203	_	5610
HHI 100_300_40_3	_	_	_	_	_	_	_	**251**	**_**	**7203**	229	_	7205
HHI 100_400_40_3	_	_	_	_	_	_	_	**240**	**_**	**7201**	230	_	7204

Table B.7: Summary of best solutions under partial accommodation for set_1 instances.

Partial Accommodation Policy								
Instance ID	Objective -1				Objective -2			
	Total Revenue	Patient Count*	Request Served	Time Taken	Total Revenue	Patient Count*	Request Served	Time Taken
HHI 10_20_40_1	10950	3	33	413	12000	4	33	413
HHI 10_30_40_1	13400	7	44	425	14800	7	47	425
HHI 10_40_40_1	17250	9	52	481	18850	9	54	481
HHI 15_30_40_1	13450	3	37	455	14700	4	40	455
HHI 15_45_40_1	18550	8	51	511	20350	9	54	512
HHI 15_60_40_1	22950	12	69	632	25550	11	72	641
HHI 20_40_40_1	13400	14	37	462	12750	14	35	462
HHI 20_60_40_1	17950	11	56	622	19500	14	59	616
HHI 20_80_40_1	30150	13	93	1032	31000	13	92	1031
HHI 25_50_40_1	22550	13	67	711	22500	13	66	756
HHI 25_75_40_1	28400	18	99	1066	30350	22	99	1063
HHI 25_100_40_1	36600	27	117	1171	37050	29	119	1172
HHI 50_100_40_1	34400	15	112	2086	36800	17	113	2070
HHI 50_150_40_1	46950	27	155	2748	50800	26	155	2657
HHI 50_200_40_1	55850	28	176	4332	60200	28	183	4339
HHI 75_150_40_1	56600	26	179	3726	59050	26	176	3691
HHI 75_225_40_1	65350	24	203	6733	69450	24	209	6711
HHI 75_300_40_1	67250	28	219	7201	73600	37	219	7200
HHI 100_200_40_1	66800	39	211	5631	73150	40	221	5703
HHI 100_300_40_1	67100	27	213	7202	71800	26	216	7201
HHI 100_400_40_1	71200	31	227	7201	79550	35	240	7201

*Number of patients with all requests served in spite of the partial accommodation policy.

Table B.8: Summary of best solutions under partial accommodation for set_2 instances.

Partial Accommodation Policy								
Instance ID	Objective -1				Objective -2			
	Total Revenue	Patient Count*	Request Served	Time Taken	Total Revenue	Patient Count*	Request Served	Time Taken
HHI 10_20_40_2	11200	5	32	378	12500	5	33	382
HHI 10_30_40_2	16150	6	41	424	17250	7	44	427
HHI 10_40_40_2	18100	10	52	496	19050	11	54	500
HHI 15_30_40_2	14200	9	50	468	14800	9	50	470
HHI 15_45_40_2	18200	9	58	539	17800	8	58	542
HHI 15_60_40_2	18700	11	57	606	18700	9	59	610
HHI 20_40_40_2	20600	13	56	494	18500	10	53	496
HHI 20_60_40_2	24600	12	76	646	26400	11	79	663
HHI 20_80_40_2	26100	6	80	1170	27000	4	78	1170
HHI 25_50_40_2	21000	15	69	824	21200	14	71	826
HHI 25_75_40_2	28100	14	81	1048	28700	15	82	1051
HHI 25_100_40_2	34400	17	108	1262	35550	18	109	1270
HHI 50_100_40_2	40000	24	128	1671	42050	27	130	1682
HHI 50_150_40_2	52250	36	156	2357	52700	35	155	2362
HHI 50_200_40_2	60550	24	187	4523	60150	25	182	4522
HHI 75_150_40_2	51750	24	170	3561	56950	24	176	3539
HHI 75_225_40_2	66750	26	209	6166	67550	28	203	6187
HHI 75_300_40_2	69250	37	216	7201	77150	33	220	7201
HHI 100_200_40_2	67450	31	217	6634	68400	32	210	6637
HHI 100_300_40_2	82450	42	272	7201	82150	43	247	7201
HHI 100_400_40_2	70000	29	215	7201	73300	24	207	7204

*Number of patients with all requests served in spite of the partial accommodation policy.

Table B.9: Summary of best solutions under partial accommodation for set_3 instances.

Partial Accommodation Policy								
Instance ID	Objective -1				Objective -2			
	Total Revenue	Patient Count*	Request Served	Time Taken	Total Revenue	Patient Count*	Request Served	Time Taken
HHI 10_20_40_3	11800	8	35	385	12300	8	36	386
HHI 10_30_40_3	13450	8	44	419	14650	10	45	420
HHI 10_40_40_3	13750	11	48	454	16150	11	52	454
HHI 15_30_40_3	14850	9	46	463	15150	8	49	463
HHI 15_45_40_3	19500	6	59	626	19450	6	58	623
HHI 15_60_40_3	23600	17	75	704	25100	15	76	681
HHI 20_40_40_3	15650	12	54	539	17200	13	55	537
HHI 20_60_40_3	19850	13	62	858	19600	13	60	797
HHI 20_80_40_3	28750	10	86	999	28750	12	86	993
HHI 25_50_40_3	23350	10	71	857	23600	10	71	851
HHI 25_75_40_3	24850	10	84	1035	26250	11	85	1029
HHI 25_100_40_3	29100	12	100	1599	31600	14	98	1588
HHI 50_100_40_3	40800	17	130	2204	45450	20	142	2170
HHI 50_150_40_3	47250	33	146	2533	50850	29	153	2533
HHI 50_200_40_3	55650	19	184	4908	56850	20	178	4895
HHI 75_150_40_3	55550	24	173	3796	57300	23	172	3788
HHI 75_225_40_3	64650	37	199	6260	67250	34	210	6252
HHI 75_300_40_3	66000	29	212	7202	71500	30	208	7201
HHI 100_200_40_3	65450	34	201	5571	65900	30	200	5568
HHI 100_300_40_3	73250	35	227	7201	75400	30	218	7201
HHI 100_400_40_3	73250	30	232	7201	82150	28	230	7201

*Number of patients with all requests served in spite of the partial accommodation policy.

Table B.10: Summary of best solutions under complete accommodation restriction for set_1 instance.

Complete Accommodation Policy								
Instance ID	Objective - 3				Objective - 4			
	Total Revenue	Patient Count	Request Served	Time Taken	Total Revenue	Patient Count	Request Served	Time Taken
HHI 10_20_40_1	1850	4	10	411	2550	5	14	410
HHI 10_30_40_1	5050	8	17	421	4400	8	19	419
HHI 10_40_40_1	5100	10	22	479	5950	11	22	466
HHI 15_30_40_1	3450	4	12	451	2350	3	10	444
HHI 15_45_40_1	3550	8	17	508	5400	9	26	489
HHI 15_60_40_1	7550	13	33	619	7200	14	29	602
HHI 20_40_40_1	5450	14	21	461	5600	15	24	449
HHI 20_60_40_1	6350	13	25	610	7300	15	33	611
HHI 20_80_40_1	6850	14	31	1023	6200	14	34	971
HHI 25_50_40_1	6850	12	29	644	6950	12	32	689
HHI 25_75_40_1	8200	18	37	1058	9500	19	43	1006
HHI 25_100_40_1	11400	28	53	1172	15850	31	57	1106
HHI 50_100_40_1	7300	16	40	1947	7150	17	37	1857
HHI 50_150_40_1	10400	25	57	2613	13950	30	66	2379
HHI 50_200_40_1	12850	30	64	4194	14600	31	72	3838
HHI 75_150_40_1	12500	27	66	3666	13150	28	71	3369
HHI 75_225_40_1	13250	30	83	6692	14000	30	73	6055
HHI 75_300_40_1	17500	40	96	7201	17250	38	87	7201
HHI 100_200_40_1	14900	37	84	5527	16700	36	84	5016
HHI 100_300_40_1	17750	37	99	7201	19750	39	102	7200
HHI 100_400_40_1	20800	53	125	7201	17900	45	108	7202

Table B.11: Summary of best solutions under complete accommodation restriction for set_2 instance.

Instance ID	Complete Accommodation Policy							
	Objective - 3				Objective - 4			
	Total Revenue	Patient Count	Request Served	Time Taken	Total Revenue	Patient Count	Request Served	Time Taken
HHI 10_20_40_2	4350	6	15	379	4350	6	19	380
HHI 10_30_40_2	6650	7	23	417	7050	7	24	425
HHI 10_40_40_2	5150	9	24	483	6900	10	26	497
HHI 15_30_40_2	5250	10	29	459	5250	10	30	469
HHI 15_45_40_2	5150	10	24	517	7250	12	26	540
HHI 15_60_40_2	4800	11	22	587	5200	10	21	606
HHI 20_40_40_2	8050	11	30	493	10450	12	33	493
HHI 20_60_40_2	6300	10	30	628	8650	13	33	622
HHI 20_80_40_2	4950	7	19	1114	5500	8	27	1157
HHI 25_50_40_2	7350	13	29	792	6700	12	29	745
HHI 25_75_40_2	11550	19	37	1023	9750	17	34	1041
HHI 25_100_40_2	8300	17	40	1245	9600	19	40	1243
HHI 50_100_40_2	10250	21	50	1596	11700	23	52	1671
HHI 50_150_40_2	15800	34	64	2253	17800	35	69	2389
HHI 50_200_40_2	9900	27	63	4152	11500	29	73	4443
HHI 75_150_40_2	11200	25	66	3329	13150	26	66	3521
HHI 75_225_40_2	16400	31	77	5603	14350	28	74	6073
HHI 75_300_40_2	18650	42	104	7200	16850	41	86	7201
HHI 100_200_40_2	15300	34	80	6089	14700	33	84	6586
HHI 100_300_40_2	22350	51	110	7200	24500	47	121	7201
HHI 100_400_40_2	17850	50	108	7204	18400	48	114	7201

Table B.12: Summary of best solutions under complete accommodation restriction for set_3 instance.

Instance ID	Complete Accommodation Policy							
	Objective - 3				Objective - 4			
	Total Revenue	Patient Count	Request Served	Time Taken	Total Revenue	Patient Count	Request Served	Time Taken
HHI 10_20_40_3	5350	8	20	385	6500	9	26	386
HHI 10_30_40_3	4150	7	18	418	4550	8	19	416
HHI 10_40_40_3	4200	10	17	453	4950	11	24	443
HHI 15_30_40_3	3050	8	19	462	3450	8	21	450
HHI 15_45_40_3	4950	7	24	621	6400	8	22	622
HHI 15_60_40_3	9000	17	33	654	9000	17	31	647
HHI 20_40_40_3	6900	11	29	536	6650	11	23	511
HHI 20_60_40_3	6550	14	32	729	6750	14	27	734
HHI 20_80_40_3	6050	12	29	986	6250	13	30	922
HHI 25_50_40_3	5100	10	24	845	6000	12	25	801
HHI 25_75_40_3	7000	11	31	1033	8250	12	33	954
HHI 25_100_40_3	5700	17	38	1451	7550	18	40	1493
HHI 50_100_40_3	8850	16	50	2127	10700	17	61	1996
HHI 50_150_40_3	13600	27	60	2498	14000	29	63	2276
HHI 50_200_40_3	11300	29	62	4833	12200	30	67	4369
HHI 75_150_40_3	11900	26	61	3736	14200	27	67	3475
HHI 75_225_40_3	18250	39	86	6182	18150	38	85	5616
HHI 75_300_40_3	15600	44	96	7202	16250	40	85	7200
HHI 100_200_40_3	13100	30	70	5438	15150	33	74	5028
HHI 100_300_40_3	15950	39	102	7202	16650	38	107	7201
HHI 100_400_40_3	15100	42	111	7201	18850	42	103	7201

Table B.13: Analysis of staff utilization for set_1 instances.

Instance ID	Staff used			Number of staff on overtime		Man-hours		
	Total	Regular	Part-time	Regular	Part-time	Initially available	Additional	Total
HHI 10_20_40_1	32	9	23	1	12	80	236	316
HHI 10_30_40_1	34	10	24	2	11	80	244	324
HHI 10_40_40_1	37	9	28	2	14	80	288	368
HHI 15_30_40_1	34	11	23	4	15	120	260	380
HHI 15_45_40_1	43	11	32	3	15	120	328	448
HHI 15_60_40_1	65	11	54	0	17	120	500	620
HHI 20_40_40_1	39	19	20	5	9	160	216	376
HHI 20_60_40_1	58	17	41	2	28	160	448	608
HHI 20_80_40_1	80	18	62	4	29	160	628	788
HHI 25_50_40_1	55	19	36	1	19	200	368	568
HHI 25_75_40_1	82	22	60	1	37	200	632	832
HHI 25_100_40_1	81	22	59	7	27	200	608	808
HHI 50_100_40_1	118	39	79	11	46	400	860	1260
HHI 50_150_40_1	146	44	102	7	58	400	1076	1476
HHI 50_200_40_1	213	45	168	7	85	400	1712	2112
HHI 75_150_40_1	198	69	129	10	55	600	1292	1892
HHI 75_225_40_1	272	65	207	11	112	600	2148	2748
HHI 75_300_40_1	340	67	273	20	123	600	2756	3356
HHI 100_200_40_1	279	93	186	11	63	800	1784	2584
HHI 100_300_40_1	369	88	281	14	126	800	2808	3608
HHI 100_400_40_1	436	95	341	20	165	800	3468	4268

Table B.14: Analysis of staff utilization for set_2 instances.

Instance ID	Staff used			Number of staff on overtime		Man-hours		
	Total	Regular	Part-time	Regular	Part-time	Initially available	Additional	Total
HHI 10_20_40_2	23	8	15	1	4	80	140	220
HHI 10_30_40_2	30	8	22	1	8	80	212	292
HHI 10_40_40_2	43	8	35	1	23	80	376	456
HHI 15_30_40_2	37	14	23	3	9	120	232	352
HHI 15_45_40_2	44	12	32	3	17	120	336	456
HHI 15_60_40_2	56	11	45	5	27	120	488	608
HHI 20_40_40_2	34	18	16	2	8	160	168	328
HHI 20_60_40_2	51	17	34	2	15	160	340	500
HHI 20_80_40_2	97	19	78	3	43	160	808	968
HHI 25_50_40_2	57	19	38	2	20	200	392	592
HHI 25_75_40_2	96	23	73	4	32	200	728	928
HHI 25_100_40_2	89	24	65	4	32	200	664	864
HHI 50_100_40_2	102	46	56	7	33	400	608	1008
HHI 50_150_40_2	137	42	95	8	48	400	984	1384
HHI 50_200_40_2	221	42	179	5	83	400	1784	2184
HHI 75_150_40_2	199	68	131	8	53	600	1292	1892
HHI 75_225_40_2	255	71	184	13	101	600	1928	2528
HHI 75_300_40_2	398	73	325	12	137	600	3196	3796
HHI 100_200_40_2	280	87	193	24	89	800	1996	2796
HHI 100_300_40_2	321	89	232	17	110	800	2364	3164
HHI 100_400_40_2	441	90	351	24	184	800	3640	4440

Table B.15: Analysis of staff utilization for set_3 instances.

Instance ID	Staff used			Number of staff on overtime		Man-hours		
	Total	Regular	Part-time	Regular	Part-time	Initially available	Additional	Total
HHI 10_20_40_3	21	8	13	1	5	80	128	208
HHI 10_30_40_3	32	10	22	3	10	80	228	308
HHI 10_40_40_3	39	9	30	2	12	80	296	376
HHI 15_30_40_3	34	12	22	5	12	120	244	364
HHI 15_45_40_3	57	8	49	1	18	120	468	588
HHI 15_60_40_3	61	14	47	2	26	120	488	608
HHI 20_40_40_3	43	16	27	0	16	160	280	440
HHI 20_60_40_3	68	16	52	1	25	160	520	680
HHI 20_80_40_3	71	17	54	4	30	160	568	728
HHI 25_50_40_3	63	22	41	2	20	200	416	616
HHI 25_75_40_3	81	20	61	1	36	200	636	836
HHI 25_100_40_3	108	22	86	4	48	200	896	1096
HHI 50_100_40_3	124	46	78	7	49	400	848	1248
HHI 50_150_40_3	143	40	103	3	59	400	1072	1472
HHI 50_200_40_3	229	45	184	10	104	400	1928	2328
HHI 75_150_40_3	174	63	111	15	42	600	1116	1716
HHI 75_225_40_3	261	70	191	12	96	600	1960	2560
HHI 75_300_40_3	345	68	277	14	129	600	2788	3388
HHI 100_200_40_3	275	84	191	8	62	800	1808	2608
HHI 100_300_40_3	367	97	270	16	138	800	2776	3576
HHI 100_400_40_3	446	93	353	14	152	800	3488	4288

Table B.16: Financial analysis of the best solutions for set_1 instances.

Instance ID	CASE – A[1]				CASE – B[2]				
	Revenue collected	Regular staff wage	Profit[3]	Profit/ Wage	Revenue collected	Additional wage[4]	Total wage	Profit[3]	Profit/ Wage
HHI 10_20_40_1	12000	4363	7637	1.75	28150	8592	12955	15195	1.17
HHI 10_30_40_1	14800	4266	10534	2.47	31350	9574	13840	17510	1.26
HHI 10_40_40_1	18850	3830	15020	3.92	43650	11414	15244	28406	1.86
HHI 15_30_40_1	14700	5932	8768	1.48	33600	9995	15927	17673	1.10
HHI 15_45_40_1	20350	5665	14685	2.59	45400	12814	18479	26921	1.45
HHI 15_60_40_1	25550	5640	19910	3.53	64450	18917	24557	39893	1.62
HHI 20_40_40_1	12750	7887	4863	0.62	29750	7789	15676	14074	0.89
HHI 20_60_40_1	19500	7892	11608	1.47	53800	16810	24702	29098	1.17
HHI 20_80_40_1	31000	7942	23058	2.90	84700	25145	33087	51613	1.55
HHI 25_50_40_1	22500	9764	12736	1.30	54600	13896	23660	30940	1.30
HHI 25_75_40_1	30350	10055	20295	2.02	79100	24708	34763	44337	1.27
HHI 25_100_40_1	37050	9794	27256	2.78	92350	23031	32825	59525	1.81
HHI 50_100_40_1	36800	19757	17043	0.86	118550	34347	54104	64446	1.19
HHI 50_150_40_1	50800	19530	31270	1.60	152350	43584	63114	89236	1.41
HHI 50_200_40_1	60200	20187	40013	1.98	210300	69643	89830	120470	1.34
HHI 75_150_40_1	59050	29697	29353	0.99	162900	55311	85008	77892	0.91
HHI 75_225_40_1	69450	29389	40061	1.36	255150	89732	119121	136029	1.14
HHI 75_300_40_1	73600	29142	44458	1.53	311750	114948	144090	167660	1.16
HHI 100_200_40_1	73150	39691	33459	0.84	204300	75482	115173	89127	0.77
HHI 100_300_40_1	71800	39425	32375	0.82	325350	118818	158243	167107	1.05
HHI 100_400_40_1	79550	39687	39863	1.00	408050	146505	186192	221858	1.19

Table B.17: Financial analysis of the best solutions for set_2 instances.

Instance ID	CASE – A[1]				CASE – B[2]				
	Revenue collected	Regular staff wage	Profit[3]	Profit/ Wage	Revenue collected	Additional wage[4]	Total wage	Profit[3]	Profit/ Wage
HHI 10_20_40_2	12500	3720	8780	2.36	21300	5267	8987	12313	1.37
HHI 10_30_40_2	17250	3818	13432	3.52	34200	8319	12137	22063	1.82
HHI 10_40_40_2	19050	4236	14814	3.50	50350	14601	18837	31513	1.67
HHI 15_30_40_2	14800	6033	8767	1.45	34750	8503	14536	20214	1.39
HHI 15_45_40_2	17800	5810	11990	2.06	49150	13226	19036	30114	1.58
HHI 15_60_40_2	18700	5698	13002	2.28	60350	19481	25179	35171	1.40
HHI 20_40_40_2	18500	8425	10075	1.20	38050	6535	14960	23090	1.54
HHI 20_60_40_2	26400	8062	18338	2.27	55800	13761	21823	33977	1.56
HHI 20_80_40_2	27000	7613	19387	2.55	93400	31990	39603	53797	1.36
HHI 25_50_40_2	21200	10166	11034	1.09	52400	15750	25916	26484	1.02
HHI 25_75_40_2	28700	9671	19029	1.97	81700	27556	37227	44473	1.19
HHI 25_100_40_2	35550	10167	25383	2.50	100700	27080	37247	63453	1.70
HHI 50_100_40_2	42050	20383	21667	1.06	105500	23905	44288	61212	1.38
HHI 50_150_40_2	52700	19934	32766	1.64	145750	39142	59076	86674	1.47
HHI 50_200_40_2	60150	20060	40090	2.00	214450	73925	93985	120465	1.28
HHI 75_150_40_2	56950	29979	26971	0.90	156800	52760	82739	74061	0.90
HHI 75_225_40_2	67550	29973	37577	1.25	243500	78273	108246	135254	1.25
HHI 75_300_40_2	77150	29699	47451	1.60	310150	135540	165239	144911	0.88
HHI 100_200_40_2	68400	39941	28459	0.71	231950	84616	124557	107393	0.86
HHI 100_300_40_2	82150	40277	41873	1.04	297000	98501	138778	158222	1.14
HHI 100_400_40_2	73300	39961	33339	0.83	435150	157692	197653	237497	1.20

Table B.18: Financial analysis of the best solutions for set_3 instances.

Instance ID	CASE – A[1]				CASE – B[2]				
	Revenue collected	Regular staff wage	Profit[3]	Profit/ Wage	Revenue collected	Additional wage[4]	Total wage	Profit[3]	Profit/ Wage
HHI 10_20_40_3	12300	4124	8176	1.98	21000	5249	9373	11627	1.24
HHI 10_30_40_3	14650	3900	10750	2.76	30050	8364	12264	17786	1.45
HHI 10_40_40_3	16150	3890	12260	3.15	35500	11135	15025	20475	1.36
HHI 15_30_40_3	15150	6002	9148	1.52	33550	9014	15016	18534	1.23
HHI 15_45_40_3	19450	5547	13903	2.51	64100	19297	24844	39256	1.58
HHI 15_60_40_3	25100	5922	19178	3.24	67800	19733	25655	42145	1.64
HHI 20_40_40_3	17200	8219	8981	1.09	42250	10576	18795	23455	1.25
HHI 20_60_40_3	19600	8317	11283	1.36	62450	20064	28381	34069	1.20
HHI 20_80_40_3	28750	8090	20660	2.55	76100	22270	30360	45740	1.51
HHI 25_50_40_3	23600	9633	13967	1.45	57800	16166	25799	32001	1.24
HHI 25_75_40_3	26250	10026	16224	1.62	77750	24561	34587	43163	1.25
HHI 25_100_40_3	31600	9819	21781	2.22	110050	36361	46180	63870	1.38
HHI 50_100_40_3	45450	19949	25501	1.28	120300	33838	53787	66513	1.24
HHI 50_150_40_3	50850	20123	30727	1.53	145450	42292	62415	83035	1.33
HHI 50_200_40_3	56850	19485	37365	1.92	218400	81265	100750	117650	1.17
HHI 75_150_40_3	57300	29592	27708	0.94	166900	43884	73476	93424	1.27
HHI 75_225_40_3	67250	29961	37289	1.24	241950	80318	110279	131671	1.19
HHI 75_300_40_3	71500	30304	41196	1.36	320950	120934	151238	169712	1.12
HHI 100_200_40_3	65900	40015	25885	0.65	199950	73312	113327	86623	0.76
HHI 100_300_40_3	75400	39466	35934	0.91	330850	117039	156505	174345	1.11
HHI 100_400_40_3	82150	39692	42458	1.07	409650	151250	190942	218708	1.15

[1] Revenue maximization under partial accommodation (Objective 3.2).

[2] Full demand satisfaction by employing the part-time staff as well and allowing overtime for all the employees.

[3] profit = revenue collected – wage (travel allowance for staff are not included).

[4] Additional wage = Hiring cost for part-time employees + overtime cost.

Appendix- C

Complete results obtained for the multi-objective home healthcare delivery model.

Table C.1: Non-dominated solutions obtained for problem instance HHC_5_10_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-148.50	356.42	1	9.73	45.00	0	0	0	1	0
-53.76	331.53	1	372.48	70.00	0	0	0	0	1
124.08	332.26	1	325.35	60.00	0	1	0	0	0
262.25	336.71	1	321.35	50.00	0	1	0	0	0
268.59	352.45	1	412.07	50.00	0	0	1	0	0
272.17	355.64	1	395.78	50.00	1	0	0	0	0
446.25	322.78	2	30.60	71.03	1	0	0	0	0
522.16	1157.12	4	427.08	156.20	1	0	0	0	0
523.08	1164.78	4	427.08	156.20	0	0	1	0	0
524.50	1186.85	4	358.53	157.83	0	1	0	0	0
524.50	1186.85	4	360.87	156.55	0	1	0	0	0
524.50	1186.85	4	370.53	156.37	0	1	0	0	0
566.00	744.84	2	16.53	85.00	0	1	0	0	0
587.41	1165.97	4	396.00	157.12	1	0	0	0	0
588.33	1173.64	4	396.00	157.12	0	0	1	0	0
589.66	1192.58	4	396.00	157.28	0	0	0	0	1
589.75	1195.71	4	359.00	158.90	0	0	0	1	0
593.50	1196.72	4	396.00	157.23	0	0	0	0	1
600.91	1197.66	4	344.38	157.12	0	0	0	1	0
775.17	341.77	0	0.80	71.45	0	0	0	0	1
775.17	341.77	0	1.42	71.15	0	0	0	0	1
786.42	356.16	2	262.00	86.37	0	0	0	0	1
814.33	324.97	2	301.00	91.03	0	0	1	0	0
814.75	324.97	2	255.00	91.15	0	1	0	0	0
816.33	1130.12	4	2.60	658.03	1	0	0	0	0
816.33	1130.12	4	2.92	656.03	1	0	0	0	0
834.34	338.39	2	2.42	91.70	0	0	0	1	0
940.01	725.99	2	3.67	105.00	0	1	0	0	0
964.08	1176.30	4	1.53	439.15	0	0	0	0	1

964.83	1169.85	4	4.45	473.65	0	0	0	1	0
969.42	344.11	0	4.37	85.00	0	0	0	0	1
974.58	1169.59	4	4.45	476.55	0	0	0	1	0
981.00	332.40	0	0.15	101.15	0	0	1	0	0
1052.50	332.40	0	0.15	101.45	0	1	0	0	0
1052.50	332.40	0	0.12	101.45	0	1	0	0	0
1054.25	727.84	3	19.45	106.20	0	0	0	0	1
1069.25	336.76	0	2.02	101.15	0	1	0	0	0
1083.42	721.82	3	3.00	111.03	0	0	0	0	1
1102.08	314.04	2	274.00	121.03	1	0	0	0	0
1111.09	340.66	2	250.02	116.40	0	0	0	1	0
1133.16	727.84	2	5.90	115.00	0	0	0	1	0
1148.67	732.53	2	5.90	96.03	0	0	0	1	0
1175.75	343.66	2	242.00	106.37	0	0	0	1	0
1179.67	312.08	2	0.07	553.42	0	0	1	0	0
1225.83	1131.77	4	13.72	644.38	0	0	1	0	0
1225.83	1131.77	4	30.38	644.00	0	0	1	0	0
1265.83	1141.69	4	1.38	693.53	0	0	1	0	0
1295.00	1139.69	4	31.53	231.52	0	0	1	0	0
1306.67	732.83	3	3.00	111.03	0	0	0	0	1
1343.05	1176.89	4	1.45	192.67	0	0	0	1	0
1347.42	1173.27	4	4.45	192.78	0	0	0	1	0
1369.50	318.33	1	0.37	131.65	0	0	0	1	0
1372.84	1170.25	4	4.62	464.60	0	0	0	0	1
1382.01	318.33	1	0.42	131.65	0	0	1	0	0
1421.75	699.25	3	1.38	126.03	0	0	1	0	0
1427.00	691.58	3	3.45	126.03	1	0	0	0	0
1436.92	312.08	2	0.15	463.02	0	0	1	0	0
1574.42	316.45	2	0.02	359.95	0	1	0	0	0
1574.42	316.45	2	1.02	358.95	0	1	0	0	0
1574.42	316.45	2	2.02	357.95	0	1	0	0	0
1612.93	1158.30	4	27.98	207.18	1	0	0	0	0
1625.83	1133.21	4	31.53	250.90	0	0	1	0	0
1664.68	1158.30	4	27.98	207.35	1	0	0	0	0
1785.25	1178.05	4	397.00	193.25	0	0	0	1	0
1935.74	744.26	1	31.52	136.63	0	0	0	1	0
1944.24	750.61	1	31.53	136.63	0	0	0	1	0
2085.09	1193.12	4	198.90	197.82	0	1	0	0	0
2114.60	1236.55	4	173.90	213.80	0	0	0	1	0
2116.93	1224.95	4	272.00	231.03	1	0	0	0	0
2117.77	1247.03	4	206.00	213.77	0	0	0	1	0
2118.50	1224.17	4	271.00	232.03	1	0	0	0	0
2138.01	740.42	3	44.57	157.67	0	0	0	1	0
2173.32	739.68	3	40.53	158.03	0	0	0	1	0

2251.00	684.75	2	27.45	156.10	1	0	0	0	0
2288.67	684.75	2	0.45	156.15	1	0	0	0	0
2317.04	678.69	2	3.53	186.07	1	0	0	0	0
2318.94	778.62	2	207.95	156.02	0	0	0	1	0
2326.52	774.83	2	201.53	160.87	0	0	0	1	0
2447.84	702.98	1	7.03	159.65	0	0	0	0	1
2453.25	702.98	1	7.03	160.35	0	0	0	0	1
2458.42	709.33	1	7.03	160.35	0	0	0	0	1
2481.83	719.73	2	241.53	159.60	0	1	0	0	0
2488.54	1143.27	4	276.53	234.80	0	0	1	0	0
2496.35	1139.37	4	271.53	239.33	0	0	1	0	0
2497.92	1138.59	4	270.53	240.80	0	0	1	0	0
2519.92	678.06	3	0.45	342.73	1	0	0	0	0
2519.92	678.06	3	240.00	177.95	1	0	0	0	0
2519.92	678.06	3	245.00	177.18	1	0	0	0	0
2519.92	678.06	3	249.00	177.05	1	0	0	0	0
2529.26	1149.54	4	23.00	289.80	0	0	0	0	1
2530.83	1148.76	4	22.00	292.28	0	0	0	0	1
2531.79	1148.28	4	21.38	293.52	0	0	0	0	1
2533.12	1147.62	4	20.53	294.73	0	0	0	0	1
2540.33	1141.18	5	390.02	704.95	0	1	0	0	0
2549.42	1150.74	5	12.67	332.82	0	1	0	0	0
2549.42	1150.74	5	12.87	332.48	0	1	0	0	0
2557.25	1144.35	5	390.02	636.58	0	1	0	0	0
2625.49	1146.81	5	360.87	614.98	0	1	0	0	0
2625.49	1146.81	5	370.53	605.32	0	1	0	0	0
2637.75	698.31	2	244.38	180.97	0	1	0	0	0
2641.41	704.67	2	244.38	180.33	0	1	0	0	0
2659.17	1140.46	5	427.08	455.25	0	0	0	0	1
2660.81	769.56	3	212.38	180.20	0	0	1	0	0
2663.94	768.00	3	210.38	180.35	0	0	1	0	0
2665.50	767.22	3	209.38	181.35	0	0	1	0	0
2671.31	758.53	4	226.78	432.25	0	0	1	0	0
2697.59	699.85	3	259.00	181.02	0	0	0	0	1
2703.00	706.20	3	256.00	181.78	0	0	0	0	1
2703.00	706.20	3	259.00	181.02	0	0	0	0	1
2739.10	773.89	4	221.60	468.95	0	0	1	0	0
2760.42	765.49	4	209.98	472.35	0	0	1	0	0
2776.58	688.13	4	240.00	296.30	0	0	0	0	1
2797.59	688.13	4	243.00	260.50	0	0	0	0	1
2797.59	688.13	4	249.00	255.02	0	0	0	0	1
2821.75	679.99	3	0.60	412.28	0	1	0	0	0
2848.56	707.06	3	48.38	235.82	0	0	1	0	0
2991.11	675.35	3	1.13	241.03	0	0	0	0	1

2991.71	675.05	3	0.75	241.42	0	0	0	0	1
2991.84	674.98	3	0.67	241.50	0	0	0	0	1

Table C.2: Non-dominated solutions obtained for problem instance HHC_5_15_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-559.17	370.46	0	439.08	10.00	0	0	1	0	0
-497.50	488.36	0	113.03	10.00	0	0	0	1	0
-454.92	469.85	1	169.48	31.08	0	0	0	0	1
-400.83	368.29	0	429.92	15.00	0	1	0	0	0
-356.67	353.22	0	459.33	10.00	1	0	0	0	0
-317.83	391.04	0	403.63	11.37	0	0	0	1	0
-317.83	391.04	0	416.40	10.00	0	0	0	1	0
-175.67	510.78	0	167.53	10.00	0	0	1	0	0
-159.17	362.82	0	406.10	20.00	0	1	0	0	0
-31.75	840.86	0	0.03	50.00	0	1	0	0	0
68.26	837.74	0	0.03	61.10	0	1	0	0	0
107.09	463.06	1	1.00	52.20	0	1	0	0	0
115.92	981.41	1	283.00	46.03	0	0	0	1	0
131.58	981.41	1	290.00	46.08	0	0	0	0	1
265.25	450.19	1	1.98	56.03	1	0	0	0	0
327.76	440.79	1	195.58	320.58	0	0	1	0	0
330.58	440.79	1	146.58	555.32	0	1	0	0	0
377.00	440.79	1	0.58	659.28	1	0	0	0	0
377.00	440.79	1	1.58	618.20	1	0	0	0	0
407.17	963.46	1	281.12	67.62	0	1	0	0	0
415.92	978.28	1	279.00	58.08	0	0	1	0	0
415.92	978.28	1	252.00	57.25	0	0	0	0	1
465.25	440.79	1	159.00	153.67	0	0	0	0	1
543.33	966.56	1	293.12	66.03	0	1	0	0	0
560.33	890.03	0	192.03	50.00	1	0	0	0	0
635.84	343.81	0	0.12	65.00	1	0	0	0	0
637.75	815.05	1	0.53	341.53	1	0	0	0	0
696.26	343.81	0	3.12	65.00	0	0	0	1	0
696.26	343.81	0	0.12	65.00	0	0	0	1	0

707.67	346.15	0	0.28	66.32	0	0	1	0	0
737.84	814.41	1	0.68	479.20	0	0	1	0	0
737.84	814.41	1	1.65	477.88	0	0	1	0	0
759.84	354.94	0	0.53	60.00	0	0	0	0	1
781.26	340.69	0	0.68	76.17	0	0	1	0	0
784.09	812.64	1	25.00	249.83	0	0	0	0	1
820.50	961.14	1	27.48	77.25	0	0	0	0	1
827.67	963.44	1	27.48	77.48	0	0	0	0	1
854.59	822.54	1	3.00	232.02	0	0	0	0	1
865.50	362.63	0	0.37	55.00	0	0	0	0	1
896.26	352.01	0	0.28	65.00	0	1	0	0	0
967.59	796.83	1	3.33	262.45	0	0	0	1	0
967.59	796.83	1	2.40	265.28	0	0	0	1	0
1006.75	798.27	1	4.00	679.25	0	1	0	0	0
1006.75	798.27	1	5.00	677.25	0	1	0	0	0
1059.84	343.22	0	0.28	76.20	0	1	0	0	0
1077.75	948.15	1	0.75	93.03	0	0	0	1	0
1089.34	340.10	0	0.48	283.98	0	0	0	0	1
1093.42	948.15	1	13.32	93.03	0	0	0	1	0
1165.34	337.17	0	0.75	358.62	1	0	0	0	0
1195.00	347.79	0	5.10	427.52	0	0	0	1	0
1195.00	347.79	0	15.10	426.73	0	0	0	1	0
1206.17	337.17	0	19.40	348.62	1	0	0	0	0
1213.42	478.74	0	270.25	63.22	1	0	0	0	0
1225.76	337.17	0	18.12	297.02	0	0	0	0	1
1225.76	337.17	0	36.75	279.15	0	0	0	0	1
1225.76	337.17	0	196.12	159.03	0	0	0	0	1
1225.76	337.17	0	0.12	438.35	0	0	0	1	0
1243.33	946.08	1	1.00	104.62	1	0	0	0	0
1243.33	946.08	1	1.00	104.35	0	0	1	0	0
1243.33	946.08	1	1.00	104.33	0	0	1	0	0
1262.17	353.62	0	229.00	82.37	0	0	1	0	0
1265.50	347.79	0	196.10	82.65	0	0	0	0	1
1269.00	473.54	0	245.25	73.22	1	0	0	0	0
1292.09	349.28	0	229.00	92.37	0	0	1	0	0
1338.34	725.61	0	319.87	575.37	1	0	0	0	0
1338.34	725.61	0	395.87	508.50	1	0	0	0	0
1556.84	919.54	1	178.58	458.23	0	0	1	0	0
1556.84	919.54	1	221.17	358.40	0	0	1	0	0
1559.66	919.54	1	8.12	1140.05	0	1	0	0	0
1559.66	919.54	1	181.58	474.62	0	1	0	0	0
1559.66	919.54	1	183.58	470.62	0	1	0	0	0
1559.66	919.54	1	183.58	470.15	0	1	0	0	0
1560.67	1328.18	1	436.00	135.05	0	0	0	0	1

1606.08	919.54	1	0.58	722.87	1	0	0	0	0
1606.08	919.54	1	193.58	293.67	1	0	0	0	0
1606.08	919.54	1	0.58	722.68	1	0	0	0	0
1697.08	1323.55	1	150.00	139.67	0	0	0	0	1
1697.08	1323.55	1	170.00	139.63	0	0	0	0	1
1842.50	851.65	0	306.55	102.53	0	0	0	1	0
1917.17	1305.74	1	257.55	145.32	0	0	0	1	0
1917.17	1305.74	1	260.55	145.08	0	0	0	1	0
1958.17	846.01	0	296.55	113.30	0	0	0	1	0
1975.58	852.85	0	305.92	107.25	1	0	0	0	0
1978.08	1317.66	1	180.48	155.33	1	0	0	0	0
1978.92	847.02	0	27.48	107.53	0	0	0	0	1
1993.75	1317.66	1	246.00	155.47	1	0	0	0	0
2017.17	1300.10	1	260.55	155.88	0	0	0	1	0
2027.84	1301.21	1	4.12	165.87	0	1	0	0	0
2027.84	1301.21	1	4.48	165.63	0	1	0	0	0
2093.75	1314.54	1	229.00	166.70	0	0	1	0	0
2094.58	841.38	0	1.48	118.58	0	0	0	0	1
2094.58	841.38	0	276.10	118.30	0	1	0	0	0
2103.34	1290.22	1	4.68	430.02	0	0	1	0	0
2103.34	1290.22	1	5.65	411.87	0	0	1	0	0
2112.84	1298.09	1	1.00	177.43	0	0	1	0	0
2242.50	834.29	0	279.55	129.53	0	0	0	1	0
2250.58	838.42	0	295.00	129.43	0	0	1	0	0
2318.42	818.84	0	2.68	352.55	0	0	0	0	1
2318.42	818.84	0	2.35	342.55	0	0	0	0	1
2320.00	1291.13	1	188.10	172.73	0	1	0	0	0
2326.17	1280.14	1	6.12	547.35	0	1	0	0	0
2335.67	1291.13	1	188.10	172.92	0	1	0	0	0
2335.67	1291.13	1	203.10	171.78	0	1	0	0	0
2375.58	835.49	0	3.17	134.25	0	0	0	1	0
2391.25	835.49	0	0.63	134.62	1	0	0	0	0
2391.25	835.49	0	0.63	134.43	1	0	0	0	0
2391.25	835.49	0	267.00	134.33	0	0	1	0	0
2391.25	835.49	0	3.17	134.33	0	0	0	1	0
2394.58	829.66	0	3.12	134.67	0	1	0	0	0
2394.58	829.66	0	0.12	134.72	0	0	1	0	0
2394.58	829.66	0	0.48	134.62	0	0	1	0	0
2394.58	829.66	0	2.75	134.43	0	1	0	0	0
2402.59	1261.39	1	265.55	396.13	0	0	0	1	0
2407.17	1285.97	1	12.00	324.52	0	0	0	1	0
2418.25	1261.39	1	256.02	411.30	0	0	0	1	0
2418.25	1261.39	1	265.55	396.22	0	0	0	1	0
2420.75	832.36	0	0.58	496.85	1	0	0	0	0

2420.75	832.36	0	0.58	496.67	1	0	0	0	0
2421.67	1269.52	1	10.65	334.52	0	0	0	1	0
2422.83	1285.97	1	12.00	324.60	0	0	0	1	0
2424.08	826.53	0	5.10	490.82	0	0	0	1	0
2439.17	815.91	0	11.12	507.12	0	0	0	1	0
2454.84	815.91	0	11.12	507.20	0	0	0	1	0

Table C.3: Non-dominated solutions obtained for problem instance HHC_5_20_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-288.67	359.02	0	369.87	5.00	0	0	0	0	1
-281.67	357.78	0	373.97	5.00	0	1	0	0	0
-244.67	376.54	0	468.03	5.00	0	0	0	1	0
-74.33	340.84	0	416.18	20.00	0	1	0	0	0
46.25	343.19	0	435.85	25.00	0	0	1	0	0
75.67	349.59	0	302.25	10.00	0	0	0	0	1
118.67	332.09	0	415.03	35.00	0	0	1	0	0
169.42	353.18	0	315.67	15.00	0	0	0	0	1
298.84	1173.96	3	280.63	126.63	0	1	0	0	0
424.67	724.38	1	16.18	40.00	0	0	0	1	0
425.67	335.00	0	332.00	31.25	1	0	0	0	0
682.17	726.06	1	1.22	51.37	0	1	0	0	0
682.17	726.06	1	3.00	51.05	0	1	0	0	0
745.79	723.19	1	24.80	56.38	0	0	0	1	0
778.17	730.64	1	0.43	55.00	0	1	0	0	0
856.39	313.40	0	0.93	76.25	1	0	0	0	0
857.75	312.72	0	1.07	76.25	1	0	0	0	0
901.92	323.13	0	0.87	75.00	0	0	0	0	1
938.33	328.03	0	3.00	57.25	0	1	0	0	0
954.83	329.49	0	2.00	57.25	0	1	0	0	0
957.75	328.03	0	0.00	57.55	0	1	0	0	0
964.17	350.76	0	0.87	56.25	0	0	0	0	1
1017.83	325.51	0	5.00	82.27	0	0	0	1	0
1065.92	699.72	2	2.13	110.00	1	0	0	0	0
1170.00	811.82	3	220.00	148.37	0	0	1	0	0

1177.67	688.18	2	1.07	110.00	0	0	0	0	1
1270.17	307.20	0	1.00	112.55	0	0	1	0	0
1274.71	679.01	2	5.87	117.32	0	0	0	0	1
1290.58	814.07	3	1.02	164.05	0	0	1	0	0
1321.75	793.73	3	220.00	153.37	0	0	1	0	0
1370.38	690.73	2	5.87	116.07	0	0	0	0	1
1452.67	811.84	3	1.02	169.05	0	0	1	0	0
1470.17	304.86	0	5.00	118.63	0	0	1	0	0
1473.58	392.58	1	42.88	420.82	0	0	1	0	0
1517.84	796.82	3	245.00	158.37	0	0	1	0	0
1535.67	318.39	0	241.00	104.62	1	0	0	0	0
1668.27	1277.01	3	315.57	255.82	0	0	0	1	0
1676.61	1272.84	3	311.57	259.82	0	0	0	1	0
1690.18	1266.05	3	305.05	266.33	0	0	0	1	0
1731.09	400.34	1	1.00	464.03	0	0	1	0	0
1859.91	737.25	3	0.15	313.87	0	0	1	0	0
1860.42	292.06	0	0.00	153.65	1	0	0	0	0
1915.47	666.35	1	23.88	173.03	0	1	0	0	0
1953.17	663.91	2	185.00	169.12	0	0	0	0	1
1959.50	724.40	3	11.00	304.67	0	0	1	0	0
1966.42	675.12	1	21.33	153.55	0	0	0	0	1
1992.58	285.55	0	2.37	495.00	1	0	0	0	0
1992.58	285.55	0	5.37	399.70	1	0	0	0	0
2015.34	298.34	0	0.00	140.50	1	0	0	0	0
2060.42	290.24	0	0.00	160.50	1	0	0	0	0
2072.79	1113.22	3	195.30	293.02	0	0	0	0	1
2072.86	1113.19	3	195.27	293.08	0	0	0	0	1
2074.88	1112.18	3	194.30	295.02	0	0	0	0	1
2142.75	285.98	0	0.37	426.63	0	0	0	1	0
2142.75	285.98	0	1.37	419.13	0	0	0	1	0
2159.50	720.68	3	4.00	324.05	0	0	1	0	0
2196.16	644.61	2	200.52	199.33	0	0	0	1	0
2202.28	1107.29	3	13.38	308.28	0	0	0	0	1
2202.49	1107.19	3	13.28	308.48	0	0	0	0	1
2204.37	1106.25	3	12.38	310.28	0	0	0	0	1
2204.57	1106.14	3	12.28	310.48	0	0	0	0	1
2216.75	670.06	1	241.00	160.82	1	0	0	0	0
2226.08	289.85	0	4.00	394.88	0	0	0	1	0
2253.17	647.16	2	143.00	202.05	0	0	0	0	1
2253.17	647.16	2	185.00	200.87	0	0	0	0	1
2263.26	679.97	1	25.00	171.25	0	1	0	0	0
2288.84	1108.67	3	27.63	394.05	0	1	0	0	0
2288.84	1108.67	3	27.72	393.97	0	1	0	0	0
2334.50	679.77	1	54.85	154.50	0	1	0	0	0

2334.66	657.94	1	6.00	183.65	0	0	0	1	0
2342.50	674.19	1	241.00	180.82	1	0	0	0	0
2342.99	657.94	1	5.30	183.30	0	0	0	1	0
2358.50	660.30	1	243.00	180.82	1	0	0	0	0
2432.08	623.73	2	1.00	230.30	0	0	0	0	1
2474.34	1097.58	3	51.70	384.38	0	1	0	0	0
2477.17	615.62	2	6.00	250.08	0	0	0	0	1
2496.16	626.38	2	245.00	230.63	0	0	0	1	0
2496.16	626.38	2	246.00	230.53	0	0	0	1	0
2511.17	656.43	0	5.00	215.72	0	0	1	0	0
2565.91	615.62	2	1.00	250.30	0	0	0	0	1
2580.42	653.31	1	246.00	171.87	0	1	0	0	0
2607.76	1092.40	3	51.70	404.38	0	1	0	0	0
2609.25	648.06	0	5.00	230.72	0	0	1	0	0
2609.25	648.06	0	10.00	230.68	0	0	1	0	0
2630.42	666.33	1	243.00	171.25	0	1	0	0	0
2630.42	666.33	1	246.00	171.13	0	1	0	0	0
2630.42	666.33	1	255.00	170.77	0	1	0	0	0
2646.67	623.06	2	2.82	281.25	0	1	0	0	0
2649.59	621.60	2	0.82	281.40	0	1	0	0	0
2649.59	621.60	2	3.00	281.25	0	1	0	0	0
2649.59	621.60	2	7.00	281.10	0	1	0	0	0
2686.75	1070.47	3	3.00	910.92	0	0	0	1	0
2818.99	1062.95	3	6.43	883.77	0	0	0	1	0
2820.16	1062.37	3	3.00	930.92	0	0	0	1	0
2833.24	602.79	2	5.32	325.97	0	0	0	1	0
2839.08	599.87	2	1.32	326.07	0	0	0	1	0
2839.08	599.87	2	8.00	325.53	0	0	0	1	0
2937.66	751.54	2	208.00	261.63	0	0	1	0	0
2960.92	711.57	3	165.00	315.97	0	0	1	0	0
2989.17	739.07	2	5.02	469.40	0	0	1	0	0
3019.50	718.99	3	165.00	302.03	0	0	1	0	0
3033.17	739.07	2	5.02	497.58	0	0	1	0	0
3033.17	739.07	2	12.02	490.58	0	0	1	0	0
3079.08	741.78	2	208.00	281.63	0	0	1	0	0
3096.67	743.98	2	180.00	275.07	0	0	1	0	0
3123.00	709.34	3	16.27	972.55	0	0	1	0	0
3123.00	709.34	3	14.00	974.97	0	0	1	0	0
3123.00	709.34	3	15.27	966.17	0	0	1	0	0
3160.92	709.22	3	165.00	322.03	0	0	1	0	0
3303.92	1084.98	3	165.00	372.68	0	0	1	0	0
3306.50	1063.88	3	4.00	436.32	0	0	1	0	0
3306.50	1063.88	3	8.00	436.23	0	0	1	0	0
3306.50	1063.88	3	10.00	436.10	0	0	1	0	0

Table C.4: Non-dominated solutions obtained for problem instance HHC_10_20_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-710.68	2455.51	5	550.73	279.73	0	1	0	0	0
-691.93	2446.13	5	544.73	279.82	0	1	0	0	0
-513.14	793.57	2	62.33	110.00	0	0	0	1	0
-491.97	419.91	1	62.17	80.00	0	0	0	1	0
-356.83	353.62	0	419.50	10.00	0	0	0	1	0
-327.33	350.17	0	415.87	15.00	0	0	0	0	1
-301.24	392.96	1	47.83	80.00	0	0	1	0	0
-219.72	785.76	2	62.33	130.00	0	0	0	1	0
-215.00	381.25	0	421.50	10.00	0	1	0	0	0
-196.67	380.60	0	422.73	10.00	0	1	0	0	0
-186.67	344.57	0	456.33	20.00	0	0	1	0	0
-40.33	353.67	0	440.97	20.00	0	0	0	0	1
-6.83	346.33	0	438.00	31.32	0	0	0	1	0
51.53	1944.60	4	420.00	209.93	0	0	0	0	1
109.09	1910.77	4	415.00	210.12	0	0	0	0	1
558.47	1522.98	3	472.10	152.82	0	0	1	0	0
925.48	1165.01	4	155.90	219.60	0	1	0	0	0
1101.83	1423.87	2	8.12	187.38	0	0	0	0	1
1122.92	879.77	1	16.17	89.52	0	0	0	1	0
1128.75	664.77	3	244.00	241.23	1	0	0	0	0
1128.75	664.77	3	245.00	240.78	1	0	0	0	0
1180.75	656.30	3	244.00	241.72	1	0	0	0	0
1217.01	329.07	0	0.95	86.12	0	0	0	1	0
1266.34	321.56	0	1.58	86.12	0	1	0	0	0
1272.42	364.32	0	0.45	61.15	0	0	0	0	1
1273.75	356.31	0	1.60	66.88	0	0	0	0	1
1357.92	355.09	0	2.55	72.92	1	0	0	0	0
1369.97	858.01	1	1.30	99.18	0	0	0	1	0
1373.76	324.61	0	0.95	106.12	0	0	0	1	0
1401.83	1419.18	2	8.12	199.15	0	0	0	0	1

1436.75	310.06	0	3.42	106.12	0	1	0	0	0
1447.92	648.49	3	244.00	261.23	1	0	0	0	0
1447.92	648.49	3	245.00	260.78	1	0	0	0	0
1552.64	763.32	2	47.83	185.20	0	0	1	0	0
1571.01	348.15	0	0.60	77.92	1	0	0	0	0
1601.69	359.04	0	1.00	77.92	0	0	1	0	0
1603.26	358.26	0	16.00	77.92	0	0	1	0	0
1653.40	755.90	2	47.83	190.20	0	0	1	0	0
1718.00	631.66	3	199.47	290.78	1	0	0	0	0
1758.53	1136.75	3	58.43	176.68	0	1	0	0	0
1770.14	1130.94	3	51.00	190.98	0	1	0	0	0
1822.75	668.39	2	3.95	205.80	1	0	0	0	0
1945.26	726.78	0	192.60	115.58	1	0	0	0	0
1969.42	666.45	2	3.18	215.45	1	0	0	0	0
2015.16	637.43	3	5.77	296.17	1	0	0	0	0
2053.75	626.30	3	5.77	311.18	1	0	0	0	0
2091.67	1038.46	5	43.67	441.08	0	1	0	0	0
2149.39	404.22	2	103.00	379.92	0	0	1	0	0
2173.96	1038.94	5	43.17	460.98	0	1	0	0	0
2176.41	1135.00	4	103.82	319.67	0	0	1	0	0
2179.58	614.25	3	0.08	453.08	0	1	0	0	0
2179.58	614.25	3	19.17	435.62	0	1	0	0	0
2199.23	404.22	2	103.00	395.92	0	0	1	0	0
2285.16	623.37	3	5.77	326.17	1	0	0	0	0
2300.92	606.56	3	10.23	756.12	1	0	0	0	0
2354.75	614.59	3	5.77	772.58	1	0	0	0	0
2443.25	942.03	3	253.17	555.78	0	1	0	0	0
2448.16	1017.63	3	457.82	327.52	1	0	0	0	0
2485.67	716.28	0	150.00	124.07	1	0	0	0	0
2615.16	1124.80	4	103.82	339.67	0	0	1	0	0
2682.50	665.93	0	229.00	183.40	0	1	0	0	0
2753.67	661.76	0	229.00	194.62	0	1	0	0	0
2777.68	683.26	0	69.43	154.47	0	0	0	0	1
2908.60	676.78	3	31.25	951.05	0	1	0	0	0
2925.42	690.52	0	69.43	164.47	0	0	0	0	1
2955.60	677.73	3	40.67	975.05	0	1	0	0	0
2955.60	677.73	3	41.67	974.05	0	1	0	0	0
3007.09	637.09	2	192.60	256.43	1	0	0	0	0

3010.68	649.40	2	174.60	238.73	1	0	0	0	0
3080.17	698.19	1	2.15	179.58	1	0	0	0	0
3080.17	700.27	1	3.95	171.48	1	0	0	0	0
3080.17	700.27	1	4.45	171.07	1	0	0	0	0
3085.85	659.28	1	1.60	228.00	0	0	0	0	1
3155.59	647.19	0	241.60	220.67	0	0	1	0	0
3160.76	653.59	0	241.60	214.85	0	0	1	0	0
3177.01	625.37	2	192.60	286.43	1	0	0	0	0
3185.34	665.55	1	1.45	224.03	0	0	0	0	1
3250.76	1181.63	3	624.17	263.10	0	0	1	0	0
3257.17	686.26	0	253.47	159.57	0	0	0	0	1
3281.34	643.96	2	2.00	266.78	1	0	0	0	0
3294.58	1112.16	4	103.82	371.40	0	0	1	0	0
3300.84	1201.88	1	327.80	201.07	1	0	0	0	0
3337.46	1457.07	3	254.90	304.28	0	1	0	0	0
3344.34	671.85	0	69.43	194.47	0	0	0	0	1
3375.06	1395.80	5	287.90	541.48	0	1	0	0	0
3424.84	681.80	0	253.47	179.57	0	0	0	0	1
3429.88	666.57	1	32.57	237.63	0	0	1	0	0
3447.68	622.02	2	4.65	306.43	1	0	0	0	0
3496.07	1104.81	3	548.07	287.42	0	0	1	0	0
3497.63	667.49	1	31.57	246.40	0	0	1	0	0
3522.34	1350.73	2	24.00	337.78	0	0	0	0	1
3522.34	1355.20	2	7.00	337.07	0	0	0	0	1
3526.67	1358.90	2	12.38	337.07	0	0	0	0	1
3526.93	672.20	0	253.47	189.57	0	0	0	0	1
3546.76	650.13	1	2.60	259.03	0	0	0	0	1
3553.51	650.13	1	1.60	259.77	0	0	0	0	1
3559.48	1381.29	5	261.10	561.48	0	1	0	0	0
3597.32	1098.64	4	107.45	420.83	0	0	1	0	0
3609.48	1356.29	5	229.10	561.62	0	1	0	0	0
3653.51	646.22	1	6.60	270.83	0	0	0	0	1
3668.74	1091.48	3	548.07	306.40	0	0	1	0	0
3687.16	1097.12	4	172.47	391.10	0	0	1	0	0
3781.43	1317.50	5	40.77	768.33	0	1	0	0	0
3792.85	1317.50	5	40.77	768.52	0	1	0	0	0
3796.60	1317.50	5	51.77	856.48	0	1	0	0	0
3800.33	1096.04	4	108.45	396.40	0	0	1	0	0

3898.58	1096.74	4	193.43	406.10	0	0	1	0	0
3967.06	1023.45	2	62.28	398.00	0	0	1	0	0
3993.23	1023.45	2	55.28	398.25	0	0	1	0	0
4009.75	1090.61	4	172.47	417.42	0	0	1	0	0
4033.92	1183.34	2	258.17	271.17	0	0	0	1	0
4085.02	977.50	3	32.73	407.90	0	1	0	0	0
4109.50	1070.81	4	103.45	902.57	0	0	1	0	0
4111.33	1071.92	4	103.45	902.57	0	0	1	0	0
4121.68	977.50	3	32.73	407.90	0	1	0	0	0
4133.92	1178.13	2	258.17	282.23	0	0	0	1	0
4187.97	1091.99	4	103.45	922.57	0	0	1	0	0
4207.43	972.04	3	32.73	422.90	0	1	0	0	0
4222.01	790.97	1	96.00	217.30	0	0	0	1	0
4322.01	785.76	1	96.00	228.37	0	0	0	1	0
4425.17	787.49	1	95.00	231.18	0	0	0	1	0
4433.92	1165.69	2	258.17	305.25	0	0	0	1	0
4445.25	1155.42	2	29.90	645.59	0	0	0	1	0
4445.25	1155.42	2	34.90	640.59	0	0	0	1	0
4445.25	1155.42	2	41.90	633.59	0	0	0	1	0
4595.82	1207.49	3	246.58	540.17	0	0	0	1	0
4617.41	1207.49	3	250.58	546.20	0	0	0	1	0
4645.66	1207.49	3	257.58	552.69	0	0	0	1	0

Table C.5: Non-dominated solutions obtained for problem instance HHC_10_30_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-432.50	382.10	1	398.82	10.00	1	0	0	0	0
-411.25	871.71	3	0.87	60.00	0	1	0	0	0
-303.17	872.00	3	3.02	65.00	0	1	0	0	0
-212.00	355.98	0	453.80	10.00	1	0	0	0	0
-59.94	353.07	2	0.23	65.00	0	0	1	0	0
-59.58	352.89	2	0.70	65.00	1	0	0	0	0

-58.17	345.08	2	0.70	80.00	1	0	0	0	0
-15.33	374.24	1	401.17	15.00	1	0	0	0	0
40.05	365.92	2	0.02	40.00	0	0	0	1	0
41.00	373.72	2	0.15	25.00	0	1	0	0	0
70.26	365.91	2	0.77	40.00	0	1	0	0	0
78.00	371.64	1	322.98	20.00	0	1	0	0	0
178.00	369.04	1	315.70	25.00	0	1	0	0	0
190.42	359.08	2	48.02	63.78	0	0	0	0	1
306.83	1314.29	5	279.93	155.00	0	0	0	1	0
363.58	359.01	2	331.18	45.00	0	0	1	0	0
366.42	1308.79	5	279.02	165.00	0	0	0	1	0
375.33	338.22	2	303.00	96.83	0	0	0	1	0
380.08	872.92	4	47.23	90.00	0	0	0	1	0
453.67	366.43	1	336.42	30.00	0	0	0	0	1
590.58	333.86	0	0.22	70.00	0	1	0	0	0
688.42	331.77	0	0.22	75.00	0	1	0	0	0
708.33	856.92	2	2.63	80.00	0	1	0	0	0
851.50	359.27	1	324.77	46.70	0	0	0	0	1
908.33	854.83	2	2.63	86.23	0	1	0	0	0
936.25	317.51	2	0.43	288.08	0	1	0	0	0
936.25	317.51	2	10.43	282.65	0	1	0	0	0
963.92	330.89	0	1.15	95.00	0	0	0	0	1
1008.01	342.60	0	0.15	80.00	0	0	0	0	1
1033.12	913.21	4	292.28	103.95	0	0	0	0	1
1037.29	911.13	4	290.28	105.90	0	0	0	0	1
1063.25	1185.06	4	2.32	606.72	0	0	0	1	0
1096.84	865.38	3	21.77	90.00	0	0	0	1	0
1138.50	969.24	2	4.82	115.02	0	0	1	0	0
1185.58	819.70	3	8.12	135.00	0	0	0	1	0
1267.21	297.55	2	2.00	458.43	0	0	1	0	0
1270.34	295.99	2	3.00	469.53	0	0	1	0	0
1343.59	339.95	2	32.90	655.40	0	0	0	0	1
1389.25	333.65	1	1.08	101.32	0	0	0	1	0
1413.25	1172.04	4	2.32	628.02	0	0	0	1	0
1498.00	1659.93	4	8.32	240.20	0	0	0	1	0
1498.28	1220.31	5	280.10	144.03	1	0	0	0	0
1552.08	808.01	3	20.53	199.05	0	1	0	0	0
1571.67	852.88	3	21.00	107.47	0	0	1	0	0

1613.42	328.50	0	0.00	123.13	1	0	0	0	0
1613.42	328.50	0	2.00	122.83	1	0	0	0	0
1626.65	1097.35	3	32.37	131.15	1	0	0	0	0
1634.46	1093.44	3	32.37	131.23	1	0	0	0	0
1635.24	1093.05	3	32.87	131.23	1	0	0	0	0
1656.42	817.13	3	33.15	174.05	0	1	0	0	0
1817.70	1192.01	5	292.10	164.03	1	0	0	0	0
1863.42	325.89	0	4.00	139.82	1	0	0	0	0
1878.34	437.97	1	175.00	147.53	0	1	0	0	0
1879.25	327.13	1	242.28	257.43	0	0	0	1	0
1939.84	449.69	1	175.00	132.53	0	1	0	0	0
1963.61	1203.76	5	280.10	159.03	1	0	0	0	0
1987.08	464.79	2	10.00	139.87	0	0	0	0	1
1989.17	463.75	2	9.00	140.58	0	0	0	0	1
2113.42	814.25	2	224.05	170.67	0	1	0	0	0
2131.33	813.82	2	200.00	170.88	0	1	0	0	0
2140.33	448.54	1	21.37	139.60	0	1	0	0	0
2173.84	804.66	2	248.00	186.67	0	1	0	0	0
2178.33	314.11	1	241.88	374.97	0	0	0	1	0
2189.08	1329.99	5	8.47	177.07	0	0	1	0	0
2238.96	869.02	4	33.50	180.58	0	0	0	0	1
2241.05	867.98	4	32.50	181.58	0	0	0	0	1
2247.65	483.37	1	47.17	153.88	0	1	0	0	0
2256.17	802.33	3	4.53	535.65	0	1	0	0	0
2259.17	799.18	4	33.30	790.40	0	0	0	0	1
2350.50	801.79	4	61.88	778.38	0	0	0	0	1
2356.42	794.73	3	9.53	221.18	0	1	0	0	0
2383.01	315.73	1	17.22	442.33	0	0	0	1	0
2409.92	302.27	1	0.45	444.55	0	0	0	1	0
2414.95	858.14	3	400.93	200.58	0	0	0	0	1
2484.42	420.43	1	0.83	175.67	0	1	0	0	0
2485.79	851.89	3	373.50	232.02	0	0	0	0	1
2526.84	1062.14	5	3.50	388.42	1	0	0	0	0
2540.33	430.31	1	21.37	176.10	0	1	0	0	0
2597.42	777.71	3	245.70	251.10	0	1	0	0	0
2649.42	1249.19	3	20.32	285.73	0	0	0	1	0
2651.92	1169.95	4	1.97	1248.58	0	0	0	1	0
2705.67	423.35	2	0.53	196.10	0	1	0	0	0

2729.09	1238.77	3	4.32	318.27	0	0	0	1	0
2781.50	798.45	2	240.58	199.48	0	0	0	1	0
2792.67	411.63	2	0.53	211.10	0	1	0	0	0
2803.75	1066.74	5	3.50	404.43	1	0	0	0	0
2876.84	1053.35	5	3.50	419.55	1	0	0	0	0
2889.67	805.87	1	1.32	181.70	0	0	0	1	0
2889.67	805.87	1	3.32	181.30	0	0	0	1	0
2906.83	771.50	3	5.00	318.52	0	0	0	0	1
2986.00	791.37	4	33.30	1369.53	0	0	0	0	1
3031.25	737.23	3	9.97	511.28	0	0	0	1	0
3031.25	737.23	3	13.23	508.52	0	0	0	1	0
3031.50	792.20	2	240.58	215.72	0	0	0	1	0
3035.59	1185.92	6	258.48	633.07	0	0	1	0	0
3087.29	848.79	4	141.50	255.98	0	0	0	0	1
3097.67	791.37	4	39.30	1180.95	0	0	0	0	1
3103.96	840.45	4	133.50	261.70	0	0	0	0	1
3217.02	843.43	3	35.50	260.85	0	0	0	0	1
3218.71	842.59	3	35.50	261.10	0	0	0	0	1
3285.59	1192.10	6	198.48	653.07	0	0	1	0	0
3312.62	824.80	3	39.40	299.40	0	0	0	0	1
3382.37	818.51	4	126.50	296.70	0	0	0	0	1
3449.70	818.55	4	108.40	328.40	0	0	0	0	1
3462.05	812.38	4	32.50	339.23	0	0	0	0	1
3479.10	803.85	4	32.50	339.40	0	0	0	0	1
3507.25	1257.47	5	145.82	292.07	0	0	1	0	0
3535.34	1244.08	5	158.82	306.93	0	0	1	0	0
3676.17	1156.58	6	182.82	734.55	0	0	1	0	0
3706.25	1161.01	3	259.27	262.20	1	0	0	0	0
3831.96	1555.52	4	146.83	252.87	1	0	0	0	0
3834.17	1251.74	4	8.02	318.45	0	0	1	0	0
3837.25	1249.02	2	303.58	288.83	0	0	1	0	0
3852.67	1233.14	5	4.02	353.18	0	0	1	0	0
3862.25	1238.35	4	8.02	333.17	0	0	1	0	0
3932.60	1161.09	6	2.65	1203.52	0	0	1	0	0
3932.60	1161.09	6	3.63	1200.52	0	0	1	0	0
3933.92	1160.43	6	7.37	1205.53	0	0	1	0	0
3935.34	1233.14	5	4.02	353.45	0	0	1	0	0
3935.34	1233.14	5	8.02	343.32	0	0	1	0	0

3957.25	1156.09	2	321.73	282.20	1	0	0	0	0
3990.91	1148.56	3	247.27	292.87	1	0	0	0	0
4312.83	1043.92	3	2.17	439.60	1	0	0	0	0
4334.58	1040.95	3	5.40	436.60	1	0	0	0	0
4334.58	1040.95	3	14.40	436.57	1	0	0	0	0
4755.59	1451.04	6	35.83	460.98	1	0	0	0	0
4780.85	1436.20	6	35.83	461.00	1	0	0	0	0
4785.27	1436.20	6	37.00	460.33	1	0	0	0	0
5092.40	1411.66	6	324.17	493.72	1	0	0	0	0
5165.49	1398.26	6	293.10	505.45	1	0	0	0	0
5265.49	1377.43	6	282.17	562.30	1	0	0	0	0

Table C.6: Non-dominated solutions obtained for problem instance HHC_10_40_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-365.33	388.13	0	455.97	5.00	0	0	0	0	1
7.00	354.35	1	356.88	10.00	0	0	1	0	0
12.17	378.61	1	453.72	15.00	1	0	0	0	0
246.25	359.24	1	365.38	35.00	0	0	1	0	0
277.83	366.58	1	373.73	35.00	0	0	0	0	1
387.09	375.04	2	415.75	30.00	1	0	0	0	0
435.84	368.72	1	366.85	35.00	0	0	0	0	1
439.83	361.68	3	0.30	40.00	0	0	1	0	0
455.67	364.31	3	0.52	40.00	0	0	0	0	1
501.67	357.12	2	354.92	45.00	1	0	0	0	0
581.51	360.38	3	1.73	45.00	0	0	0	0	1
729.26	831.74	5	0.97	81.13	0	0	1	0	0
782.33	349.71	2	332.78	60.00	0	0	0	1	0
811.33	336.81	0	0.98	70.00	1	0	0	0	0
848.75	351.22	2	287.42	55.00	0	0	1	0	0
913.09	734.86	5	0.78	86.10	0	1	0	0	0
927.09	352.56	4	104.13	55.00	0	0	0	0	1

939.75	355.51	4	0.65	55.00	0	0	0	1	0
993.90	725.50	5	1.27	86.03	0	1	0	0	0
1001.33	1071.57	6	20.65	117.92	0	0	0	1	0
1001.33	1071.57	6	258.93	116.23	0	0	0	1	0
1007.99	328.44	0	0.53	85.00	0	0	0	0	1
1066.68	327.07	0	0.47	90.00	0	0	0	0	1
1067.41	326.70	0	0.53	90.00	0	0	0	0	1
1109.64	337.04	1	0.02	70.00	1	0	0	0	0
1109.67	337.03	1	0.85	70.00	1	0	0	0	0
1124.17	690.08	5	37.02	96.03	0	0	0	1	0
1132.67	738.04	5	113.03	91.03	1	0	0	0	0
1142.25	690.19	5	43.45	96.03	0	0	0	1	0
1172.76	1062.82	6	5.65	146.03	0	0	0	1	0
1201.42	816.44	5	276.13	91.52	0	0	0	0	1
1220.23	353.16	4	4.07	70.00	0	1	0	0	0
1251.33	334.86	4	1.62	75.00	0	0	0	1	0
1371.08	825.20	2	11.40	80.00	0	0	0	0	1
1376.98	426.22	0	0.05	81.07	0	0	1	0	0
1398.79	326.02	2	0.08	408.53	0	0	0	0	1
1410.75	814.62	5	59.00	96.55	0	0	0	0	1
1438.50	740.70	5	269.63	95.00	1	0	0	0	0
1447.09	384.26	2	0.08	388.20	0	0	1	0	0
1502.59	340.20	3	253.52	80.00	0	0	0	1	0
1505.25	307.69	0	0.53	156.18	0	1	0	0	0
1511.55	304.24	3	0.98	444.42	0	0	0	1	0
1519.50	327.38	1	0.07	100.00	0	0	0	1	0
1547.17	791.33	5	284.85	96.80	0	0	1	0	0
1547.17	791.33	5	284.42	97.23	0	0	1	0	0
1593.07	411.38	0	0.05	101.07	0	0	1	0	0
1607.91	703.50	5	244.62	121.28	0	1	0	0	0
1629.09	331.76	3	242.67	95.00	0	0	0	1	0
1651.93	302.39	3	0.42	486.55	0	1	0	0	0
1677.58	321.84	3	264.63	95.00	0	1	0	0	0
1678.33	710.29	5	242.42	126.28	0	1	0	0	0
1697.62	345.72	4	5.15	90.00	1	0	0	0	0
1711.55	302.51	3	0.98	451.38	0	0	0	1	0
1723.18	301.74	3	1.02	433.60	0	0	0	1	0
1724.42	319.01	1	0.07	125.00	0	0	0	1	0

1737.00	314.12	3	254.63	105.37	0	1	0	0	0
1740.25	730.94	5	196.45	110.00	1	0	0	0	0
1751.17	818.78	3	13.22	90.00	0	0	0	0	1
1856.42	697.92	5	220.62	131.28	0	1	0	0	0
1904.33	733.64	5	222.43	105.00	1	0	0	0	0
1935.93	328.44	4	2.77	105.00	1	0	0	0	0
1966.84	352.21	4	25.97	105.00	1	0	0	0	0
1967.76	708.44	4	12.52	125.88	0	0	0	1	0
2014.42	704.10	4	0.88	130.00	0	0	0	1	0
2058.17	670.31	4	273.98	170.00	1	0	0	0	0
2079.42	714.15	6	23.58	131.03	1	0	0	0	0
2080.67	682.97	5	6.62	231.60	0	0	0	0	1
2093.65	719.34	6	25.15	165.73	1	0	0	0	0
2135.09	305.49	3	0.50	166.02	0	0	0	0	1
2150.75	683.19	5	1.13	221.60	0	0	0	0	1
2150.92	684.92	5	6.62	216.60	0	0	0	0	1
2169.92	303.76	3	18.37	359.55	0	0	0	0	1
2201.35	430.45	3	0.28	91.13	0	0	1	0	0
2201.92	430.17	3	0.52	91.13	0	0	1	0	0
2201.92	430.17	3	0.73	91.10	0	0	1	0	0
2240.24	699.97	6	26.57	136.03	1	0	0	0	0
2409.02	1039.99	6	11.30	281.10	0	1	0	0	0
2414.18	1043.56	6	4.30	272.38	0	1	0	0	0
2578.59	662.96	5	139.23	221.28	1	0	0	0	0
2603.50	664.08	5	175.83	196.28	1	0	0	0	0
2695.66	677.22	3	2.97	200.00	1	0	0	0	0
2727.17	667.44	4	15.82	200.00	1	0	0	0	0
2799.96	670.82	6	28.13	186.03	1	0	0	0	0
2801.52	670.03	6	28.13	186.63	1	0	0	0	0
2841.17	661.15	5	167.23	201.28	1	0	0	0	0
2843.37	679.28	6	28.13	171.03	1	0	0	0	0
2844.94	678.50	6	28.13	171.63	1	0	0	0	0
2917.01	658.22	5	167.23	211.28	1	0	0	0	0
3022.34	638.87	5	10.52	275.00	0	1	0	0	0
3044.42	661.58	4	15.82	220.00	1	0	0	0	0
3161.83	760.63	3	188.93	171.35	0	0	1	0	0
3188.26	634.44	5	3.52	281.70	0	1	0	0	0
3231.59	635.75	5	3.52	286.70	0	1	0	0	0

3257.42	657.56	4	242.67	215.00	0	0	0	1	0
3302.25	752.26	3	188.93	186.35	0	0	1	0	0
3331.42	998.92	5	5.47	899.48	0	0	0	1	0
3334.76	744.99	3	166.27	191.27	0	0	0	0	1
3357.42	656.00	4	242.67	226.27	0	0	0	1	0
3394.92	644.54	4	242.67	230.00	0	0	0	1	0
3407.76	968.86	5	12.47	890.05	0	0	0	1	0
3435.01	619.96	4	15.52	353.20	0	0	0	1	0
3447.67	625.98	4	9.80	311.55	0	0	0	1	0
3461.83	745.98	3	188.93	202.43	0	0	1	0	0
3476.25	745.21	3	243.25	196.22	0	0	0	0	1
3480.18	743.25	3	241.27	196.27	0	0	0	0	1
3533.50	973.48	5	12.47	900.05	0	0	0	1	0
3616.76	650.52	4	169.27	280.00	0	1	0	0	0
3634.84	649.45	4	170.63	280.63	0	1	0	0	0
3696.68	970.49	6	165.18	356.88	0	0	0	1	0
3734.03	738.67	5	17.03	486.35	0	0	0	0	1
3740.68	971.82	6	164.18	367.15	0	0	0	1	0
3743.92	733.72	5	17.03	505.80	0	0	0	0	1
3755.83	727.76	5	19.02	497.42	0	0	0	0	1
3766.17	730.67	5	173.13	227.83	0	0	0	0	1
3773.18	973.62	6	165.18	353.15	0	0	0	1	0
3779.51	642.05	4	169.27	296.18	0	1	0	0	0
3812.83	714.10	5	169.37	242.83	0	0	0	0	1
3817.25	711.89	5	177.13	245.32	0	0	0	0	1
3849.00	620.71	4	3.67	337.70	0	1	0	0	0
3939.67	631.15	4	16.63	313.32	0	1	0	0	0
3944.08	719.29	3	5.85	257.53	0	0	1	0	0
3962.92	632.65	4	5.53	312.70	0	1	0	0	0
3988.58	988.80	6	0.63	1114.90	0	1	0	0	0
4060.67	707.69	3	2.48	267.37	0	0	0	0	1
4088.58	980.98	6	0.63	1134.90	0	1	0	0	0
4093.16	707.13	3	1.98	272.37	0	0	0	0	1
4095.50	705.96	3	2.48	272.37	0	0	0	0	1
4120.67	619.43	5	164.63	332.95	0	1	0	0	0
4143.92	620.93	5	164.63	332.33	0	1	0	0	0
4196.92	964.59	6	20.78	1109.80	0	1	0	0	0
4403.87	981.07	6	7.75	398.75	0	1	0	0	0

4421.29	984.86	6	6.83	377.23	0	1	0	0	0
4521.29	983.30	6	7.75	388.75	0	1	0	0	0

Table C.7: Non-dominated solutions obtained for problem instance HHC_15_30_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-505.33	386.74	0	446.97	10.00	1	0	0	0	0
-248.17	342.57	0	450.18	20.00	0	0	0	1	0
-181.08	1042.46	4	8.42	146.82	0	0	1	0	0
-181.08	1042.46	4	9.42	146.38	0	0	1	0	0
-176.83	348.31	0	452.32	15.00	0	0	1	0	0
-172.83	337.08	0	390.75	30.00	1	0	0	0	0
-164.00	1009.73	4	2.73	166.38	0	1	0	0	0
-44.67	456.66	1	338.00	51.02	0	0	0	0	1
77.00	1009.51	4	3.75	156.62	0	1	0	0	0
221.17	351.59	1	280.00	51.15	0	0	0	0	1
221.17	351.59	1	308.00	51.08	0	1	0	0	0
221.17	351.59	1	85.00	51.23	0	0	0	1	0
228.34	338.57	1	282.00	71.10	0	0	0	1	0
228.34	338.57	1	321.00	71.08	0	0	0	1	0
271.92	319.82	1	0.38	448.70	0	0	1	0	0
301.67	446.76	1	338.00	61.02	0	0	0	0	1
323.75	1459.99	5	327.93	204.75	0	1	0	0	0
323.75	1459.99	5	351.93	202.95	0	1	0	0	0
338.83	658.41	3	1.18	111.08	0	0	0	1	0
338.83	658.41	3	19.18	111.02	0	0	0	1	0
494.83	990.60	4	354.60	172.02	0	0	0	1	0
499.26	327.14	1	301.32	81.08	0	1	0	0	0
535.83	821.76	2	7.00	101.02	0	0	0	0	1
635.83	266.51	1	0.35	530.83	1	0	0	0	0
669.58	279.53	1	0.35	498.93	1	0	0	0	0
671.92	824.62	2	12.00	106.02	0	0	0	0	1

723.92	281.90	1	5.55	500.08	1	0	0	0	0
780.25	1020.67	4	243.32	167.82	0	0	1	0	0
780.25	1020.67	4	244.32	166.47	0	0	1	0	0
780.25	1020.67	4	245.32	166.38	0	0	1	0	0
883.42	1071.59	2	2.82	116.08	0	0	1	0	0
895.17	338.83	0	0.32	90.00	0	0	0	0	1
924.17	1071.71	2	1.82	116.08	0	0	1	0	0
933.92	313.98	0	2.25	75.00	0	0	1	0	0
933.92	313.98	0	6.25	65.00	0	0	1	0	0
938.09	301.82	0	6.25	85.00	0	0	1	0	0
941.17	339.88	0	7.78	86.17	0	0	0	0	1
981.83	613.10	4	27.08	173.22	0	0	0	1	0
1012.42	814.72	2	3.28	116.02	0	0	0	0	1
1090.75	270.29	0	5.18	142.20	1	0	0	0	0
1152.50	282.32	0	0.48	144.05	1	0	0	0	0
1154.42	839.19	2	0.08	131.62	1	0	0	0	0
1187.59	292.10	0	0.25	96.03	0	0	0	1	0
1204.92	292.10	0	1.47	96.03	0	0	0	1	0
1217.33	292.10	0	8.25	96.02	0	0	0	1	0
1328.33	687.81	2	1.87	116.10	0	0	0	1	0
1335.25	691.06	2	4.50	116.23	0	0	0	1	0
1335.25	691.06	2	4.50	116.08	0	0	0	1	0
1362.00	1800.73	5	13.37	279.58	0	1	0	0	0
1362.00	1800.73	5	15.37	277.95	0	1	0	0	0
1501.59	296.10	1	0.40	136.23	0	1	0	0	0
1501.59	296.10	1	5.17	136.08	0	1	0	0	0
1518.17	642.97	3	0.77	146.08	0	1	0	0	0
1519.84	601.76	3	186.47	183.22	0	0	0	1	0
1728.00	639.46	3	0.18	163.03	0	1	0	0	0
1738.84	615.15	3	189.47	178.22	0	0	0	1	0
2035.67	568.71	4	1.18	254.28	0	0	1	0	0
2048.83	570.87	4	1.18	258.05	0	0	1	0	0
2125.83	571.21	4	4.00	245.22	0	0	0	1	0
2144.84	561.42	4	10.18	264.18	0	0	1	0	0
2148.08	576.68	4	4.00	249.90	0	0	0	1	0
2184.92	561.49	4	4.00	285.22	0	0	0	1	0
2222.76	1138.12	2	295.00	257.10	1	0	0	0	0
2316.00	597.54	1	171.37	338.10	0	1	0	0	0

2322.76	1135.21	2	244.00	267.80	1	0	0	0	0
2337.17	603.01	1	159.37	309.95	0	1	0	0	0
2358.34	574.79	1	270.28	273.13	1	0	0	0	0
2398.59	556.04	1	176.77	313.13	1	0	0	0	0
2416.00	593.63	1	9.37	355.03	0	1	0	0	0
2416.00	593.63	1	10.37	354.03	0	1	0	0	0
2416.00	593.63	1	11.37	353.05	0	1	0	0	0
2416.00	593.63	1	159.37	350.10	0	1	0	0	0
2420.41	1074.12	2	242.00	280.67	0	0	0	0	1
2422.76	1132.29	2	273.00	279.10	1	0	0	0	0
2428.75	543.75	1	186.55	471.72	1	0	0	0	0
2434.42	1069.07	1	12.03	297.45	0	0	0	0	1
2434.42	1069.07	1	14.03	295.45	0	0	0	0	1
2434.42	1069.07	1	17.03	294.48	0	0	0	0	1
2573.16	1066.30	2	242.00	298.67	0	0	0	0	1
2631.67	988.33	2	300.00	268.77	0	0	1	0	0
2715.08	958.44	2	3.18	322.38	0	0	0	1	0
2782.67	962.80	2	247.03	288.47	0	0	1	0	0
2814.27	979.29	2	31.65	319.05	0	0	0	1	0
2882.67	963.58	2	243.48	298.47	0	0	1	0	0
2895.52	984.75	2	44.65	331.05	0	0	0	1	0
2940.34	957.76	3	168.47	300.20	0	1	0	0	0
3027.27	1300.00	5	44.85	403.03	0	0	1	0	0
3040.34	953.86	3	195.37	312.20	0	1	0	0	0
3091.02	1291.41	5	44.23	414.08	0	0	1	0	0
3099.75	945.26	3	181.37	320.77	0	1	0	0	0
3105.35	1009.25	2	2.47	440.73	1	0	0	0	0
3107.77	1276.22	5	279.72	449.87	0	0	1	0	0
3122.09	1040.03	2	2.47	461.20	1	0	0	0	0
3146.68	1036.91	2	1.47	476.82	1	0	0	0	0
3191.02	1292.19	5	44.85	423.03	0	0	1	0	0
3207.77	1277.01	5	276.17	459.87	0	0	1	0	0
3245.52	1272.74	5	276.17	460.20	0	0	1	0	0
3249.17	898.74	4	17.17	371.12	0	0	0	1	0
3261.51	888.15	4	28.53	411.70	0	0	0	1	0
3262.42	911.77	4	4.00	371.62	0	0	0	1	0
3302.00	937.68	3	7.40	349.85	0	0	1	0	0
3302.00	937.68	3	11.18	349.83	0	0	1	0	0

3303.42	928.69	3	17.17	349.73	0	0	1	0	0
3348.35	919.58	4	13.00	381.62	0	0	0	1	0
3362.42	912.55	4	261.00	418.90	0	0	0	1	0
3397.34	864.45	4	8.17	858.10	0	0	1	0	0
3415.67	907.78	4	272.00	419.43	0	0	0	1	0
3443.67	899.52	4	8.17	778.10	0	0	1	0	0
3449.17	895.61	4	11.17	647.75	0	0	0	1	0
3449.17	895.61	4	18.17	636.92	0	0	0	1	0
3459.58	907.78	4	279.00	422.43	0	0	0	1	0
3459.58	907.78	4	280.00	421.43	0	0	0	1	0
3485.85	914.46	4	49.53	443.43	0	0	0	1	0
3498.17	880.07	4	8.17	818.10	0	0	1	0	0

Table C.8: Non-dominated solutions obtained for problem instance HHC_15_45_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-443.59	1121.41	3	2.18	50.00	0	0	0	0	1
-363.51	1113.75	3	2.18	65.00	0	0	0	0	1
-263.51	886.67	3	11.05	50.00	0	0	1	0	0
-42.51	356.05	1	2.18	55.00	0	0	0	0	1
-37.01	1183.57	4	47.50	121.67	0	1	0	0	0
-8.67	381.05	1	7.18	15.00	0	0	0	0	1
65.92	1201.37	4	39.35	132.35	0	0	0	1	0
71.41	882.50	3	0.85	70.00	0	0	1	0	0
167.33	1171.85	4	35.50	148.67	0	1	0	0	0
196.92	1165.72	4	29.15	187.53	0	0	0	1	0
223.50	377.24	2	0.22	35.00	0	0	0	1	0
232.08	367.86	2	0.07	35.07	0	0	1	0	0
232.08	367.86	2	0.93	35.00	0	1	0	0	0
267.67	362.25	1	354.00	35.00	0	0	0	1	0
306.42	362.13	2	0.03	45.00	0	0	0	1	0
318.50	341.46	1	365.30	40.00	0	0	1	0	0

355.92	332.34	1	387.58	56.38	0	0	0	0	1
437.99	1568.24	4	413.73	171.47	0	0	0	0	1
523.58	344.17	1	333.80	40.00	0	0	1	0	0
585.08	358.35	1	329.38	40.00	0	0	0	1	0
642.67	1572.77	4	385.57	167.52	0	0	0	0	1
708.67	349.17	1	374.10	55.90	0	0	0	0	1
829.58	701.45	3	4.93	110.00	1	0	0	0	0
1053.58	696.59	3	4.93	120.00	1	0	0	0	0
1078.91	1188.32	4	240.00	175.50	0	0	0	1	0
1216.74	1101.74	3	243.38	96.05	0	0	1	0	0
1308.50	1183.91	4	245.53	197.12	0	0	0	1	0
1325.67	1168.60	4	262.92	173.47	0	1	0	0	0
1374.00	358.36	0	0.22	66.05	0	0	1	0	0
1386.09	1093.66	3	254.32	101.05	0	0	1	0	0
1439.50	1148.26	4	245.53	232.12	0	0	0	1	0
1445.42	349.64	0	1.00	72.12	0	0	1	0	0
1460.58	1153.74	4	262.92	183.47	0	1	0	0	0
1504.42	1158.77	4	262.92	183.47	0	1	0	0	0
1553.66	1160.60	4	271.15	216.87	1	0	0	0	0
1569.41	1166.85	4	259.15	206.87	1	0	0	0	0
1663.83	741.70	2	3.93	96.05	0	0	1	0	0
1685.75	304.76	0	0.82	131.22	1	0	0	0	0
1729.33	338.76	2	0.60	324.72	0	0	1	0	0
1730.92	322.51	0	0.00	122.22	0	0	0	0	1
1749.27	302.90	0	1.00	175.00	0	0	0	0	1
1774.58	730.16	2	8.37	101.33	0	0	1	0	0
1790.93	312.90	0	1.00	136.10	1	0	0	0	0
1818.33	338.76	2	31.33	392.72	0	0	1	0	0
1823.42	849.57	2	1.25	121.80	0	1	0	0	0
1868.08	336.42	2	257.88	135.00	1	0	0	0	0
1873.42	847.34	2	1.25	126.80	0	1	0	0	0
1894.16	345.54	2	257.88	120.00	1	0	0	0	0
2078.41	1031.46	3	2.15	340.72	0	0	1	0	0
2094.00	709.53	2	9.43	126.08	0	0	0	0	1
2097.60	719.20	2	2.22	136.10	1	0	0	0	0
2130.08	717.38	2	8.00	141.10	1	0	0	0	0
2149.83	1159.33	4	59.53	222.47	0	0	0	1	0
2196.59	322.88	2	0.40	623.40	0	1	0	0	0

2196.59	322.88	2	1.40	615.23	0	1	0	0	0
2222.26	1111.89	4	3.50	622.18	0	1	0	0	0
2226.33	316.19	1	2.33	148.30	0	0	0	1	0
2237.92	1100.11	4	3.50	676.27	0	1	0	0	0
2247.33	705.44	2	10.17	131.55	0	0	0	0	1
2252.67	1105.94	4	3.50	627.18	0	1	0	0	0
2252.74	1052.62	3	2.15	325.72	0	0	1	0	0
2272.99	1137.04	4	8.37	534.17	0	0	0	1	0
2280.83	1123.68	4	9.33	273.47	0	0	0	1	0
2280.83	1123.68	4	27.33	255.47	0	0	0	1	0
2295.99	1124.38	4	9.33	496.68	0	0	0	1	0
2499.08	338.07	1	3.33	128.15	0	0	0	1	0
2531.59	324.35	1	0.50	144.38	0	1	0	0	0
2531.59	324.35	1	12.50	144.10	0	1	0	0	0
2578.91	1119.52	4	9.33	511.62	0	0	0	1	0
2636.57	651.85	3	9.33	203.25	0	0	0	1	0
2681.66	654.28	3	9.33	183.25	0	0	0	1	0
2754.17	689.57	2	445.22	151.10	0	0	1	0	0
3150.11	1456.46	3	34.68	261.38	0	0	0	0	1
3152.00	332.31	1	151.80	147.32	0	0	1	0	0
3173.67	320.10	1	2.33	292.03	0	0	1	0	0
3316.59	699.38	2	168.80	182.32	0	0	1	0	0
3402.00	322.05	1	151.80	163.68	0	0	1	0	0
3407.92	669.71	2	175.52	188.68	0	0	1	0	0
3433.34	324.27	1	1.22	179.92	0	0	1	0	0
3433.88	646.72	0	78.82	282.77	1	0	0	0	0
3434.67	655.20	2	296.22	227.47	0	0	1	0	0
3478.93	670.34	1	147.83	236.40	0	0	0	1	0
3517.75	614.49	0	244.88	314.47	1	0	0	0	0
3557.67	655.00	2	391.53	213.68	0	0	1	0	0
3576.09	659.56	2	12.93	264.38	0	1	0	0	0
3636.16	1464.10	4	267.00	456.92	0	0	1	0	0
3750.16	999.65	3	4.93	648.70	1	0	0	0	0
3810.50	652.52	2	194.33	262.32	0	0	1	0	0
3839.92	1426.37	4	5.60	1894.53	1	0	0	0	0
3851.67	1457.89	4	267.00	462.63	0	0	1	0	0
3852.00	990.44	3	14.05	332.73	1	0	0	0	0
3855.67	1437.42	4	8.32	519.68	0	1	0	0	0

3855.67	1437.42	4	12.50	519.40	0	1	0	0	0
3920.61	1441.86	3	31.68	297.23	0	0	0	0	1
3924.33	1453.98	4	267.00	477.63	0	0	1	0	0
3924.76	660.90	2	183.40	239.62	0	0	0	1	0
3925.57	1081.39	4	11.97	1377.27	0	1	0	0	0
3927.91	1080.22	4	10.47	1398.52	0	1	0	0	0
3927.91	1080.22	4	14.40	1386.10	0	1	0	0	0
3935.66	986.63	3	4.93	668.70	1	0	0	0	0
3965.66	986.91	3	35.32	337.73	1	0	0	0	0
4008.84	648.51	2	8.05	282.32	0	0	1	0	0
4012.00	648.51	2	1.00	297.32	0	0	1	0	0
4104.26	651.14	2	194.40	260.47	0	0	0	1	0
4105.26	1072.06	3	24.80	697.72	0	0	0	1	0
4119.69	1435.48	3	34.68	303.35	0	0	0	0	1
4120.61	1438.95	3	31.87	303.35	0	0	0	0	1
4141.09	652.23	2	0.87	270.68	0	0	0	1	0
4141.09	652.23	2	1.82	269.77	0	0	0	1	0
4151.51	1085.95	3	24.80	657.72	0	0	0	1	0
4154.59	652.23	2	183.40	269.62	0	0	0	1	0
4164.75	632.88	2	9.23	302.32	0	0	1	0	0
4210.91	1409.10	4	248.52	1018.28	1	0	0	0	0
4249.84	642.47	2	1.87	291.18	0	0	0	1	0
4300.67	1401.43	4	254.33	869.28	0	1	0	0	0
4354.45	1053.87	2	282.00	269.77	0	0	0	0	1
4381.43	1446.89	4	8.63	632.93	1	0	0	0	0
4381.88	1066.05	3	35.02	635.27	0	0	0	1	0
4423.62	1049.97	2	277.32	284.90	0	0	0	0	1
4433.01	1088.90	3	72.57	1682.12	0	0	0	1	0
4437.18	1050.01	3	72.57	1762.12	0	0	0	1	0
4474.51	1063.90	3	72.57	1722.12	0	0	0	1	0
4498.87	1039.76	2	277.32	300.37	0	0	0	0	1
4533.42	1402.40	4	254.33	839.28	0	1	0	0	0
4533.67	1407.77	4	254.33	839.28	0	1	0	0	0
4673.99	1036.80	1	35.20	315.98	0	0	0	0	1
4699.47	1037.06	1	35.02	316.37	0	0	0	0	1
4699.99	1036.80	1	35.20	316.37	0	0	0	0	1

Table C.9: Non-dominated solutions obtained for problem instance HHC_15_60_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-245.08	1172.89	5	0.83	135.00	1	0	0	0	0
-224.42	1899.78	6	387.97	216.00	0	0	0	0	1
-187.09	1069.13	5	12.97	135.00	0	1	0	0	0
-162.59	1070.17	5	15.03	135.00	0	1	0	0	0
-162.00	1911.74	6	387.97	221.18	0	0	0	0	1
-133.33	337.85	0	436.67	30.00	0	0	1	0	0
-119.50	336.84	0	438.05	30.00	0	0	1	0	0
-67.25	1168.55	5	0.83	140.00	1	0	0	0	0
-44.08	1013.62	5	7.60	155.00	0	0	0	0	1
-32.17	346.51	1	354.05	20.00	0	0	0	1	0
10.92	1021.84	5	7.60	150.00	0	0	0	0	1
126.00	437.15	3	0.02	110.00	1	0	0	0	0
141.17	347.83	1	414.97	30.00	0	0	0	1	0
164.75	353.30	1	423.02	25.00	0	1	0	0	0
185.34	337.62	3	2.10	70.00	0	1	0	0	0
217.00	337.62	3	3.10	70.00	0	1	0	0	0
217.34	333.65	3	0.60	85.00	0	0	0	0	1
546.04	1181.56	5	41.18	215.00	0	0	1	0	0
582.75	420.36	3	0.45	130.00	0	0	1	0	0
659.84	354.52	2	373.68	75.00	1	0	0	0	0
750.70	1158.77	5	41.18	245.00	0	0	1	0	0
880.25	440.62	4	1.08	125.00	1	0	0	0	0
934.00	404.74	3	0.45	155.00	0	0	1	0	0
1053.59	324.90	2	332.83	110.00	1	0	0	0	0
1349.25	453.76	4	172.50	147.50	0	0	1	0	0
1681.99	1018.97	5	260.57	185.00	0	1	0	0	0
1744.58	1025.27	5	260.57	190.00	0	1	0	0	0
1816.83	281.88	2	0.48	535.20	0	1	0	0	0
1835.75	312.93	0	2.65	96.25	0	1	0	0	0
1840.25	834.81	3	6.47	155.00	0	1	0	0	0
1845.50	309.38	0	3.62	100.00	0	1	0	0	0

1852.59	378.68	3	0.55	576.25	1	0	0	0	0
2016.75	1117.07	5	271.18	200.00	1	0	0	0	0
2017.75	424.95	3	6.68	618.27	0	0	1	0	0
2019.42	1117.68	5	290.18	200.00	1	0	0	0	0
2038.17	632.75	4	276.22	355.13	0	1	0	0	0
2048.25	295.82	0	1.85	146.85	0	0	0	0	1
2054.43	263.77	0	5.92	152.43	1	0	0	0	0
2066.42	397.04	2	0.45	681.57	0	0	1	0	0
2068.67	304.95	0	0.12	151.68	0	0	0	1	0
2108.80	842.42	3	21.77	175.00	0	1	0	0	0
2124.17	287.47	0	8.68	143.25	1	0	0	0	0
2125.92	271.53	2	7.75	563.15	0	1	0	0	0
2131.83	399.59	3	15.45	554.82	1	0	0	0	0
2196.59	1424.76	5	269.80	231.57	0	0	0	1	0
2200.25	1425.80	5	273.80	231.57	0	0	0	1	0
2205.33	289.57	0	1.85	166.85	0	0	0	0	1
2338.09	293.23	0	0.12	181.98	0	0	0	1	0
2379.92	606.32	4	276.22	510.15	0	1	0	0	0
2457.58	287.78	0	6.58	173.33	0	0	1	0	0
2476.08	1128.32	5	272.13	240.00	0	0	1	0	0
2514.33	268.85	0	4.25	204.32	0	0	1	0	0
2533.33	1131.45	5	276.27	255.00	0	0	1	0	0
2565.82	701.99	4	273.68	623.92	1	0	0	0	0
2595.76	1040.85	5	2.80	550.92	1	0	0	0	0
2601.67	630.79	3	4.92	176.68	1	0	0	0	0
2604.34	631.40	3	8.22	176.68	1	0	0	0	0
2626.09	692.02	4	274.12	787.32	1	0	0	0	0
2678.17	375.72	3	0.93	815.93	0	0	0	0	1
2751.51	1049.87	5	7.00	525.92	1	0	0	0	0
2754.18	1050.48	5	7.00	525.92	1	0	0	0	0
2758.09	1406.20	6	57.80	787.15	0	0	0	1	0
2821.51	1405.22	6	57.80	792.15	0	0	0	1	0
2860.07	1187.67	6	7.05	797.83	0	0	0	0	1
2860.07	1187.67	6	10.05	794.27	0	0	0	0	1
2920.17	373.12	3	8.93	749.12	0	0	0	0	1
2934.67	923.38	5	8.65	365.93	0	1	0	0	0
2939.17	938.44	5	8.10	377.93	0	1	0	0	0
3006.58	798.40	3	4.55	210.00	0	0	1	0	0

3030.00	806.16	3	8.18	215.00	0	0	1	0	0
3064.76	580.95	3	3.00	770.43	0	0	0	1	0
3101.01	572.28	3	3.00	811.33	0	0	0	1	0
3222.00	1097.79	5	18.28	893.90	0	0	1	0	0
3256.42	1106.00	5	18.28	659.77	0	0	1	0	0
3337.24	734.29	4	7.05	276.43	0	0	0	0	1
3382.83	736.25	4	10.43	277.82	0	0	0	0	1
3681.34	546.11	0	294.05	1075.13	0	0	1	0	0
3808.08	582.54	1	240.37	282.95	0	1	0	0	0
3820.16	1070.42	4	450.85	347.82	0	0	0	0	1
3926.09	539.01	0	5.20	1095.13	0	0	1	0	0
3994.67	535.43	0	53.20	1128.02	0	0	1	0	0
4096.66	572.50	1	240.37	312.95	0	1	0	0	0
4108.58	559.14	0	246.38	352.47	0	0	1	0	0
4108.58	559.14	0	260.38	351.58	0	0	1	0	0
4187.49	920.81	3	438.78	352.30	0	1	0	0	0
4362.74	1071.30	3	240.00	308.67	1	0	0	0	0
4378.34	1076.92	3	240.00	308.67	1	0	0	0	0
4437.33	553.15	1	17.88	463.63	0	1	0	0	0
4466.99	906.23	3	403.78	382.30	0	1	0	0	0
4517.33	553.51	1	33.22	454.88	0	1	0	0	0
4537.58	1205.29	5	78.18	527.03	0	1	0	0	0
4611.92	567.36	3	191.32	397.85	0	1	0	0	0
4616.67	553.52	1	12.35	654.57	0	0	0	1	0
4616.67	553.52	1	9.35	668.00	0	0	0	1	0
4691.58	1607.32	5	139.43	582.33	0	1	0	0	0
4691.92	556.34	3	191.32	499.10	0	1	0	0	0
4708.17	688.43	0	247.65	371.52	0	0	0	0	1
4734.83	690.03	3	186.00	818.32	0	0	0	0	1
4742.91	1048.97	3	240.00	343.67	1	0	0	0	0
4785.25	681.36	0	189.20	376.52	0	0	0	0	1
4861.42	552.16	1	0.20	674.57	0	0	0	1	0
5017.91	1207.01	5	182.85	506.20	0	1	0	0	0
5029.57	699.50	2	10.43	379.67	0	0	0	0	1
5043.16	987.99	4	18.68	442.77	1	0	0	0	0
5045.83	988.60	4	9.68	442.77	1	0	0	0	0
5062.67	630.45	3	7.32	1853.15	0	0	1	0	0
5062.67	630.45	3	17.32	1789.95	0	0	1	0	0

5077.33	990.54	5	12.57	1050.25	1	0	0	0	0
5079.59	980.60	4	2.00	495.87	1	0	0	0	0
5080.00	991.15	5	12.57	1050.25	1	0	0	0	0
5084.41	970.74	5	9.57	1071.25	1	0	0	0	0
5090.00	670.16	4	81.32	1186.57	0	0	1	0	0
5098.08	686.67	4	57.32	1146.57	0	0	1	0	0
5111.49	875.56	3	21.00	468.92	0	1	0	0	0
5141.41	1040.09	4	176.00	409.28	0	0	0	0	1
5215.08	864.92	3	33.88	469.02	0	1	0	0	0
5248.50	665.55	1	7.43	692.47	0	0	0	0	1
5295.66	683.10	2	10.43	409.67	0	0	0	0	1
5298.49	1033.84	4	176.00	429.28	0	0	0	0	1
5317.91	1198.26	5	182.85	538.00	0	1	0	0	0
5334.08	1189.08	5	13.95	973.63	0	1	0	0	0
5334.08	1189.08	5	17.63	958.63	0	1	0	0	0
5439.74	687.51	2	10.60	399.65	0	0	1	0	0
5498.99	1189.30	5	17.88	948.63	0	1	0	0	0
5499.24	1003.40	3	240.25	461.32	0	0	1	0	0
5622.59	870.05	3	244.00	826.22	0	0	0	1	0
5626.00	949.02	4	213.90	478.55	0	0	0	1	0
5644.08	1007.12	3	240.25	472.47	0	0	1	0	0
5675.32	671.10	2	10.60	430.53	0	0	1	0	0
5715.50	1394.02	6	284.53	665.60	1	0	0	0	0
5735.75	1394.76	6	284.53	661.38	1	0	0	0	0
5738.42	1395.37	6	284.53	661.38	1	0	0	0	0
5763.16	955.94	4	244.00	476.55	0	0	0	1	0
5878.26	907.22	4	213.90	595.55	0	0	0	1	0
5929.50	930.27	4	213.90	508.55	0	0	0	1	0
6079.00	918.67	3	244.00	531.55	0	0	0	1	0
6166.60	964.01	3	13.88	729.35	0	0	1	0	0
6166.60	964.01	3	19.85	708.62	0	0	1	0	0
6192.16	974.88	4	10.43	681.88	0	0	0	0	1
6260.41	980.19	4	10.43	669.65	0	0	0	0	1
6271.00	920.15	4	20.38	577.83	0	0	0	1	0
6274.15	985.09	4	10.43	574.67	0	0	0	0	1
6343.00	911.08	4	20.38	602.83	0	0	0	1	0
6384.00	1779.14	6	270.97	1162.93	0	0	0	0	1
6406.58	1781.87	6	261.97	1160.38	0	0	0	0	1

6406.58	1781.87	6	270.97	1100.07	0	0	0	0	1
6452.33	919.76	4	20.38	592.83	0	0	0	1	0
6555.49	1261.29	5	12.65	1660.93	0	0	0	0	1
6590.49	1283.87	5	12.65	1665.35	0	0	0	0	1
6640.58	1271.37	5	12.77	1668.35	0	0	0	0	1
7066.75	1287.62	5	23.62	1429.00	0	0	0	1	0
7127.33	1692.00	6	303.28	1033.60	0	0	0	1	0
7127.92	1287.62	5	23.62	1499.03	0	0	0	1	0
7163.49	1685.15	6	303.28	1038.60	0	0	0	1	0
7169.91	1306.37	5	25.02	1415.07	0	0	0	1	0
7190.66	1691.53	6	303.28	1048.60	0	0	0	1	0

Table C.10: Non-dominated solutions obtained for problem instance HHC_20_40_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-776.66	2269.68	6	422.00	121.18	0	0	0	0	1
-775.49	2272.13	6	422.00	121.18	0	0	0	0	1
-495.00	1349.55	5	6.12	106.45	0	0	0	0	1
-492.92	1348.51	5	7.12	106.45	0	0	0	0	1
-460.33	382.64	1	451.47	10.00	1	0	0	0	0
-179.67	358.24	1	371.53	20.00	1	0	0	0	0
-172.58	359.07	2	33.10	45.00	1	0	0	0	0
-169.92	361.38	2	0.60	45.00	0	0	0	0	1
-137.25	351.04	2	11.02	55.00	0	0	0	0	1
-120.33	351.26	2	0.10	55.00	1	0	0	0	0
-62.17	362.67	1	338.47	35.00	0	0	0	1	0
-23.91	505.77	2	0.12	25.00	0	1	0	0	0
-23.67	505.65	2	3.88	25.00	0	1	0	0	0
-21.76	352.21	1	400.98	30.00	0	0	0	1	0
-21.51	353.38	1	374.03	30.00	0	1	0	0	0
85.83	339.65	1	387.35	40.00	0	0	1	0	0
129.92	504.49	2	70.97	30.00	0	0	0	1	0

154.59	1275.00	5	283.45	90.00	1	0	0	0	0
226.01	344.46	2	335.30	70.58	0	0	0	0	1
289.67	356.62	1	391.70	30.00	0	0	1	0	0
304.67	343.72	2	330.02	75.58	0	0	0	0	1
319.42	1272.27	5	283.45	95.00	1	0	0	0	0
429.17	351.76	1	374.03	40.00	0	1	0	0	0
517.92	873.78	4	69.88	60.00	0	0	0	1	0
535.50	338.60	2	9.53	80.00	1	0	0	0	0
705.62	368.74	0	0.13	35.00	0	0	0	1	0
705.83	368.64	0	0.87	35.00	0	0	0	1	0
801.92	1227.37	5	289.47	100.00	0	0	0	1	0
877.17	480.98	2	69.97	334.98	0	0	0	1	0
881.42	1231.75	5	246.47	105.00	0	0	0	1	0
947.76	1233.17	5	331.65	125.13	0	0	1	0	0
992.47	361.75	0	0.40	40.00	1	0	0	0	0
993.09	361.44	0	0.60	40.00	1	0	0	0	0
1182.50	840.87	2	4.27	101.42	0	1	0	0	0
1192.34	712.47	4	6.53	115.00	1	0	0	0	0
1197.50	356.09	0	2.57	55.00	0	0	0	0	1
1237.76	1226.87	5	284.47	130.13	0	0	1	0	0
1288.75	348.28	0	2.83	65.00	0	0	0	0	1
1299.75	860.20	3	4.58	70.00	0	0	0	1	0
1338.01	469.17	2	31.68	351.40	0	0	0	1	0
1394.42	853.24	3	2.12	100.00	0	0	0	0	1
1433.01	1247.35	6	38.15	140.00	1	0	0	0	0
1470.17	863.18	3	2.47	70.00	0	0	0	1	0
1476.93	334.09	0	243.48	80.00	1	0	0	0	0
1485.01	1239.53	6	50.10	150.00	1	0	0	0	0
1526.34	295.71	1	0.22	596.88	0	1	0	0	0
1526.34	295.71	1	7.22	589.88	0	1	0	0	0
1538.50	327.78	0	0.43	85.00	0	1	0	0	0
1553.15	328.12	0	0.47	85.00	0	0	1	0	0
1553.84	327.78	0	1.53	85.00	0	0	1	0	0
1597.84	1244.61	6	38.15	145.00	1	0	0	0	0
1604.72	1199.56	5	0.52	152.45	0	0	0	1	0
1604.93	1199.46	5	1.18	152.45	0	0	0	1	0
1605.59	1199.13	5	15.68	152.45	0	0	0	1	0
1613.50	329.24	0	0.43	91.43	0	1	0	0	0

1619.28	850.82	3	6.47	110.00	0	0	0	0	1
1652.52	1185.86	5	2.23	454.32	0	1	0	0	0
1663.69	1189.91	5	2.23	454.32	0	1	0	0	0
1667.01	330.18	0	261.75	110.00	1	0	0	0	0
1766.85	858.25	3	15.60	115.00	0	0	1	0	0
1768.41	857.46	3	14.60	115.40	0	0	1	0	0
1880.04	1292.97	4	79.08	134.32	0	0	0	1	0
1893.17	686.37	4	252.62	145.00	1	0	0	0	0
2085.58	674.66	3	7.25	365.67	0	0	0	0	1
2184.24	1230.44	5	17.80	165.40	0	0	1	0	0
2247.25	1126.11	5	16.02	317.00	0	0	0	0	1
2250.59	1130.20	5	12.42	327.00	0	0	0	0	1
2392.50	322.17	0	16.87	189.47	1	0	0	0	0
2494.75	838.82	3	176.68	110.00	0	0	0	1	0
2527.67	837.83	2	4.07	105.00	0	0	0	1	0
2541.67	841.93	3	194.22	115.00	0	0	0	1	0
2542.50	323.22	0	3.33	209.15	1	0	0	0	0
2545.50	837.83	2	4.43	105.00	0	0	0	1	0
2553.29	1195.67	5	27.00	195.00	0	0	1	0	0
2620.42	831.38	3	195.68	120.00	0	0	0	1	0
2620.75	1168.16	5	249.70	240.00	0	0	0	1	0
2623.27	677.92	3	5.28	160.00	1	0	0	0	0
2624.17	833.36	2	4.43	115.00	0	0	0	1	0
2659.59	1140.53	5	5.40	260.00	0	0	1	0	0
2688.26	672.43	3	9.53	165.00	1	0	0	0	0
2730.35	675.19	3	5.28	165.00	1	0	0	0	0
2739.84	1141.19	5	19.40	260.00	0	0	1	0	0
2762.85	674.64	3	243.48	165.00	1	0	0	0	0
2775.72	1196.84	5	4.82	210.00	0	0	0	1	0
2784.27	665.50	3	243.48	175.00	1	0	0	0	0
2792.50	316.71	0	0.87	283.78	1	0	0	0	0
2792.50	316.71	0	3.33	226.03	1	0	0	0	0
2841.29	1197.92	5	3.90	210.00	0	0	0	1	0
2864.51	763.63	3	12.42	667.42	0	0	0	0	1
2886.01	1140.75	5	12.40	275.00	0	0	1	0	0
2887.93	1175.76	5	195.68	195.00	0	0	0	1	0
2892.58	819.16	3	2.68	140.00	0	0	0	1	0
2894.18	662.77	3	243.48	180.00	1	0	0	0	0

2930.62	1189.94	5	2.18	215.00	0	0	0	1	0
3019.18	1194.68	6	259.62	200.00	1	0	0	0	0
3027.85	1175.26	5	181.18	200.00	0	0	0	1	0
3039.72	856.94	3	45.70	238.47	0	0	0	1	0
3043.75	670.13	1	240.17	246.80	0	0	0	0	1
3047.92	670.89	1	240.17	247.83	0	0	0	0	1
3060.14	1184.87	5	2.18	506.40	0	0	0	1	0
3063.20	1183.34	5	3.22	506.98	0	0	0	1	0
3093.30	849.68	3	44.70	243.47	0	0	0	1	0
3094.76	1186.94	6	303.75	205.00	1	0	0	0	0
3323.34	1017.24	3	215.85	266.43	0	1	0	0	0
3381.01	1186.36	6	259.62	215.00	1	0	0	0	0
3411.29	757.14	1	2.28	249.27	0	0	1	0	0
3435.59	1017.82	3	215.85	281.42	0	1	0	0	0
3447.67	652.56	1	25.20	295.03	0	0	0	0	1
3490.34	649.82	1	25.20	300.03	0	0	0	0	1
3491.82	1003.01	4	3.37	1023.95	0	1	0	0	0
3492.47	1002.69	4	3.37	1024.37	0	1	0	0	0
3564.66	774.21	1	16.42	257.68	0	0	1	0	0
3575.85	1162.47	3	257.00	243.55	0	0	1	0	0
3578.50	996.58	4	13.75	964.65	0	1	0	0	0
3587.85	762.61	1	17.28	257.68	0	0	1	0	0
3617.09	639.02	3	199.17	325.03	0	0	0	0	1
3639.17	1169.44	6	3.70	240.00	1	0	0	0	0
3647.59	1155.37	3	257.00	253.55	0	0	1	0	0
3700.84	1165.37	6	6.53	245.00	1	0	0	0	0
3718.51	1165.37	6	9.53	245.00	1	0	0	0	0
3785.51	636.29	3	199.17	330.03	0	0	0	0	1
3785.51	636.29	3	254.17	329.87	0	0	0	0	1
3900.84	1106.64	5	18.18	748.00	0	0	0	0	1
3934.52	1011.10	3	0.85	362.02	0	1	0	0	0
3935.17	1010.77	3	0.58	362.43	0	1	0	0	0
3949.92	1102.41	5	12.42	753.00	0	0	0	0	1
3976.13	1503.83	5	5.68	386.02	0	1	0	0	0
3977.69	1503.05	5	4.68	387.02	0	1	0	0	0
3978.34	1502.72	5	4.27	387.43	0	1	0	0	0
3985.92	1096.16	5	12.42	773.00	0	0	0	0	1
4026.92	991.53	4	215.85	367.43	0	1	0	0	0

4115.64	991.39	4	219.42	372.33	0	1	0	0	0
4120.84	988.79	4	215.85	372.43	0	1	0	0	0
4128.26	1095.96	5	7.00	840.18	0	0	1	0	0
4129.82	1095.18	5	6.00	841.18	0	0	1	0	0
4130.76	1094.71	5	6.40	841.78	0	0	1	0	0
4241.75	1087.93	5	174.15	366.05	0	0	1	0	0
4372.38	1478.03	6	12.00	370.48	0	0	1	0	0
4373.94	1477.25	6	11.00	371.48	0	0	1	0	0
4377.68	1089.32	5	174.15	377.27	0	0	1	0	0
4378.51	1480.24	6	14.00	368.48	0	0	1	0	0
4396.14	1107.29	5	191.08	377.27	0	0	1	0	0
4439.34	1107.21	3	2.95	382.87	0	0	1	0	0
4474.01	1098.52	3	7.55	365.97	0	0	1	0	0
4475.85	1473.81	6	266.17	422.22	0	0	0	0	1
4476.51	1097.27	3	5.95	367.57	0	0	1	0	0
4507.43	1475.42	6	242.70	423.83	0	0	0	0	1
4675.85	1472.69	6	266.17	428.83	0	0	0	0	1

Table C.11: Non-dominated solutions obtained for problem instance HHC_20_60_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-183.42	2224.92	7	384.48	125.00	0	0	0	0	1
-109.17	355.12	1	399.40	20.00	0	0	1	0	0
-76.42	2221.17	7	404.57	130.00	0	0	0	0	1
65.50	373.40	1	464.05	10.00	1	0	0	0	0
136.17	340.18	1	375.88	25.00	0	0	0	0	1
172.25	337.78	1	405.50	40.00	0	0	1	0	0
332.17	339.40	1	426.77	30.00	0	1	0	0	0
342.34	1354.24	6	44.02	110.00	0	0	0	0	1
420.17	1346.43	6	27.77	125.00	0	0	0	0	1
431.51	381.24	1	434.97	20.00	0	0	0	1	0
476.67	332.22	1	409.98	45.00	0	1	0	0	0

528.42	345.28	2	328.88	30.00	0	0	0	0	1
604.75	336.53	3	0.05	50.00	0	1	0	0	0
688.76	842.43	5	12.03	100.00	0	0	1	0	0
734.04	834.41	5	6.10	110.00	0	0	1	0	0
754.83	344.86	4	0.27	80.00	0	0	0	1	0
755.25	344.65	4	2.73	80.00	0	0	0	1	0
798.59	479.55	4	0.03	70.00	0	0	1	0	0
875.50	375.47	1	405.53	40.00	1	0	0	0	0
994.33	839.50	5	5.55	105.00	0	1	0	0	0
997.92	453.16	5	166.90	115.00	0	0	1	0	0
1068.00	465.66	5	170.90	120.00	0	0	1	0	0
1069.09	477.47	4	0.03	75.00	0	0	1	0	0
1088.33	843.77	5	5.30	115.00	1	0	0	0	0
1104.92	844.51	5	5.30	110.00	1	0	0	0	0
1140.92	1223.80	6	286.23	130.00	0	0	1	0	0
1192.50	837.26	6	1.00	153.50	0	0	0	1	0
1192.50	837.26	6	2.00	153.05	0	0	0	1	0
1340.00	382.88	2	1.43	422.42	0	0	1	0	0
1432.83	1215.61	6	300.00	140.00	0	0	1	0	0
1463.58	831.46	5	5.67	115.00	0	1	0	0	0
1609.43	344.22	0	2.55	90.00	0	0	0	0	1
1612.50	334.10	0	3.00	91.23	0	0	0	0	1
1708.58	369.50	2	27.00	413.77	0	0	1	0	0
1839.08	1571.90	6	339.28	155.00	0	1	0	0	0
2005.25	330.88	0	6.00	106.32	0	0	1	0	0
2023.08	328.40	4	8.63	548.73	1	0	0	0	0
2024.91	840.33	4	3.63	130.00	0	0	0	0	1
2027.33	839.12	4	11.45	130.00	0	0	0	0	1
2141.75	429.50	5	50.83	153.28	0	0	1	0	0
2196.25	860.98	3	4.03	120.00	0	0	1	0	0
2219.25	311.69	0	11.23	121.33	0	0	1	0	0
2242.75	855.93	3	6.00	115.00	0	0	1	0	0
2307.59	796.60	5	3.42	807.22	0	0	0	1	0
2353.92	320.05	1	11.28	111.68	0	0	0	1	0
2375.00	320.05	1	7.62	111.88	0	0	0	1	0
2427.42	316.22	0	6.28	148.32	0	1	0	0	0
2429.08	411.48	4	4.23	299.02	0	0	0	0	1
2436.75	323.19	4	8.63	563.73	1	0	0	0	0

2457.85	323.42	3	1.80	513.70	1	0	0	0	0
2460.67	322.02	3	0.63	558.70	1	0	0	0	0
2465.68	331.52	0	3.08	142.00	1	0	0	0	0
2470.50	329.11	0	4.70	141.32	1	0	0	0	0
2579.67	403.56	4	4.38	309.02	0	0	0	0	1
2627.42	309.97	0	6.28	170.32	0	1	0	0	0
2786.00	425.38	5	17.63	168.45	0	0	1	0	0
2812.76	795.11	7	12.00	376.15	0	0	0	1	0
2860.92	818.72	6	150.58	198.73	0	0	0	1	0
2860.92	818.72	6	163.58	198.17	0	0	0	1	0
3003.34	817.08	3	1.43	151.15	0	1	0	0	0
3052.58	844.47	3	1.30	151.08	1	0	0	0	0
3121.17	805.76	3	2.45	151.15	0	1	0	0	0
3246.66	1100.33	6	1.60	386.58	0	0	0	1	0
3265.42	828.27	3	1.30	171.08	1	0	0	0	0
3395.50	654.77	4	240.30	962.25	1	0	0	0	0
3590.75	776.75	5	142.52	237.55	1	0	0	0	0
3689.08	642.64	4	196.63	999.65	1	0	0	0	0
3791.34	753.44	5	7.30	642.63	1	0	0	0	0
3988.67	766.18	6	4.00	249.62	0	0	1	0	0
4009.67	766.27	6	3.62	249.95	0	0	1	0	0
4020.41	589.05	3	36.60	514.02	0	1	0	0	0
4048.83	592.55	3	36.60	532.02	0	1	0	0	0
4090.84	750.31	5	11.70	552.82	1	0	0	0	0
4371.00	635.34	1	126.38	466.97	1	0	0	0	0
4391.50	643.15	3	264.42	664.35	1	0	0	0	0
4415.41	632.84	1	8.47	687.97	1	0	0	0	0
4415.41	632.84	1	15.97	677.97	1	0	0	0	0
4422.34	790.39	2	1.60	196.12	0	0	0	1	0
4446.17	786.04	4	165.72	219.98	0	0	0	1	0
4467.09	786.04	4	165.72	220.55	0	0	0	1	0
4501.25	1057.83	5	5.92	398.43	0	1	0	0	0
4508.91	624.18	1	196.63	451.13	1	0	0	0	0
4510.08	695.37	3	6.68	595.87	0	0	1	0	0
4571.42	784.14	2	2.60	217.55	0	0	0	1	0
4727.00	727.79	1	157.90	330.85	0	1	0	0	0
4743.09	639.24	3	264.42	725.35	1	0	0	0	0
4758.00	775.52	3	184.22	224.52	0	0	1	0	0

4899.42	720.76	1	155.90	344.15	0	1	0	0	0
5074.17	1105.62	7	8.00	956.53	0	0	0	1	0
5097.59	1105.62	7	8.00	968.53	0	0	0	1	0
5097.59	1105.62	7	9.00	967.53	0	0	0	1	0
5149.94	1198.70	4	1.58	450.75	0	0	0	1	0
5153.83	776.34	3	255.40	245.27	0	0	1	0	0
5233.51	1597.53	6	13.05	373.35	0	0	0	1	0
5249.42	1590.58	6	13.05	388.35	0	0	0	1	0
5406.61	1090.48	7	212.15	449.53	0	0	0	1	0
5418.83	757.63	3	255.40	276.68	0	0	1	0	0
5436.61	1090.48	7	212.15	449.90	0	0	0	1	0
5457.52	1090.48	7	212.15	450.10	0	0	0	1	0
5521.75	746.34	6	180.53	296.80	0	0	1	0	0
5521.75	746.34	6	169.87	296.80	0	0	1	0	0
5535.66	750.03	3	278.00	290.60	0	0	1	0	0
5661.34	743.41	6	162.27	302.98	0	0	1	0	0
5665.92	755.73	3	255.40	297.33	0	0	1	0	0
5671.66	753.09	4	6.68	311.13	0	0	1	0	0
5753.33	737.37	4	21.68	305.60	0	0	1	0	0
5773.24	744.70	4	2.30	321.13	0	0	1	0	0
5913.09	1079.21	5	15.97	1591.67	1	0	0	0	0
6121.33	693.80	6	17.63	439.85	0	0	1	0	0
6286.09	717.99	6	17.63	364.05	0	0	1	0	0
6389.00	703.33	6	17.63	459.85	0	0	1	0	0
6532.42	1021.53	3	11.03	478.58	0	1	0	0	0
6627.65	1028.39	3	8.82	467.82	0	1	0	0	0
6633.00	1025.72	3	6.25	468.30	0	1	0	0	0
6880.24	1025.96	5	197.52	503.52	0	1	0	0	0
7030.17	1030.93	5	206.03	507.75	0	1	0	0	0
7047.91	1022.05	5	197.52	508.52	0	1	0	0	0

Table C.12: Non-dominated solutions obtained for problem instance HHC_20_80_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-232.09	349.18	1	392.07	25.00	1	0	0	0	0
-159.33	353.11	1	396.68	10.00	1	0	0	0	0
35.67	350.36	1	398.88	35.00	0	0	0	1	0
134.42	349.28	1	408.50	25.00	0	0	0	0	1
169.00	352.94	1	415.43	25.00	0	0	0	0	1
178.09	352.62	1	379.60	30.00	0	0	0	1	0
178.34	365.53	3	0.25	55.00	0	0	0	1	0
211.25	358.83	3	14.25	70.00	0	0	0	1	0
353.76	1636.25	6	348.70	160.00	0	0	0	0	1
411.25	359.67	3	8.30	65.00	0	0	0	1	0
423.92	718.66	5	297.13	110.00	0	0	1	0	0
438.09	347.93	1	377.82	45.00	0	0	0	1	0
438.67	369.59	1	383.28	35.00	0	1	0	0	0
448.59	367.55	1	394.45	41.02	0	1	0	0	0
469.42	1411.49	7	373.00	205.32	1	0	0	0	0
469.42	1411.49	7	375.00	204.62	1	0	0	0	0
474.51	1629.11	6	331.70	165.00	0	0	0	0	1
567.84	1414.68	7	399.00	209.52	1	0	0	0	0
578.67	321.48	4	0.33	95.00	0	0	0	0	1
582.51	325.13	4	0.33	90.00	0	0	0	0	1
589.23	350.59	4	0.82	90.00	0	1	0	0	0
590.51	349.95	4	1.55	90.00	0	1	0	0	0
602.34	342.71	4	5.07	90.00	0	0	1	0	0
612.33	854.22	4	451.30	132.88	0	0	0	1	0
647.00	752.61	2	29.17	70.00	1	0	0	0	0
804.08	806.59	5	15.88	160.00	0	0	0	1	0
839.42	354.14	2	342.95	70.00	0	0	1	0	0
936.75	808.08	5	15.88	165.00	0	0	0	1	0
1021.59	1579.14	6	329.83	210.00	0	0	1	0	0
1082.53	810.18	5	18.58	165.00	0	0	0	1	0
1196.17	356.27	0	0.70	55.00	1	0	0	0	0

1275.75	671.12	7	358.00	286.12	1	0	0	0	0
1275.75	671.12	7	362.00	284.12	1	0	0	0	0
1275.75	671.12	7	374.00	283.85	1	0	0	0	0
1299.75	735.36	3	45.67	120.00	1	0	0	0	0
1377.92	357.82	0	1.97	60.00	1	0	0	0	0
1384.75	321.84	0	1.20	100.00	0	0	0	1	0
1480.34	311.53	4	1.85	271.32	1	0	0	0	0
1534.92	322.85	0	6.20	105.00	0	0	0	1	0
1539.84	326.50	0	1.20	100.00	0	0	0	1	0
1552.25	661.62	7	71.27	294.12	1	0	0	0	0
1765.92	317.39	4	1.02	244.23	1	0	0	0	0
1800.67	303.32	4	1.95	243.13	1	0	0	0	0
1806.17	1160.38	6	259.25	221.53	0	0	0	1	0
1807.75	658.42	7	18.77	304.12	1	0	0	0	0
1863.47	838.37	3	32.95	151.63	0	0	0	1	0
1902.51	654.58	7	8.68	379.87	1	0	0	0	0
1965.50	1163.11	6	245.25	215.00	0	0	0	1	0
2043.39	831.53	3	32.95	161.63	0	0	0	1	0
2058.91	823.77	3	33.02	165.40	0	0	0	1	0
2065.50	1160.51	6	275.25	226.53	0	0	0	1	0
2161.58	325.22	1	0.98	131.10	0	0	1	0	0
2177.75	642.47	7	15.70	339.87	1	0	0	0	0
2177.75	642.47	7	18.77	339.12	1	0	0	0	0
2286.50	326.46	1	0.75	151.23	0	0	1	0	0
2348.50	282.35	3	2.88	480.32	0	0	1	0	0
2399.59	1041.12	6	243.95	228.08	0	1	0	0	0
2481.01	287.81	3	16.55	506.30	0	0	1	0	0
2577.67	682.87	4	26.57	191.23	0	0	1	0	0
2594.09	305.75	3	0.85	706.65	0	1	0	0	0
2635.59	1039.17	6	243.95	238.08	0	1	0	0	0
2753.59	701.19	4	18.82	190.00	0	1	0	0	0
2899.92	650.79	4	8.33	196.73	0	0	0	0	1
2933.17	649.75	4	8.33	197.00	0	0	0	0	1
2944.09	300.54	3	0.85	728.00	0	1	0	0	0
2953.59	698.58	4	30.82	196.02	0	1	0	0	0
3195.91	1081.05	6	8.60	379.67	0	0	0	1	0
3213.66	1086.43	6	21.30	386.37	0	0	0	1	0
3307.35	955.31	6	1.00	393.70	0	0	0	0	1

3311.18	958.96	6	1.00	388.70	0	0	0	0	1
3326.09	628.61	5	192.37	349.00	0	0	0	0	1
3372.26	1741.36	7	462.57	383.22	1	0	0	0	0
3437.84	1025.94	4	461.75	247.23	0	1	0	0	0
3533.84	624.64	5	249.13	481.83	0	1	0	0	0
3632.93	625.84	5	198.33	595.23	0	0	0	0	1
3741.59	621.84	5	249.13	491.83	0	1	0	0	0
3967.92	612.77	4	43.83	299.57	0	0	0	0	1
3990.42	665.50	4	10.28	273.13	1	0	0	0	0
3992.00	638.27	2	240.10	281.23	0	0	1	0	0
4001.67	669.03	4	7.80	284.37	1	0	0	0	0
4064.17	665.78	4	7.80	288.13	1	0	0	0	0
4066.92	653.45	4	276.00	280.08	1	0	0	0	0
4077.09	1706.48	8	331.40	424.55	1	0	0	0	0
4216.01	1704.05	8	331.40	434.55	1	0	0	0	0
4257.25	663.71	4	277.00	284.42	1	0	0	0	0
4259.42	663.71	4	276.00	285.08	1	0	0	0	0
4309.67	651.68	0	243.00	267.95	0	0	0	0	1
4321.67	653.58	0	242.32	271.27	0	0	0	0	1
4342.92	1130.13	3	252.97	322.23	0	0	0	1	0
4359.01	600.93	5	25.00	641.45	0	0	0	0	1
4389.09	657.36	4	7.80	329.32	1	0	0	0	0
4393.42	1006.07	4	265.00	299.73	0	0	0	0	1
4427.59	604.05	4	198.33	327.52	0	0	0	0	1
4431.43	607.70	4	193.17	322.37	0	0	0	0	1
4444.42	989.33	0	106.43	312.97	0	0	0	0	1
4594.01	599.35	4	21.83	331.27	0	0	0	0	1
4613.59	594.60	4	10.05	963.88	0	0	1	0	0
4613.59	594.60	4	16.05	957.33	0	0	1	0	0
4652.92	650.52	4	10.28	339.37	1	0	0	0	0
4658.57	633.10	4	3.72	1238.05	0	1	0	0	0
4662.75	600.73	0	21.83	337.55	0	0	0	0	1
4693.42	996.70	4	265.00	330.95	0	0	0	0	1
4699.33	1021.60	3	262.10	316.23	0	0	1	0	0
4722.75	596.70	4	16.88	921.48	0	0	1	0	0
4750.34	600.72	0	46.00	507.42	0	0	0	0	1
4841.01	628.70	4	30.97	1230.63	0	1	0	0	0
4862.84	617.79	4	21.03	1240.72	0	1	0	0	0

4936.75	1019.86	3	240.10	326.23	0	0	1	0	0
4949.76	1007.58	3	245.00	332.23	0	1	0	0	0
5127.76	998.86	4	245.00	362.23	0	1	0	0	0
5157.59	1004.30	3	245.00	352.23	0	1	0	0	0
5259.66	1393.83	6	13.18	901.83	0	0	0	1	0
5259.66	1393.83	6	21.30	884.15	0	0	0	1	0
5383.01	890.71	6	25.00	840.27	0	0	0	0	1
5386.84	894.36	6	23.53	856.37	0	0	0	0	1
5386.84	894.36	6	25.00	835.27	0	0	0	0	1
5407.43	921.30	4	10.32	426.60	0	0	0	0	1
5427.04	934.62	6	16.68	1015.02	0	0	1	0	0
5466.01	935.76	6	13.57	1053.88	0	0	1	0	0
5474.34	918.57	4	21.83	437.55	0	0	0	0	1
5575.17	937.85	6	16.88	1011.48	0	0	1	0	0
5698.84	1275.29	7	257.37	498.38	0	0	0	0	1
5781.26	1283.26	7	257.37	520.70	0	0	0	0	1
5943.84	1274.91	7	257.37	530.70	0	0	0	0	1
5991.00	960.24	4	17.88	485.35	0	0	1	0	0
6002.16	949.07	4	17.88	495.35	0	0	1	0	0
6063.08	955.51	4	18.58	495.35	0	0	1	0	0
6100.24	1397.11	6	260.38	526.00	0	0	0	1	0
6197.33	1386.52	6	263.38	544.35	0	0	0	1	0
6204.35	1308.84	7	55.62	1352.85	0	1	0	0	0
6446.91	1257.49	7	268.23	761.20	0	1	0	0	0
6451.84	1296.99	7	54.48	1362.85	0	1	0	0	0
6519.76	1284.29	7	57.83	1354.43	0	1	0	0	0
6545.08	1260.33	7	268.23	796.20	0	1	0	0	0
6559.16	1274.48	7	268.23	771.20	0	1	0	0	0

Table C.13: Non-dominated solutions obtained for problem instance HHC_25_50_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-339.00	352.84	0	461.10	10.00	0	0	0	1	0
-329.67	348.52	0	442.03	20.00	0	0	0	1	0
-294.17	343.85	0	460.58	15.00	0	0	0	0	1
-287.00	357.96	0	461.30	5.00	0	1	0	0	0
36.17	376.08	1	415.07	15.00	0	0	0	0	1
488.26	359.35	1	398.57	40.00	0	1	0	0	0
536.59	362.78	1	407.47	41.73	0	0	1	0	0
716.17	356.36	1	379.25	55.00	1	0	0	0	0
743.13	445.63	3	0.10	86.17	0	1	0	0	0
743.34	445.52	3	1.90	86.17	0	1	0	0	0
765.00	458.79	3	1.05	86.15	1	0	0	0	0
765.00	458.79	3	2.20	86.03	1	0	0	0	0
795.84	462.10	3	0.35	86.13	0	0	0	0	1
854.50	349.39	2	0.08	66.03	0	0	1	0	0
879.34	322.60	2	1.70	106.05	0	0	1	0	0
883.50	459.49	3	4.58	76.20	0	0	0	1	0
894.58	366.69	1	399.98	40.00	0	0	1	0	0
962.92	447.92	3	4.58	98.20	0	0	0	1	0
966.09	2042.51	6	385.50	206.13	0	0	0	0	1
989.00	2048.84	6	385.50	201.13	0	0	0	0	1
1175.59	452.55	3	0.58	86.20	0	0	0	1	0
1241.01	822.85	4	8.00	124.25	0	1	0	0	0
1339.75	776.85	5	17.00	157.53	1	0	0	0	0
1384.84	821.31	4	1.00	129.12	0	1	0	0	0
1393.67	346.25	2	280.73	68.75	0	0	0	1	0
1479.91	769.63	5	17.00	162.53	1	0	0	0	0
1509.17	806.40	4	3.70	147.78	0	0	1	0	0
1548.08	404.90	4	160.90	147.37	0	1	0	0	0
1548.08	404.90	4	161.13	137.37	0	1	0	0	0
1602.00	427.80	2	0.68	447.40	0	0	0	1	0
1633.00	807.55	4	3.70	147.78	0	0	1	0	0

1656.67	814.76	4	7.20	124.95	0	0	0	1	0
1681.18	1176.47	5	15.00	176.13	0	0	0	0	1
1687.67	355.16	0	5.35	70.00	0	0	0	1	0
1702.34	816.49	4	7.20	124.95	0	0	0	1	0
1781.84	338.22	0	0.95	85.00	0	0	0	1	0
1802.00	416.22	2	13.68	329.60	0	0	0	1	0
1811.68	1165.65	5	15.00	196.82	0	0	0	0	1
1841.92	816.74	4	4.20	124.95	0	0	0	1	0
1851.52	275.91	0	1.30	208.78	0	0	0	0	1
1853.42	274.96	0	6.70	208.78	0	0	0	0	1
1874.51	335.98	0	6.95	90.00	0	0	0	1	0
1918.34	340.31	0	8.97	98.15	0	1	0	0	0
1931.41	1645.46	6	242.00	215.97	1	0	0	0	0
1934.67	406.60	3	10.58	339.60	0	0	0	1	0
1966.67	341.09	0	6.97	105.15	0	1	0	0	0
2009.75	1651.41	6	242.00	216.02	1	0	0	0	0
2028.34	344.32	4	20.93	293.83	0	1	0	0	0
2207.76	340.85	4	29.93	279.03	0	1	0	0	0
2352.92	1199.90	2	33.68	139.95	0	0	0	1	0
2364.42	1216.87	2	22.93	146.10	0	0	1	0	0
2415.66	803.51	3	6.20	149.82	0	1	0	0	0
2468.75	273.45	2	0.35	798.28	0	0	1	0	0
2484.51	336.26	0	6.90	116.28	1	0	0	0	0
2485.59	1190.28	3	14.75	149.95	0	0	0	1	0
2491.25	1275.72	5	247.20	200.98	0	0	0	1	0
2515.59	1200.77	3	40.68	144.95	0	0	0	1	0
2516.59	273.45	2	1.35	788.50	0	0	1	0	0
2564.76	311.12	3	3.17	361.03	0	1	0	0	0
2573.25	800.90	3	10.07	154.82	0	1	0	0	0
2580.01	336.30	0	8.00	106.08	0	0	1	0	0
2592.42	321.08	0	6.13	121.28	1	0	0	0	0
2673.99	766.29	5	251.90	190.45	0	1	0	0	0
2681.58	765.42	5	252.90	191.40	0	1	0	0	0
2744.17	307.65	3	5.17	366.45	0	1	0	0	0
2837.13	687.25	3	4.23	842.67	0	0	0	0	1
2974.58	806.35	3	4.20	157.77	1	0	0	0	0
2996.00	805.23	3	4.20	162.77	1	0	0	0	0
3136.59	1166.96	5	259.00	240.52	0	0	1	0	0

3138.51	1164.72	5	259.00	245.52	0	0	1	0	0
3179.26	629.30	3	5.00	510.95	1	0	0	0	0
3366.25	665.63	4	241.67	456.45	0	1	0	0	0
3458.59	624.10	3	7.23	531.70	1	0	0	0	0
3550.92	1085.18	6	18.05	481.82	1	0	0	0	0
3552.75	1085.18	6	20.05	479.25	1	0	0	0	0
3572.67	1075.89	6	18.05	487.27	1	0	0	0	0
3620.42	688.70	4	26.35	1767.35	0	0	1	0	0
3700.91	710.55	5	4.37	262.12	0	1	0	0	0
3726.83	1168.73	2	298.95	239.65	0	1	0	0	0
3729.08	1219.72	5	9.88	411.53	0	0	0	1	0
3771.42	660.05	4	241.67	506.93	0	1	0	0	0
3793.42	1146.27	2	275.17	253.33	0	1	0	0	0
3803.59	699.02	5	10.07	271.18	0	1	0	0	0
3878.75	1221.45	5	9.88	401.53	0	0	0	1	0
3967.76	679.32	1	35.00	314.42	0	1	0	0	0
4153.76	699.63	1	24.97	291.70	0	1	0	0	0
4183.76	1132.97	5	58.00	412.23	0	0	1	0	0
4404.17	661.89	2	263.97	465.02	0	1	0	0	0
4495.36	1843.13	4	71.30	399.62	0	0	0	0	1
4578.59	675.71	3	240.17	338.30	0	1	0	0	0
4589.26	1001.42	2	84.07	318.30	0	0	0	0	1
4689.26	991.37	2	84.07	334.32	0	0	0	0	1
4804.93	1061.96	1	10.30	323.98	1	0	0	0	0
4866.18	1063.00	1	11.65	332.77	1	0	0	0	0
4904.49	1098.02	3	209.00	288.53	1	0	0	0	0
5032.04	1412.28	5	76.82	426.70	1	0	0	0	0
5046.75	1084.29	3	209.00	318.53	1	0	0	0	0
5066.18	1047.37	1	4.65	353.98	1	0	0	0	0
5200.58	1081.01	3	209.00	323.53	1	0	0	0	0
5261.50	1068.70	6	16.00	567.70	1	0	0	0	0
5360.93	1029.04	6	20.05	1167.30	1	0	0	0	0
5451.42	1038.46	6	22.03	1180.32	1	0	0	0	0
5461.09	1093.51	3	5.53	393.58	0	0	0	1	0
5469.09	1076.57	3	3.28	403.58	0	0	0	1	0
5528.09	1035.50	3	12.00	382.73	0	1	0	0	0
5533.84	1035.96	6	138.13	499.45	1	0	0	0	0
5556.59	1022.66	6	16.13	1294.83	1	0	0	0	0

5616.00	1036.33	3	17.80	394.63	0	1	0	0	0
5626.08	1045.17	6	138.13	494.45	1	0	0	0	0
5662.09	1027.59	4	18.23	406.17	1	0	0	0	0
5686.42	1037.07	6	138.13	514.45	1	0	0	0	0
5778.34	1036.70	4	18.23	411.17	1	0	0	0	0
5802.92	993.64	5	5.00	568.10	0	1	0	0	0
5819.26	1410.84	5	84.07	508.75	0	0	0	0	1
5827.68	1738.98	6	319.80	1150.88	0	0	0	0	1
5839.84	1743.10	6	319.80	1150.88	0	0	0	0	1
5874.18	1106.17	2	12.80	386.10	0	0	1	0	0
5883.51	1083.17	2	18.45	409.55	0	0	1	0	0
5886.25	1021.52	4	18.23	416.17	1	0	0	0	0
5891.51	1399.76	5	84.07	528.75	0	0	0	0	1
5960.51	991.03	5	11.07	569.10	0	1	0	0	0
5960.51	991.03	5	12.00	566.10	0	1	0	0	0
5964.92	1080.57	2	42.45	397.28	0	0	1	0	0
6004.93	1082.51	3	248.00	379.70	0	0	1	0	0
6138.92	1031.89	5	240.17	406.63	0	1	0	0	0
6184.59	1003.80	4	24.07	1888.80	0	0	1	0	0
6266.94	1072.48	3	248.00	406.48	0	0	1	0	0
6270.75	1036.36	5	241.17	411.63	0	1	0	0	0
6307.93	1071.90	3	248.00	411.22	0	0	1	0	0
6340.35	1017.43	4	26.35	1898.92	0	0	1	0	0
6375.76	1520.56	5	262.00	487.00	0	0	0	1	0
6375.93	1039.54	4	26.35	1850.12	0	0	1	0	0
6436.18	1488.90	5	34.17	536.30	0	0	0	1	0
6493.68	1485.72	5	36.25	555.05	0	0	0	1	0
6502.18	1489.87	5	34.17	551.30	0	0	0	1	0
6634.76	1020.79	5	254.00	620.23	0	0	1	0	0
6724.60	1478.49	5	34.17	566.30	0	0	0	1	0
6800.68	1047.92	3	14.87	535.60	0	0	1	0	0
6838.85	1034.96	3	14.87	556.23	0	0	1	0	0
6909.92	1013.39	5	167.45	684.97	0	0	1	0	0
6911.43	1036.44	3	5.80	537.95	0	0	1	0	0
6912.09	1016.57	5	167.45	664.97	0	0	1	0	0

Table C.14: Non-dominated solutions obtained for problem instance HHC_25_75_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-348.00	358.60	1	440.20	20.00	0	0	0	1	0
-212.83	374.05	1	471.22	5.00	0	0	1	0	0
-153.67	366.45	2	428.62	25.00	0	0	0	0	1
157.42	378.16	1	416.33	15.00	1	0	0	0	0
206.92	372.40	2	392.00	40.00	0	0	0	0	1
221.50	344.47	1	406.58	50.00	1	0	0	0	0
309.75	339.65	2	413.17	40.00	0	1	0	0	0
316.75	364.78	1	415.23	30.47	1	0	0	0	0
369.75	370.30	1	400.48	20.00	0	0	0	1	0
499.99	352.70	4	0.07	55.00	0	0	0	0	1
500.09	352.64	4	0.37	55.00	0	0	0	0	1
630.51	1059.90	9	34.82	195.00	0	1	0	0	0
671.60	1061.89	9	31.72	195.00	0	1	0	0	0
742.89	720.05	7	324.55	115.00	0	0	0	0	1
757.56	1587.45	10	399.58	200.00	0	1	0	0	0
765.34	355.44	4	9.67	80.00	0	0	0	1	0
773.19	1579.64	10	399.58	200.18	0	1	0	0	0
847.17	310.44	5	2.07	100.00	0	1	0	0	0
912.50	315.07	5	0.57	100.00	0	1	0	0	0
916.06	712.24	7	324.55	130.00	0	0	0	0	1
959.67	353.71	4	1.87	90.00	0	0	0	1	0
961.08	333.68	5	2.62	100.00	0	0	1	0	0
965.17	331.63	5	8.38	100.00	0	0	1	0	0
1039.42	718.00	8	8.37	135.00	1	0	0	0	0
1193.75	341.13	4	4.88	90.00	0	0	0	1	0
1237.42	697.75	8	1.80	143.23	0	0	1	0	0
1239.42	696.75	8	12.52	135.00	0	0	1	0	0
1280.26	324.88	3	0.07	381.12	0	0	0	1	0
1343.83	309.17	4	306.53	91.20	0	1	0	0	0
1366.01	712.42	8	8.37	145.00	1	0	0	0	0
1407.17	1046.02	8	21.63	165.00	0	0	0	0	1

1419.54	328.14	4	6.48	524.80	0	0	1	0	0
1525.09	1061.75	8	21.63	155.00	0	0	0	0	1
1582.51	304.79	3	9.77	355.97	0	0	0	1	0
1632.10	1212.31	3	16.13	115.00	1	0	0	0	0
1652.19	318.74	0	0.15	100.00	0	0	0	1	0
1757.84	1088.21	8	242.13	168.12	1	0	0	0	0
1757.84	1088.21	8	245.82	165.00	1	0	0	0	0
1764.42	1075.25	8	252.90	175.00	1	0	0	0	0
1798.09	315.89	0	0.00	115.00	0	0	0	1	0
1823.51	324.09	0	0.00	115.00	0	0	0	1	0
1848.59	307.00	0	0.85	115.00	0	0	1	0	0
1873.25	308.31	3	1.00	537.65	0	1	0	0	0
1882.59	307.77	0	8.13	96.23	0	0	1	0	0
1896.34	306.28	4	21.82	376.12	0	0	0	1	0
1997.84	687.45	6	320.87	295.12	0	0	0	1	0
2019.17	307.24	0	13.67	150.00	0	0	0	0	1
2023.25	290.22	0	11.67	160.00	0	0	0	0	1
2103.51	339.80	0	0.35	122.75	1	0	0	0	0
2103.51	339.80	0	4.35	122.55	1	0	0	0	0
2127.79	1395.11	9	31.57	684.42	0	1	0	0	0
2151.35	1389.29	9	32.75	684.42	0	1	0	0	0
2177.34	276.85	3	1.30	438.52	1	0	0	0	0
2177.34	276.85	3	18.30	424.72	1	0	0	0	0
2227.51	288.57	3	15.08	428.52	1	0	0	0	0
2258.75	283.71	3	16.48	695.28	0	0	0	0	1
2260.76	706.02	5	10.88	125.00	0	0	0	1	0
2266.93	1409.67	9	31.57	666.53	0	1	0	0	0
2405.50	1071.98	8	255.72	180.00	0	0	1	0	0
2409.51	1069.87	8	257.82	180.00	0	0	1	0	0
2414.84	291.52	3	22.48	748.08	0	0	0	0	1
2525.92	702.90	5	10.88	135.00	0	0	0	1	0
2571.75	696.65	5	10.88	145.00	0	0	0	1	0
2615.01	627.47	7	243.90	380.25	1	0	0	0	0
2628.07	1027.91	6	9.50	219.68	0	1	0	0	0
2632.08	1025.90	6	27.90	212.68	0	1	0	0	0
2653.68	1032.98	7	4.88	365.12	0	0	0	1	0
2660.60	634.39	7	247.90	386.97	1	0	0	0	0
2671.34	1178.77	4	7.82	190.00	0	0	0	0	1

2672.68	1027.94	7	7.20	374.67	0	0	0	1	0
2756.59	1043.92	8	260.28	205.00	0	0	0	0	1
2830.17	682.62	5	12.52	201.87	0	0	1	0	0
2830.17	682.62	5	10.62	202.10	0	0	1	0	0
2927.34	1169.40	4	7.82	205.00	0	0	0	0	1
2985.42	1046.29	8	260.28	225.00	0	0	0	0	1
3010.60	610.95	7	263.90	418.63	1	0	0	0	0
3206.84	992.79	7	12.70	302.70	0	0	0	1	0
3233.16	1019.13	8	46.67	403.77	0	0	1	0	0
3381.68	1091.76	8	17.25	340.00	1	0	0	0	0
3389.51	1091.81	8	15.25	340.00	1	0	0	0	0
3402.76	595.41	7	241.72	729.77	0	0	0	0	1
3461.84	610.04	7	260.28	704.77	0	0	0	0	1
3466.43	1090.02	8	15.25	350.00	1	0	0	0	0
3525.67	644.26	7	1.48	386.78	0	0	1	0	0
3677.25	1028.15	6	444.95	281.87	0	0	1	0	0
3694.77	993.04	4	252.67	266.15	0	0	0	1	0
3937.67	964.79	8	13.52	619.67	0	0	0	0	1
3940.59	974.17	8	13.52	604.67	0	0	0	0	1
4016.76	627.45	2	31.85	386.78	0	0	1	0	0
4050.76	628.21	2	8.13	368.02	0	0	1	0	0
4050.76	628.21	2	30.48	365.00	0	0	1	0	0
4293.17	606.78	4	92.90	1076.55	0	1	0	0	0
4377.51	729.14	1	11.35	309.75	1	0	0	0	0
4415.08	606.67	4	46.58	1129.90	0	1	0	0	0
4516.42	1320.88	7	71.10	442.48	0	0	1	0	0
4527.34	736.69	1	75.35	304.55	1	0	0	0	0
4612.76	724.97	1	11.35	319.75	1	0	0	0	0
4636.50	1126.06	5	240.15	321.43	0	1	0	0	0
4747.25	1114.73	5	240.15	332.70	0	1	0	0	0
4769.58	1317.96	7	50.17	917.32	0	0	1	0	0
4803.60	617.81	5	262.00	287.77	0	0	0	1	0
4835.68	618.69	4	243.45	292.77	0	0	0	1	0
4854.50	1013.04	5	242.33	307.65	0	0	1	0	0
4862.01	613.76	4	191.72	297.55	0	0	0	1	0
4919.43	613.20	4	244.00	302.77	0	0	0	1	0
4986.50	1108.48	5	240.15	352.70	0	1	0	0	0
4998.09	588.78	5	252.15	570.02	0	1	0	0	0

5006.01	981.19	5	240.47	317.65	0	0	1	0	0
5026.59	986.26	5	244.55	316.42	0	0	1	0	0
5052.54	1008.80	4	25.15	436.23	0	0	0	1	0
5053.51	1697.26	9	369.65	826.93	0	1	0	0	0
5066.60	1001.77	4	16.15	444.18	0	0	0	1	0
5069.72	1000.21	4	14.15	446.18	0	0	0	1	0
5208.16	1064.88	4	221.85	366.18	0	0	0	0	1
5255.84	1684.76	9	369.65	836.93	0	1	0	0	0
5265.25	584.88	5	251.53	641.53	0	1	0	0	0
5267.92	584.88	5	252.15	641.53	0	1	0	0	0
5304.25	1057.07	4	241.85	386.18	0	0	0	0	1
5396.51	958.81	5	23.12	481.78	0	0	1	0	0
5430.51	959.58	5	8.13	476.90	0	0	1	0	0
5430.51	959.58	5	24.12	463.02	0	0	1	0	0
5473.66	1060.55	4	241.85	401.18	0	0	0	0	1
5491.26	930.94	8	54.07	778.23	0	1	0	0	0
5510.92	935.20	8	54.07	872.15	0	1	0	0	0
5510.92	935.20	8	57.15	849.15	0	1	0	0	0
5517.50	1311.54	7	250.58	429.20	0	0	1	0	0
5520.42	947.52	7	54.07	474.18	0	1	0	0	0
5567.68	909.93	6	54.07	484.50	0	1	0	0	0
5639.16	1022.00	4	20.10	717.95	0	0	0	0	1
5639.16	1022.00	4	37.85	677.63	0	0	0	0	1
5649.49	1055.20	4	20.10	671.78	0	0	0	0	1
5689.84	1311.61	7	250.58	429.20	0	0	1	0	0
5720.76	912.67	7	54.07	504.18	0	1	0	0	0
5813.43	1272.49	8	262.00	432.77	0	0	0	1	0
5845.52	1274.21	8	262.00	427.77	0	0	0	1	0
5851.09	1293.76	8	262.00	432.77	0	0	0	1	0
5890.85	1271.60	8	262.00	437.77	0	0	0	1	0
5923.34	1060.93	4	21.35	421.48	1	0	0	0	0
5932.43	1060.93	4	5.35	429.75	1	0	0	0	0
5932.43	1060.93	4	21.35	422.23	1	0	0	0	0
5951.00	923.31	8	174.47	542.85	0	0	0	0	1
5953.00	1412.01	8	61.87	691.78	0	0	0	0	1
5963.92	934.71	8	162.47	537.53	0	0	0	0	1
5976.17	1425.41	8	20.10	681.78	0	0	0	0	1
6125.35	1410.47	7	311.97	488.87	1	0	0	0	0

6149.58	1407.84	8	63.98	696.78	0	0	0	0	1
6357.85	1783.79	8	333.68	512.22	1	0	0	0	0
6397.18	1382.32	8	262.82	617.87	0	0	0	0	1
6457.85	1775.97	8	311.97	518.87	1	0	0	0	0
6908.16	1328.20	8	20.10	1535.42	0	0	0	0	1
6921.83	1324.29	8	20.10	1701.57	0	0	0	0	1
6932.16	1357.49	8	20.10	1667.40	0	0	0	0	1

Table C.15: Non-dominated solutions obtained for problem instance HHC_25_100_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-1797.38	3582.40	13	599.23	200.00	0	0	0	1	0
-285.67	356.77	1	461.43	5.00	0	0	0	1	0
-229.00	355.03	1	467.10	5.00	0	1	0	0	0
-224.50	378.09	1	446.30	5.00	1	0	0	0	0
-86.67	381.38	1	435.48	10.00	1	0	0	0	0
-41.50	372.55	2	422.08	20.00	0	0	0	0	1
14.92	349.33	2	388.98	25.00	0	1	0	0	0
45.17	451.46	5	1.00	70.00	0	0	1	0	0
82.67	373.28	3	403.02	25.00	0	0	0	0	1
84.67	486.40	2	413.28	20.00	0	0	1	0	0
123.00	367.55	3	2.33	40.00	0	1	0	0	0
138.91	2427.91	12	424.72	190.00	0	0	0	1	0
307.00	348.07	1	410.88	20.00	0	0	1	0	0
347.42	374.19	4	14.38	60.00	0	1	0	0	0
509.09	2496.77	13	396.78	241.02	0	0	1	0	0
634.00	498.16	4	348.33	50.00	0	0	0	1	0
692.84	297.46	3	0.05	434.17	0	0	0	0	1
692.92	297.42	3	1.13	434.17	0	0	0	0	1
695.09	495.00	5	21.85	55.00	0	0	0	1	0
746.67	455.04	6	6.00	75.00	0	0	1	0	0
776.09	1258.21	11	50.35	216.02	0	0	1	0	0

799.84	1265.53	11	36.13	216.02	0	0	1	0	0
832.34	1888.55	10	282.82	130.00	1	0	0	0	0
875.58	1576.53	10	313.23	130.00	0	1	0	0	0
953.00	337.94	0	0.83	35.00	0	1	0	0	0
1046.02	355.55	0	1.75	60.00	0	0	0	0	1
1048.75	354.18	0	3.10	60.00	0	0	0	0	1
1060.09	1797.82	11	315.65	160.00	0	0	0	0	1
1139.09	1803.65	11	315.65	155.00	0	0	0	0	1
1213.34	1882.30	10	282.82	140.00	1	0	0	0	0
1233.25	1569.11	10	317.75	135.00	0	1	0	0	0
1258.67	1087.54	5	27.27	80.00	0	1	0	0	0
1259.33	1090.39	5	18.57	90.00	0	1	0	0	0
1294.75	335.02	1	14.83	45.00	0	1	0	0	0
1339.17	1799.69	11	284.02	160.00	0	0	0	0	1
1380.68	1300.27	6	1.77	110.00	0	0	0	0	1
1381.17	1300.02	6	6.75	110.00	0	0	0	0	1
1455.76	1587.45	11	82.05	350.28	0	0	0	0	1
1687.42	359.74	0	1.08	70.00	1	0	0	0	0
1722.17	308.07	0	4.02	110.00	0	0	0	1	0
1837.26	1581.52	11	82.05	360.28	0	0	0	0	1
1898.50	1583.08	11	82.05	360.28	0	0	0	0	1
1905.65	1330.50	10	646.15	214.83	0	0	0	1	0
1935.09	1364.75	5	10.18	100.00	1	0	0	0	0
2006.27	1280.19	10	577.15	234.07	0	0	0	1	0
2023.00	347.62	0	1.48	90.00	1	0	0	0	0
2077.34	1535.79	11	38.63	492.35	0	0	1	0	0
2123.17	426.02	5	8.90	344.45	1	0	0	0	0
2125.95	1343.22	7	11.08	130.00	0	0	1	0	0
2130.33	1341.04	7	12.20	130.00	0	0	1	0	0
2136.25	1529.42	11	44.83	492.63	0	0	1	0	0
2173.17	426.02	5	1.90	350.78	1	0	0	0	0
2254.93	435.61	5	6.03	327.15	1	0	0	0	0
2258.33	1656.15	11	53.30	798.55	0	0	0	1	0
2281.17	1652.16	11	53.30	833.55	0	0	0	1	0
2331.76	713.92	7	22.40	433.65	0	0	1	0	0
2354.68	779.03	7	14.85	783.82	0	0	0	1	0
2354.68	779.03	7	14.85	775.32	0	0	0	1	0
2357.93	1352.60	5	10.18	120.00	1	0	0	0	0

2372.17	427.85	1	8.68	123.72	0	0	1	0	0
2387.33	427.85	1	35.75	120.00	0	0	1	0	0
2390.67	704.99	6	16.40	416.07	0	0	1	0	0
2448.34	734.28	5	171.88	576.03	0	0	0	0	1
2741.25	815.71	7	279.70	285.87	1	0	0	0	0
2759.42	1205.75	9	9.78	165.00	0	0	0	1	0
2876.59	1298.43	10	21.07	330.87	1	0	0	0	0
2910.51	1280.25	10	21.07	350.87	1	0	0	0	0
2963.50	1202.51	9	9.78	175.00	0	0	0	1	0
3012.66	1536.20	7	435.33	210.00	0	1	0	0	0
3115.76	1148.35	9	310.38	482.18	0	0	1	0	0
3215.17	1017.29	8	31.38	707.00	0	1	0	0	0
3239.66	1016.52	8	33.62	707.00	0	1	0	0	0
3295.36	666.86	3	16.27	180.00	0	1	0	0	0
3500.99	1029.98	6	184.03	200.00	0	1	0	0	0
3549.51	1036.48	6	188.53	215.00	0	1	0	0	0
3576.84	791.21	8	254.88	325.87	1	0	0	0	0
3699.89	1058.51	6	194.53	235.00	0	1	0	0	0
3718.08	652.56	3	199.27	180.00	0	1	0	0	0
3718.08	652.56	3	166.27	190.00	0	1	0	0	0
3922.34	771.90	8	151.55	362.12	1	0	0	0	0
3933.84	731.61	7	246.78	714.93	0	0	0	1	0
3935.76	1308.40	6	258.05	194.72	1	0	0	0	0
3943.08	731.61	7	269.15	707.95	0	0	0	1	0
4058.01	1305.27	6	258.05	199.72	1	0	0	0	0
4064.24	639.79	3	4.50	225.00	0	1	0	0	0
4088.73	1316.66	6	274.98	199.72	1	0	0	0	0
4088.73	639.01	3	4.92	225.00	0	1	0	0	0
4109.34	746.40	6	252.92	302.62	0	0	0	0	1
4177.76	730.19	6	252.92	317.62	0	0	0	0	1
4185.00	744.52	5	275.92	310.18	0	0	0	0	1
4186.66	632.39	4	251.73	405.68	0	1	0	0	0
4210.50	1592.80	11	283.08	353.45	0	0	0	0	1
4233.00	1590.57	11	283.08	363.45	0	0	0	0	1
4423.17	705.13	2	16.40	434.78	0	0	1	0	0
4460.51	714.06	3	41.40	409.78	0	0	1	0	0
4472.76	1232.99	7	262.97	245.00	0	0	1	0	0
4475.67	714.06	3	45.40	406.07	0	0	1	0	0

4480.01	751.08	7	153.47	488.55	1	0	0	0	0
4482.51	787.17	5	248.35	373.25	1	0	0	0	0
4485.41	607.20	3	255.93	441.58	0	1	0	0	0
4489.75	1575.48	11	285.07	386.47	0	0	0	0	1
4524.98	1984.88	11	590.53	373.32	0	0	0	1	0
4551.83	1727.49	10	315.63	385.00	0	1	0	0	0
4554.92	780.43	7	30.68	457.30	1	0	0	0	0
4566.58	1743.98	10	315.63	370.00	0	1	0	0	0
4569.58	1744.46	10	323.63	374.10	0	1	0	0	0
4579.83	624.58	4	265.50	415.68	0	1	0	0	0
4581.08	757.85	5	287.73	432.63	1	0	0	0	0
4582.00	768.04	5	287.73	422.63	1	0	0	0	0
4622.76	1226.01	7	262.97	261.55	0	0	1	0	0
4638.73	1928.00	11	530.53	400.62	0	0	0	1	0
4693.57	981.69	6	29.33	300.00	0	1	0	0	0
4719.41	995.70	6	31.38	290.00	0	1	0	0	0
4740.00	607.12	3	26.83	495.45	0	0	0	1	0
4786.17	607.12	3	29.83	486.25	0	0	0	1	0
4788.16	992.23	6	31.38	300.00	0	1	0	0	0
4792.50	642.09	3	250.55	241.25	0	0	0	1	0
4802.92	615.67	2	44.83	267.27	0	0	0	1	0
4900.50	638.81	3	247.00	247.80	0	0	0	1	0
4902.42	1106.99	6	18.43	296.02	0	0	0	1	0
5002.26	610.20	2	44.83	282.27	0	0	0	1	0
5041.00	1101.03	6	32.42	306.02	0	0	0	1	0
5077.28	1881.79	12	284.42	763.65	0	0	0	1	0
5098.58	1128.70	8	180.83	291.02	0	0	0	1	0
5115.17	1095.02	8	22.00	537.00	0	0	0	1	0
5132.94	1881.79	12	284.42	781.67	0	0	0	1	0
5208.25	1112.95	8	180.83	301.02	0	0	0	1	0
5251.09	1569.04	11	92.40	946.07	0	0	1	0	0
5289.25	1178.94	7	35.75	438.30	0	0	1	0	0
5289.25	1178.94	7	43.65	426.30	0	0	1	0	0
5352.42	1164.15	7	35.75	476.07	0	0	1	0	0
5391.84	1602.97	11	114.00	905.63	0	0	1	0	0
5393.17	1089.10	8	28.00	525.00	0	0	0	1	0
5424.18	1279.26	6	17.67	324.18	1	0	0	0	0
5431.01	1706.42	10	267.47	415.80	1	0	0	0	0

5445.09	1692.98	10	265.25	430.80	1	0	0	0	0
5452.01	1824.03	12	124.30	1569.17	0	0	0	1	0
5452.01	1824.03	12	124.32	1538.17	0	0	0	1	0
5546.43	1276.14	6	17.67	329.18	1	0	0	0	0
5554.43	1693.60	10	267.47	440.80	1	0	0	0	0
5597.84	1277.18	6	17.67	329.18	1	0	0	0	0
5692.17	1247.42	9	20.83	578.38	1	0	0	0	0
5693.43	1949.38	13	269.82	591.12	0	0	1	0	0
5712.25	1257.24	9	20.83	563.38	1	0	0	0	0
5774.50	1256.20	9	20.83	568.38	1	0	0	0	0
5788.18	1591.42	10	84.83	910.63	0	0	1	0	0
5791.34	2445.56	14	399.20	978.58	0	0	1	0	0
5827.76	1946.95	13	269.82	601.12	0	0	1	0	0

Table C.16: Non-dominated solutions obtained for problem instance HHC_50_100_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-291.08	750.49	4	8.83	65.00	0	0	0	1	0
-166.00	352.08	1	419.92	10.00	0	0	0	1	0
-124.00	344.46	1	447.60	20.00	1	0	0	0	0
-113.67	348.26	1	463.63	10.00	0	0	0	1	0
-46.17	356.61	1	439.45	10.00	0	0	0	1	0
68.09	368.86	2	421.67	30.00	1	0	0	0	0
173.59	2196.70	10	336.80	200.00	0	1	0	0	0
181.42	362.41	3	2.83	55.00	0	0	0	1	0
184.00	729.85	4	421.68	40.00	0	0	1	0	0
208.17	385.49	2	420.92	20.00	0	0	0	0	1
244.18	2188.95	10	325.80	205.00	0	1	0	0	0
350.00	376.49	3	341.15	30.00	0	0	1	0	0
361.17	349.37	5	14.17	85.00	0	0	1	0	0
404.67	362.05	5	50.92	80.00	0	0	0	0	1
429.25	726.71	6	20.10	85.27	0	0	1	0	0

529.00	711.09	7	20.10	115.00	0	0	1	0	0
572.84	355.30	4	303.43	50.00	0	1	0	0	0
662.64	501.83	6	4.85	95.00	1	0	0	0	0
666.17	1070.87	9	295.88	165.00	0	0	0	0	1
673.25	496.53	6	11.15	95.00	1	0	0	0	0
833.59	1174.47	9	124.80	191.25	1	0	0	0	0
945.17	361.17	0	0.10	45.00	0	1	0	0	0
957.67	356.74	4	279.20	70.00	0	0	1	0	0
973.84	361.17	0	17.10	45.00	0	1	0	0	0
982.67	1616.12	5	40.58	115.00	0	1	0	0	0
1016.25	314.96	1	35.48	75.48	0	0	1	0	0
1048.18	1992.27	11	315.63	241.25	1	0	0	0	0
1064.09	347.49	4	287.43	60.00	0	1	0	0	0
1105.08	1589.09	5	26.18	120.00	0	1	0	0	0
1169.09	1807.08	9	297.48	185.00	0	0	0	1	0
1176.92	351.62	0	0.10	65.00	0	1	0	0	0
1184.67	1786.98	11	365.48	235.00	0	0	0	0	1
1239.17	355.73	0	10.47	65.00	0	1	0	0	0
1254.25	1886.18	11	317.18	250.00	0	0	0	0	1
1261.25	318.67	2	2.80	80.00	0	0	1	0	0
1283.75	1886.31	11	304.18	250.00	0	0	0	0	1
1293.00	320.19	2	14.78	85.00	0	0	1	0	0
1400.42	2424.98	11	158.48	451.32	0	0	0	0	1
1433.93	1988.99	11	300.48	251.25	1	0	0	0	0
1481.34	336.02	1	20.58	92.77	0	0	0	1	0
1513.09	324.33	1	9.82	115.00	0	0	0	0	1
1515.09	344.68	1	5.87	92.77	0	0	0	1	0
1548.92	313.61	0	0.00	106.33	1	0	0	0	0
1552.92	304.49	0	42.90	150.00	0	0	0	0	1
1554.17	344.14	4	287.43	70.00	0	1	0	0	0
1608.67	1037.47	5	17.58	150.00	0	0	0	1	0
1619.18	2030.41	11	318.57	266.25	1	0	0	0	0
1623.17	1418.83	8	278.95	175.00	0	0	0	1	0
1636.42	313.61	0	13.00	111.45	1	0	0	0	0
1641.59	1418.99	8	278.95	175.00	0	0	0	1	0
1661.51	1525.34	10	264.97	215.00	0	0	1	0	0
1669.09	329.13	1	36.58	98.85	0	0	0	1	0
1700.50	2413.26	11	158.48	481.32	0	0	0	0	1

1704.43	1526.33	10	264.97	215.00	0	0	1	0	0
1738.58	1985.16	10	45.83	493.82	0	0	1	0	0
1740.67	308.71	1	20.82	150.00	0	0	0	0	1
1752.83	1984.58	10	45.83	513.82	0	0	1	0	0
1811.75	647.91	6	36.77	343.82	0	0	1	0	0
1861.42	1003.55	9	303.15	634.43	0	0	0	0	1
1861.42	1003.55	9	306.15	631.43	0	0	0	0	1
1943.75	637.21	6	31.75	353.82	0	0	1	0	0
1961.42	1001.20	9	304.00	633.58	0	0	0	0	1
2023.91	1986.72	10	48.75	370.00	0	0	1	0	0
2028.33	627.83	6	38.05	373.82	0	0	1	0	0
2036.76	689.04	5	8.83	151.95	0	0	0	1	0
2071.84	1520.45	10	264.97	225.00	0	0	1	0	0
2131.93	1520.66	10	264.97	225.00	0	0	1	0	0
2150.58	1992.20	10	49.38	370.00	0	0	1	0	0
2153.85	593.35	5	4.00	497.78	1	0	0	0	0
2167.70	1176.50	7	15.98	200.00	1	0	0	0	0
2178.42	1171.15	7	16.65	200.00	1	0	0	0	0
2239.25	642.24	6	31.75	353.82	0	0	1	0	0
2249.01	673.41	5	8.83	171.95	0	0	0	1	0
2353.75	781.62	8	242.15	486.48	1	0	0	0	0
2365.44	596.19	5	4.00	497.78	1	0	0	0	0
2390.50	684.35	5	44.20	161.95	0	0	0	1	0
2563.52	584.84	5	4.00	532.78	1	0	0	0	0
2580.83	782.08	8	242.15	491.48	1	0	0	0	0
2583.17	1372.75	8	17.58	250.00	0	0	0	1	0
2620.34	1380.35	8	17.58	251.20	0	0	0	1	0
2652.92	1365.22	8	17.58	261.83	0	0	0	1	0
2709.58	772.53	8	242.15	506.48	1	0	0	0	0
2753.51	1029.12	6	383.67	231.58	0	0	0	1	0
2774.92	619.14	7	12.28	381.90	0	0	0	0	1
2776.59	619.14	7	12.28	545.20	0	0	0	0	1
2882.00	629.29	7	10.28	531.67	0	0	0	0	1
2980.08	1510.35	6	385.93	215.00	0	1	0	0	0
2982.68	1116.53	9	4.00	371.07	1	0	0	0	0
3072.76	1012.61	6	305.57	242.03	0	0	1	0	0
3153.01	632.23	4	119.85	225.00	0	1	0	0	0
3193.85	1079.20	9	12.00	392.98	1	0	0	0	0

3198.34	1013.21	5	408.28	226.07	0	0	1	0	0
3201.67	697.93	2	247.57	141.60	0	1	0	0	0
3206.69	1094.66	9	4.00	391.07	1	0	0	0	0
3340.67	686.21	2	247.57	156.60	0	1	0	0	0
3454.84	689.89	3	243.33	161.60	0	1	0	0	0
3468.34	654.73	3	71.87	213.78	0	0	0	1	0
3492.50	1469.20	9	429.13	331.45	1	0	0	0	0
3514.25	640.78	3	42.70	235.80	0	0	0	1	0
3593.84	678.17	3	247.57	176.60	0	1	0	0	0
3834.59	623.56	3	38.58	238.78	0	0	0	1	0
3870.00	910.16	8	143.10	722.10	0	0	0	0	1
3958.67	1510.70	7	248.25	338.12	1	0	0	0	0
4145.34	721.56	6	191.40	443.97	1	0	0	0	0
4152.00	1079.53	9	36.22	664.73	1	0	0	0	0
4180.17	1066.53	9	75.38	825.57	1	0	0	0	0
4212.34	1068.89	9	47.40	1091.30	1	0	0	0	0
4237.51	996.90	6	37.58	283.78	0	0	0	1	0
4258.42	756.08	6	248.60	412.52	1	0	0	0	0
4279.09	961.78	7	33.32	467.97	0	0	0	0	1
4280.93	944.07	8	250.02	947.35	0	0	0	0	1
4303.51	990.26	6	49.83	276.83	0	0	0	1	0
4333.26	940.31	7	33.32	492.97	0	0	0	0	1
4349.26	727.46	6	191.40	448.97	1	0	0	0	0
4443.09	1010.12	6	30.47	275.00	0	1	0	0	0
4449.51	983.46	5	281.95	293.78	0	0	0	1	0
4582.09	998.40	6	30.47	290.00	0	1	0	0	0
4591.01	994.40	5	249.95	283.78	0	0	0	1	0
4591.26	992.21	6	49.83	293.78	0	0	0	1	0
4591.92	997.98	7	162.73	346.23	0	0	1	0	0
4591.92	997.98	7	174.97	339.20	0	0	1	0	0
4618.92	994.32	5	249.95	298.78	0	0	0	1	0
4644.17	1443.35	11	263.83	390.00	0	0	1	0	0
4668.75	1454.29	11	263.83	370.00	0	0	1	0	0
4671.75	1836.48	11	246.57	385.00	0	0	1	0	0
4690.76	984.92	6	30.47	310.00	0	1	0	0	0
4701.67	925.29	7	250.02	529.90	0	0	0	0	1
4720.09	931.41	7	250.02	519.90	0	0	0	0	1
4776.34	924.41	7	250.02	544.90	0	0	0	0	1

4803.26	978.78	5	249.95	303.78	0	0	0	1	0
4803.51	976.59	6	49.83	313.78	0	0	0	1	0
4822.84	995.58	6	30.47	320.00	0	1	0	0	0
4844.42	1701.09	9	291.45	383.53	0	0	0	1	0
4869.08	1718.46	9	259.48	373.12	0	0	0	1	0
4956.09	969.30	6	243.33	310.00	0	1	0	0	0
4961.84	983.86	6	281.72	315.00	0	1	0	0	0
4970.18	1831.90	11	246.57	405.00	0	0	1	0	0
4985.91	1712.03	9	297.48	373.02	0	0	0	1	0
5014.09	963.61	6	243.33	325.00	0	1	0	0	0
5153.09	951.89	6	243.33	340.00	0	1	0	0	0
5198.16	1696.40	9	291.45	393.53	0	0	0	1	0
5416.92	1801.79	10	271.87	569.88	1	0	0	0	0
5421.26	1804.49	10	271.87	562.88	1	0	0	0	0
5465.01	1793.10	10	272.60	577.88	1	0	0	0	0

Table C.17: Non-dominated solutions obtained for problem instance HHC_50_150_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-1306.00	3211.97	10	431.47	195.00	0	0	0	0	1
-446.50	2307.30	9	331.70	150.00	1	0	0	0	0
-355.42	2302.22	9	382.42	155.00	1	0	0	0	0
-275.02	885.28	4	23.35	75.00	0	1	0	0	0
-263.90	879.72	4	43.77	75.00	0	1	0	0	0
-27.12	741.78	4	15.93	85.00	0	1	0	0	0
-23.92	2291.32	9	331.70	160.00	1	0	0	0	0
10.50	2295.49	9	331.70	160.00	1	0	0	0	0
80.34	351.99	3	20.17	75.17	0	1	0	0	0
103.83	351.28	1	400.57	10.00	1	0	0	0	0
145.59	482.45	4	23.10	90.00	0	0	1	0	0
166.59	701.53	3	368.18	50.00	0	0	0	0	1
193.25	340.01	2	318.98	40.00	0	0	0	0	1

284.75	703.06	3	342.40	45.00	1	0	0	0	0
286.42	2290.15	9	368.55	170.00	0	0	1	0	0
352.84	1926.03	9	330.08	175.00	0	1	0	0	0
416.00	347.92	2	335.25	30.00	0	0	1	0	0
430.42	343.92	1	398.70	30.00	0	0	1	0	0
442.75	695.44	4	310.53	65.00	1	0	0	0	0
458.92	343.99	2	415.20	30.00	0	1	0	0	0
474.92	352.15	2	372.40	30.00	0	1	0	0	0
497.00	1924.64	9	338.40	175.00	0	1	0	0	0
551.26	2331.11	9	376.65	180.00	0	0	1	0	0
595.83	2276.76	10	372.88	200.00	0	0	1	0	0
601.79	1223.89	5	25.77	115.00	0	1	0	0	0
633.61	1238.36	5	23.35	115.00	0	1	0	0	0
690.50	346.14	0	11.97	35.00	0	0	0	0	1
726.33	341.21	2	387.57	45.00	1	0	0	0	0
799.08	359.64	0	6.30	35.00	0	0	0	0	1
815.75	361.60	0	10.30	35.00	0	0	0	0	1
880.19	828.53	6	73.82	200.00	0	0	0	1	0
883.92	341.85	2	347.77	40.00	0	0	1	0	0
905.75	1916.44	9	334.70	185.00	0	1	0	0	0
923.34	1919.17	9	334.70	185.00	0	1	0	0	0
980.56	1206.26	9	33.75	225.80	0	0	0	1	0
1026.34	1183.37	9	33.30	235.00	0	0	0	1	0
1066.00	338.84	1	4.43	45.00	1	0	0	0	0
1223.77	335.44	0	3.70	70.00	0	0	1	0	0
1248.41	335.65	1	0.12	50.00	0	1	0	0	0
1248.58	335.57	1	12.88	50.00	0	1	0	0	0
1252.91	345.26	1	0.53	60.00	0	1	0	0	0
1292.83	1577.40	5	123.20	125.00	0	0	1	0	0
1324.92	341.47	2	1.45	50.00	1	0	0	0	0
1349.17	1580.25	5	123.20	125.00	0	0	1	0	0
1366.17	330.55	0	4.95	75.00	0	0	1	0	0
1538.17	654.11	4	27.25	190.00	0	1	0	0	0
1637.56	1012.23	6	29.10	175.00	1	0	0	0	0
1650.59	1005.71	6	28.63	180.32	1	0	0	0	0
1650.59	1005.71	6	27.63	181.92	1	0	0	0	0
1672.25	1575.78	5	122.83	135.00	0	0	1	0	0
1740.42	328.28	2	10.88	70.00	0	1	0	0	0

1758.75	1654.65	10	288.38	230.00	0	0	0	1	0
1797.17	1571.91	5	123.83	145.00	0	0	1	0	0
1866.59	1001.34	6	27.63	211.92	1	0	0	0	0
1866.59	1001.34	6	26.63	212.32	1	0	0	0	0
1876.25	1523.52	8	87.50	255.17	0	1	0	0	0
1885.11	751.06	5	18.43	943.40	0	0	0	1	0
2002.09	1510.11	8	91.25	275.00	0	1	0	0	0
2006.92	656.83	5	20.17	175.17	0	1	0	0	0
2015.42	764.20	5	13.22	898.13	0	0	0	1	0
2030.01	646.82	5	40.25	200.00	0	1	0	0	0
2057.26	1073.07	7	282.30	782.35	0	0	0	1	0
2073.00	1649.30	10	264.38	235.00	0	0	0	1	0
2090.01	1530.75	8	91.25	260.00	0	1	0	0	0
2143.34	1164.01	6	8.88	232.55	0	0	0	1	0
2201.59	982.63	6	43.82	235.32	1	0	0	0	0
2214.07	1109.54	9	14.30	593.13	0	0	0	1	0
2224.17	1496.79	8	96.93	280.17	0	1	0	0	0
2331.11	1185.38	7	28.73	246.55	0	0	0	1	0
2357.34	1062.14	7	250.30	812.35	0	0	0	1	0
2408.26	1100.28	9	39.53	640.20	0	0	0	1	0
2640.00	629.96	5	19.82	215.00	1	0	0	0	0
2679.92	1529.10	7	181.20	215.00	0	0	1	0	0
2912.33	1048.35	4	398.33	170.83	1	0	0	0	0
3026.67	1530.56	5	429.40	223.60	0	0	1	0	0
3122.50	1593.39	2	439.60	211.30	0	0	0	0	1
3215.25	1087.68	7	174.22	1502.98	0	0	0	1	0
3216.92	1526.99	6	317.00	250.00	0	0	1	0	0
3243.59	1078.95	8	264.58	1384.43	0	0	0	1	0
3262.75	1083.08	8	154.75	1512.75	0	0	0	1	0
3300.84	1074.83	8	154.75	1542.98	0	0	0	1	0
3342.26	1098.64	8	87.58	1514.83	0	0	0	1	0
3523.67	673.17	1	258.30	160.00	0	0	0	0	1
3523.67	673.17	1	291.70	150.00	0	0	0	0	1
3580.83	594.29	6	189.82	301.92	1	0	0	0	0
3589.34	1068.69	8	192.75	1390.28	0	0	0	1	0
3602.41	671.03	1	291.70	160.00	0	0	0	0	1
3603.50	1076.83	6	156.22	1648.13	0	0	0	1	0
3640.42	611.64	5	179.43	245.00	1	0	0	0	0

3648.67	626.48	5	194.50	230.83	1	0	0	0	0
3726.33	610.42	5	181.82	265.00	1	0	0	0	0
3733.43	1083.25	8	150.02	1538.05	0	0	0	1	0
3771.67	1093.76	8	147.58	1649.50	0	0	0	1	0
3777.50	1328.08	6	82.40	330.00	1	0	0	0	0
3815.33	2199.95	9	283.28	380.00	1	0	0	0	0
3815.50	666.48	1	291.70	170.00	0	0	0	0	1
3922.59	1335.11	6	82.40	334.82	1	0	0	0	0
3951.75	1335.42	5	75.15	334.82	1	0	0	0	0
3954.50	2186.80	9	243.28	400.00	1	0	0	0	0
3998.83	2187.30	9	243.28	405.00	1	0	0	0	0
4103.49	2182.59	9	283.28	410.00	1	0	0	0	0
4110.16	1016.05	5	268.38	230.00	0	1	0	0	0
4150.42	1265.40	7	185.07	265.00	0	0	0	1	0
4177.67	1324.17	6	82.40	349.82	1	0	0	0	0
4225.17	1257.30	7	240.07	275.00	0	0	0	1	0
4275.08	1952.71	10	451.63	400.42	0	0	0	1	0
4279.25	1860.08	9	320.32	320.00	0	1	0	0	0
4306.00	1860.82	9	320.32	320.00	0	1	0	0	0
4318.24	1010.84	5	256.53	240.00	0	1	0	0	0
4326.50	2217.71	10	313.98	355.00	0	1	0	0	0
4329.67	1853.13	9	320.32	330.00	0	1	0	0	0
4338.83	1010.84	5	268.38	240.00	0	1	0	0	0
4365.58	1011.58	5	268.38	240.00	0	1	0	0	0
4367.58	2229.44	10	313.98	355.00	0	1	0	0	0
4379.83	1478.98	6	122.12	305.23	0	0	1	0	0
4390.84	1481.82	6	129.88	305.23	0	0	1	0	0
4464.83	1475.46	6	134.98	305.23	0	0	1	0	0
4497.33	1940.39	10	453.28	380.00	0	0	0	1	0
4578.67	1474.99	6	122.83	320.23	0	0	1	0	0
4620.75	2160.27	9	327.70	365.00	0	0	1	0	0
4663.42	2178.10	9	329.92	365.00	0	0	1	0	0
4707.42	1162.44	6	255.07	987.95	0	0	0	1	0
4761.17	2136.97	9	327.70	380.00	0	0	1	0	0
4786.92	2130.59	9	304.77	390.00	0	0	1	0	0
4807.59	1175.44	6	250.57	962.95	0	0	0	1	0
4824.50	934.30	5	254.75	325.00	0	0	1	0	0
4912.24	937.31	5	253.85	315.00	0	0	1	0	0

5089.25	2130.72	9	327.70	400.00	0	0	1	0	0
5143.50	1934.00	11	252.85	864.68	0	0	0	1	0
5240.33	931.06	5	254.75	335.00	0	0	1	0	0
5241.74	950.04	5	254.75	315.00	0	0	1	0	0
5312.33	1916.70	11	252.85	882.27	0	0	0	1	0
5375.33	1914.46	11	252.85	894.68	0	0	0	1	0

Table C.18: Non-dominated solutions obtained for problem instance HHC_50_200_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-883.08	3101.76	11	432.95	175.00	0	0	0	1	0
-558.58	3097.19	11	432.95	180.00	0	0	0	1	0
-421.58	3094.39	11	432.95	185.00	0	0	0	1	0
-410.33	3096.58	11	398.92	185.00	0	0	0	1	0
-399.58	3096.29	11	400.55	185.00	0	0	0	1	0
-238.17	513.24	1	461.18	5.00	0	0	1	0	0
-227.67	512.26	1	462.23	5.00	0	0	0	0	1
-97.07	3089.82	11	432.95	190.00	0	0	0	1	0
-75.07	3091.72	11	400.55	190.00	0	0	0	1	0
-18.00	377.38	1	444.43	10.00	0	1	0	0	0
0.17	375.38	1	462.52	10.00	0	1	0	0	0
36.58	3093.85	11	433.22	205.00	0	0	0	0	1
169.50	3090.38	11	433.22	215.00	0	0	0	0	1
196.25	890.83	4	114.73	60.00	0	0	0	0	1
239.34	367.58	2	376.90	30.00	0	0	0	1	0
243.84	745.23	3	444.43	40.00	0	1	0	0	0
262.25	374.41	2	414.87	20.00	0	0	0	1	0
280.17	372.67	1	448.08	20.00	1	0	0	0	0
313.75	487.98	2	382.18	25.00	0	0	0	1	0
324.25	854.10	4	113.38	75.00	0	0	1	0	0
357.42	709.90	3	374.37	55.00	0	0	1	0	0
379.09	372.56	0	0.10	25.00	0	0	1	0	0

466.25	2969.51	11	375.67	230.00	0	0	0	0	1
491.00	370.36	2	412.88	40.00	1	0	0	0	0
554.83	370.53	0	6.78	30.00	0	0	1	0	0
580.67	367.80	0	26.90	40.00	0	0	1	0	0
603.66	2334.65	10	349.52	195.00	0	0	1	0	0
646.42	361.41	0	0.80	65.00	0	0	0	1	0
647.67	360.78	0	12.20	65.00	0	0	0	1	0
677.42	755.97	3	391.33	40.00	0	0	0	1	0
695.09	756.93	3	399.42	40.00	0	0	0	1	0
803.58	900.50	3	78.87	140.00	1	0	0	0	0
847.06	366.55	0	2.47	50.00	0	0	0	1	0
850.92	364.62	0	31.28	50.00	0	0	0	1	0
866.24	2332.37	10	349.52	200.00	0	0	1	0	0
882.75	707.80	2	450.88	75.00	1	0	0	0	0
892.09	738.91	4	376.90	60.00	0	0	0	1	0
937.32	2324.85	10	349.57	200.00	0	0	1	0	0
944.92	847.92	5	97.05	100.00	0	0	1	0	0
993.74	729.30	2	438.77	55.00	1	0	0	0	0
1071.42	327.79	0	2.85	85.00	1	0	0	0	0
1098.75	368.09	0	0.12	90.00	0	1	0	0	0
1226.71	369.07	1	13.47	60.00	0	0	0	1	0
1328.09	359.72	0	1.12	105.00	0	1	0	0	0
1337.84	349.07	0	0.20	115.00	0	0	0	0	1
1380.28	347.86	0	5.10	125.00	0	1	0	0	0
1424.00	2639.45	10	346.75	210.00	1	0	0	0	0
1492.09	347.26	0	26.83	112.93	0	0	0	0	1
1505.33	357.55	1	7.47	95.00	0	0	0	1	0
1725.51	1227.80	6	78.15	145.00	0	0	1	0	0
1725.51	1227.80	6	86.50	143.50	0	0	1	0	0
1743.00	2622.29	10	351.03	225.00	1	0	0	0	0
1761.16	2630.24	10	366.63	225.00	1	0	0	0	0
1766.84	1218.31	6	75.50	155.00	0	0	1	0	0
1770.33	2635.15	10	346.75	220.00	1	0	0	0	0
2084.07	2057.78	12	306.18	255.00	0	1	0	0	0
2159.74	2059.17	12	289.25	255.00	0	1	0	0	0
2170.67	687.54	4	60.83	381.98	0	0	1	0	0
2242.17	1555.95	9	328.82	316.65	0	0	1	0	0
2269.50	1539.65	10	294.52	676.52	0	1	0	0	0

2278.66	2056.94	12	289.25	260.00	0	1	0	0	0
2381.07	1937.70	6	145.73	210.00	0	1	0	0	0
2431.84	1588.14	5	103.75	180.00	0	0	0	0	1
2549.59	683.63	4	100.83	391.65	0	0	1	0	0
2659.92	1971.85	5	132.32	185.00	0	0	0	0	1
2691.51	1189.09	7	81.50	220.00	0	0	1	0	0
2736.58	1527.14	10	294.52	686.52	0	1	0	0	0
2736.58	1527.14	10	366.52	614.52	0	1	0	0	0
2832.74	2357.37	11	169.47	439.30	0	1	0	0	0
3092.84	1534.90	9	151.00	346.65	0	0	1	0	0
3124.26	1552.46	9	147.08	376.65	0	0	1	0	0
3187.26	1171.52	4	105.10	484.43	0	0	0	0	1
3214.09	1541.26	9	151.25	361.72	0	0	1	0	0
3251.24	2348.65	11	165.93	544.30	0	1	0	0	0
3297.82	2352.68	11	169.47	454.30	0	1	0	0	0
3462.59	1167.65	4	136.10	544.43	0	0	0	0	1
4066.34	1512.52	9	147.08	447.03	0	0	1	0	0
4190.49	2738.24	10	149.78	422.23	0	1	0	0	0
4320.33	1053.61	1	248.17	225.00	0	0	0	0	1
4478.33	1032.03	2	259.00	246.55	0	0	0	0	1
4520.33	1050.49	1	241.17	231.62	0	0	0	0	1
4649.76	1513.28	7	158.82	396.72	0	0	1	0	0
4744.17	1007.79	2	125.38	335.88	0	0	0	0	1
4781.17	1931.78	6	309.38	262.33	0	1	0	0	0
4803.92	1944.10	5	249.40	255.00	0	0	0	0	1
4835.09	1501.22	7	158.82	423.33	0	0	1	0	0
4837.02	1508.59	7	158.82	411.72	0	0	1	0	0
4856.76	1930.95	5	256.28	271.73	0	0	0	0	1
4879.84	2304.37	6	317.40	282.33	0	1	0	0	0
4887.09	1150.16	7	240.27	305.00	0	0	0	1	0
4889.50	1923.67	5	309.38	252.33	0	1	0	0	0
4975.34	1172.29	6	283.13	285.00	0	0	0	1	0
5011.10	1157.83	6	248.98	310.00	0	0	0	1	0
5016.00	1176.25	6	283.13	333.90	0	0	0	1	0
5016.59	1371.57	7	296.30	542.78	0	1	0	0	0
5019.50	1003.93	2	125.38	355.88	0	0	0	0	1
5051.59	1173.27	6	283.13	340.00	0	0	0	1	0
5051.76	1161.80	6	244.77	358.90	0	0	0	1	0

5069.75	1176.25	6	283.13	340.00	0	0	0	1	0
5170.00	1944.50	5	249.40	275.00	0	0	0	0	1
5175.33	2280.63	4	302.85	355.00	1	0	0	0	0
5210.99	2177.88	8	149.78	520.00	0	1	0	0	0
5219.76	1370.84	6	254.08	540.27	0	1	0	0	0
5224.33	1003.38	6	274.28	392.25	0	0	1	0	0
5224.33	1003.38	6	282.28	376.72	0	0	1	0	0
5234.50	977.76	5	249.28	411.72	0	0	1	0	0
5241.34	1381.73	6	274.30	500.27	0	1	0	0	0
5245.91	2272.61	4	302.85	360.00	1	0	0	0	0
5277.34	1475.90	6	291.37	491.55	0	0	0	0	1
5286.43	1371.64	2	112.77	375.88	0	0	0	0	1
5396.58	991.53	5	276.83	424.88	0	0	1	0	0
5402.50	1417.20	4	266.32	452.27	1	0	0	0	0
5441.16	2159.65	8	149.78	550.00	0	1	0	0	0
5445.08	2171.54	8	149.78	530.00	0	1	0	0	0
5529.25	1463.88	4	266.32	440.88	1	0	0	0	0
5529.43	2398.89	11	323.27	403.42	0	0	0	1	0
5561.76	1367.78	2	112.77	395.88	0	0	0	0	1
5612.75	1445.52	4	266.32	460.88	1	0	0	0	0
5620.69	2391.94	11	286.67	420.00	0	0	0	1	0
5666.84	1436.58	4	271.57	458.88	1	0	0	0	0
5700.43	2379.91	11	293.87	424.23	0	0	0	1	0
5793.67	1353.36	4	321.95	491.45	0	0	0	0	1
5832.18	2372.20	11	299.33	430.00	0	0	0	1	0
5874.69	2374.34	11	293.87	429.23	0	0	0	1	0
5879.92	1359.52	2	125.38	415.88	0	0	0	0	1
5895.74	2689.25	13	302.65	564.37	0	1	0	0	0
5919.42	1369.06	2	125.38	395.88	0	0	0	0	1
5933.07	2674.15	13	319.27	590.78	0	1	0	0	0
5944.93	2385.39	11	283.13	423.90	0	0	0	1	0
5957.10	1872.28	5	121.22	415.03	0	0	0	0	1
6012.17	1860.88	5	127.22	430.88	0	0	0	0	1
6075.24	2689.51	13	319.27	600.78	0	1	0	0	0
6101.66	2665.29	12	332.72	592.80	0	1	0	0	0
6109.76	2367.51	11	349.27	440.00	0	0	0	1	0
6137.59	2229.00	11	308.13	478.00	0	0	1	0	0
6140.26	1531.84	7	258.33	613.00	0	0	0	1	0

6161.08	2230.45	11	308.13	478.00	0	0	1	0	0
6187.17	2222.50	11	316.00	483.00	0	0	1	0	0
6285.33	2219.38	11	316.00	488.00	0	0	1	0	0
6314.75	1873.56	5	125.38	425.03	0	0	0	0	1
6318.34	3198.32	11	331.65	599.12	0	0	0	0	1
6368.00	3216.88	10	333.47	726.70	1	0	0	0	0

Table C.19: Non-dominated solutions obtained for problem instance HHC_75_150_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-1658.03	4763.25	13	534.88	275.00	0	0	0	1	0
26.99	3155.92	11	361.15	225.00	0	0	0	0	1
97.25	3231.60	12	346.63	245.00	0	0	0	1	0
303.25	370.24	0	28.02	30.00	1	0	0	0	0
352.17	351.52	0	2.67	45.00	0	1	0	0	0
358.67	334.12	0	7.12	55.00	1	0	0	0	0
388.42	3153.36	11	361.15	235.00	0	0	0	0	1
409.59	3226.42	12	367.83	255.00	0	0	0	1	0
412.75	342.08	0	16.15	53.85	1	0	0	0	0
498.92	3230.83	12	346.63	260.00	0	0	0	1	0
576.00	367.44	0	20.30	50.00	1	0	0	0	0
646.67	3218.69	12	346.63	270.00	0	0	0	1	0
699.17	874.84	4	361.25	55.00	1	0	0	0	0
710.17	719.57	4	392.72	50.00	0	0	0	0	1
736.84	720.61	4	380.72	50.00	0	0	0	0	1
754.67	714.61	5	331.17	115.00	0	0	0	1	0
821.75	733.50	4	415.62	50.00	0	1	0	0	0
1143.17	355.47	4	316.15	65.00	0	0	1	0	0
1155.33	725.30	5	389.67	65.00	0	1	0	0	0
1163.67	715.43	4	380.72	60.00	0	0	0	0	1
1177.83	719.44	5	373.53	70.00	0	1	0	0	0
1206.59	337.86	1	25.37	60.00	0	0	0	0	1

1225.34	326.03	0	6.07	60.00	0	0	1	0	0
1225.34	326.03	0	4.80	60.00	0	0	1	0	0
1405.84	348.96	4	304.15	75.00	0	0	1	0	0
1518.10	341.99	1	2.23	85.00	0	0	0	1	0
1521.59	340.25	1	3.77	85.00	0	0	0	1	0
1535.42	350.27	4	316.15	75.00	0	0	1	0	0
1545.51	335.35	1	5.77	91.12	0	0	0	1	0
1547.50	352.35	4	302.15	75.00	0	0	1	0	0
1576.59	320.85	2	1.37	95.00	0	0	0	0	1
1634.16	2171.42	10	296.05	195.00	0	0	1	0	0
1720.84	323.03	1	2.67	95.00	0	0	1	0	0
1762.92	1751.37	7	42.67	175.00	1	0	0	0	0
1777.84	312.65	2	42.10	125.00	0	0	0	0	1
1847.42	1746.70	7	27.58	185.00	1	0	0	0	0
2019.59	1567.57	6	53.87	164.73	0	1	0	0	0
2019.59	1567.57	6	71.87	156.63	0	1	0	0	0
2051.67	1425.45	9	288.37	210.00	0	0	1	0	0
2105.59	1733.25	7	23.67	201.13	1	0	0	0	0
2109.16	675.67	5	8.83	379.38	0	0	1	0	0
2114.91	1782.62	10	266.95	210.00	0	0	1	0	0
2132.43	1429.74	6	73.23	140.00	0	0	0	0	1
2166.08	675.10	5	8.83	384.38	0	0	1	0	0
2196.51	1431.06	6	73.23	135.00	0	0	0	0	1
2251.75	1740.96	7	42.67	195.00	1	0	0	0	0
2272.16	2149.50	11	268.43	240.00	0	0	1	0	0
2278.33	1740.21	7	42.67	200.00	1	0	0	0	0
2411.91	665.26	5	8.83	399.38	0	0	1	0	0
2489.67	671.62	5	8.83	389.38	0	0	1	0	0
2504.99	1771.28	10	268.43	220.00	0	0	1	0	0
2536.08	1388.15	9	429.87	255.00	0	0	1	0	0
2802.43	1406.65	7	73.23	186.83	0	0	0	0	1
2820.42	1406.10	9	466.55	230.00	0	0	1	0	0
2858.17	1420.11	9	466.55	230.00	0	0	1	0	0
2911.66	1484.93	9	249.17	345.38	0	1	0	0	0
2970.92	999.73	5	116.57	421.73	0	0	0	0	1
2998.50	2207.28	10	110.65	345.22	0	0	0	0	1
3010.08	2203.09	10	110.65	355.22	0	0	0	0	1
3027.59	1399.86	9	451.47	295.00	0	0	1	0	0

3034.67	2209.72	10	110.65	345.22	0	0	0	0	1
3070.66	1040.27	8	466.55	210.00	0	0	1	0	0
3081.58	2204.47	10	110.65	356.22	0	0	0	0	1
3129.75	1499.47	9	261.10	360.25	0	1	0	0	0
3139.91	1047.56	8	466.55	214.77	0	0	1	0	0
3163.34	991.60	5	110.65	486.30	0	0	0	0	1
3213.34	1139.27	7	9.68	333.25	0	1	0	0	0
3328.50	1000.11	5	110.65	431.73	0	0	0	0	1
3403.84	1111.73	8	26.45	319.87	0	1	0	0	0
3513.93	1123.45	8	13.32	299.87	0	1	0	0	0
3514.01	1123.41	8	23.95	299.87	0	1	0	0	0
3660.15	1405.02	8	444.48	267.48	0	0	1	0	0
3913.59	1386.28	9	451.47	324.27	0	0	1	0	0
4368.59	2115.81	7	256.00	261.42	0	0	0	0	1
4439.25	2127.72	6	256.00	261.42	0	0	0	0	1
4525.42	1002.89	8	451.47	329.20	0	0	1	0	0
4568.00	2116.01	6	271.13	276.42	0	0	0	0	1
4568.00	2118.97	6	253.82	281.42	0	0	0	0	1
4659.34	2027.20	7	48.08	371.13	1	0	0	0	0
4714.84	1666.27	8	62.67	336.13	1	0	0	0	0
4825.92	1628.41	7	39.67	386.13	1	0	0	0	0
4827.33	1716.34	7	110.65	339.12	0	0	0	0	1
4849.68	1509.16	7	49.90	345.00	0	1	0	0	0
4951.17	620.49	7	200.62	314.20	0	0	1	0	0
4956.08	1704.62	7	114.23	330.07	0	0	0	0	1
4984.75	998.84	8	451.47	339.20	0	0	1	0	0
4998.00	1622.85	8	39.67	391.13	1	0	0	0	0
5032.09	1646.18	8	62.67	366.13	1	0	0	0	0
5040.92	619.42	7	188.92	329.20	0	0	1	0	0
5090.92	624.77	7	188.92	304.20	0	0	1	0	0
5095.08	632.80	7	159.57	319.20	0	0	1	0	0
5141.43	1477.10	6	221.15	378.77	0	1	0	0	0
5141.43	1477.10	6	251.15	369.27	0	1	0	0	0
5148.75	2092.48	7	114.23	357.35	0	0	0	0	1
5212.43	1479.99	7	49.90	365.00	0	1	0	0	0
5229.09	1479.92	7	248.70	355.00	0	1	0	0	0
5236.26	1479.92	7	248.70	383.77	0	1	0	0	0
5277.50	2080.76	7	117.65	368.50	0	0	0	0	1

5283.18	1855.31	8	69.92	410.00	0	1	0	0	0
5542.24	2523.58	11	252.10	479.35	0	0	0	0	1
5542.24	2523.58	11	256.00	471.78	0	0	0	0	1
5614.34	1526.66	7	255.32	433.77	0	0	0	1	0
5632.17	1545.72	7	268.32	422.93	0	0	0	1	0
5645.93	1826.14	8	69.92	430.00	0	1	0	0	0
5677.41	3985.57	12	415.93	692.90	0	0	0	1	0
5695.83	2888.35	11	304.28	534.78	0	0	0	0	1
5719.08	3963.54	12	415.93	708.13	0	0	0	1	0
5758.17	3967.71	12	415.93	698.13	0	0	0	1	0
5758.17	3967.71	12	415.93	697.90	0	0	0	1	0
5857.09	1537.91	7	255.32	446.70	0	0	0	1	0
5863.66	2899.72	11	304.28	511.78	0	0	0	0	1
5942.17	3178.33	11	313.20	579.13	1	0	0	0	0
5986.91	3944.07	12	415.93	768.78	0	0	0	1	0

Table C.20: Non-dominated solutions obtained for problem instance HHC_75_225_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-2045.84	4802.00	13	455.15	285.00	0	0	1	0	0
-1817.67	3188.86	11	443.73	155.00	0	1	0	0	0
-1646.00	2814.12	10	443.73	135.00	0	1	0	0	0
-1514.09	3195.39	11	443.73	165.00	0	1	0	0	0
-1497.26	2701.81	7	434.22	115.00	0	0	1	0	0
-1221.42	3065.48	11	395.13	170.00	0	1	0	0	0
-996.33	2308.93	10	384.13	140.00	0	1	0	0	0
-885.58	2409.74	11	323.03	183.65	0	0	1	0	0
-697.74	2059.10	10	322.03	165.00	0	0	1	0	0
-672.91	2056.46	10	365.33	165.00	0	0	1	0	0
-610.17	2812.80	11	421.68	170.00	0	0	0	1	0
-503.00	2404.87	12	320.05	205.00	0	0	1	0	0
-367.67	352.91	1	417.98	10.00	0	0	1	0	0

-317.25	741.85	4	367.02	40.00	0	1	0	0	0
-315.83	348.42	1	463.42	10.00	1	0	0	0	0
-293.92	747.13	4	366.10	45.00	0	0	1	0	0
-268.33	2846.60	11	438.82	185.00	0	0	0	1	0
-194.75	720.67	4	395.35	45.00	0	1	0	0	0
-180.58	2266.61	12	388.15	215.00	1	0	0	0	0
-111.16	975.93	5	102.85	85.00	0	0	0	1	0
-71.26	2798.56	11	421.68	190.00	0	0	0	1	0
-42.50	2752.13	12	388.15	255.00	1	0	0	0	0
-10.92	352.21	2	431.70	20.00	0	1	0	0	0
11.26	483.34	4	308.55	55.00	0	0	0	1	0
12.67	379.09	0	1.78	15.00	0	0	1	0	0
32.83	378.73	0	7.07	20.00	0	0	1	0	0
48.17	484.38	4	315.55	55.00	0	0	0	1	0
79.17	719.00	4	337.35	50.55	0	0	1	0	0
91.33	374.70	0	15.88	15.00	1	0	0	0	0
112.58	737.96	4	456.85	50.00	0	1	0	0	0
173.52	371.65	0	2.55	30.00	1	0	0	0	0
177.50	369.66	0	8.45	30.00	1	0	0	0	0
190.01	333.87	3	370.10	55.00	1	0	0	0	0
218.92	337.56	3	346.37	45.00	1	0	0	0	0
219.00	395.74	0	2.13	30.00	0	0	1	0	0
249.67	342.00	4	333.83	55.00	1	0	0	0	0
250.59	401.67	0	14.37	30.00	0	0	1	0	0
443.01	1914.67	11	346.63	195.00	1	0	0	0	0
495.22	357.75	0	2.42	65.00	0	0	0	0	1
499.00	355.86	0	14.58	60.42	0	0	0	0	1
573.00	824.67	4	62.98	634.27	0	0	0	0	1
613.42	331.07	4	333.83	75.00	1	0	0	0	0
622.25	338.92	0	16.88	40.00	0	0	0	1	0
676.09	375.71	0	10.50	40.00	0	1	0	0	0
703.84	329.98	2	33.12	70.00	1	0	0	0	0
744.42	367.22	0	13.80	50.00	0	1	0	0	0
764.67	369.80	0	1.92	50.00	0	1	0	0	0
786.51	1901.97	11	323.92	210.00	1	0	0	0	0
797.09	1903.74	11	346.63	215.00	1	0	0	0	0
804.68	1255.19	6	77.05	856.67	0	0	0	1	0
819.58	373.98	0	31.50	35.00	0	1	0	0	0

827.00	819.46	4	62.98	654.27	0	0	0	0	1
869.16	813.54	4	66.73	711.27	0	0	0	0	1
961.01	1171.40	10	323.03	190.00	0	0	1	0	0
962.26	1638.60	8	117.65	205.00	1	0	0	0	0
1013.46	1922.00	7	76.83	205.00	0	0	0	0	1
1052.38	1917.48	7	76.83	215.00	0	0	0	0	1
1055.42	361.54	1	5.87	60.00	0	0	0	1	0
1072.34	1169.05	10	307.25	198.65	0	0	1	0	0
1231.67	1898.06	11	295.38	225.00	1	0	0	0	0
1259.59	1267.69	6	74.85	891.82	0	0	0	1	0
1269.67	1913.90	7	80.78	225.00	0	0	0	0	1
1275.09	1295.66	7	100.85	170.00	0	0	0	1	0
1299.17	1622.97	8	117.65	225.00	1	0	0	0	0
1335.43	1302.67	6	78.85	185.00	0	0	0	1	0
1345.75	1169.66	10	255.35	200.00	0	0	1	0	0
1402.34	1288.52	6	78.85	862.82	0	0	0	1	0
1427.01	1165.32	10	251.35	203.65	0	0	1	0	0
1538.51	1167.32	10	251.35	208.65	0	0	1	0	0
1802.60	1677.24	7	104.85	210.00	0	0	0	1	0
2070.74	1946.60	4	448.48	193.55	0	1	0	0	0
2281.33	781.82	6	167.33	235.00	0	0	1	0	0
2329.33	767.33	7	187.33	235.00	0	0	1	0	0
2741.67	702.24	2	243.28	150.00	0	0	0	1	0
2797.75	674.93	1	259.22	170.00	0	0	0	1	0
2811.25	716.07	1	263.07	135.00	0	1	0	0	0
2812.50	2016.84	13	282.33	330.00	0	0	1	0	0
2870.00	714.80	1	263.07	136.22	0	1	0	0	0
2896.16	712.93	1	188.12	144.77	0	1	0	0	0
2917.75	717.38	1	263.07	136.22	0	1	0	0	0
3019.42	1630.19	8	147.85	888.82	0	0	0	1	0
3057.92	1605.19	8	100.95	965.82	0	0	0	1	0
3057.92	1605.19	8	147.85	928.82	0	0	0	1	0
3095.26	666.23	3	194.22	185.00	0	0	0	1	0
3147.59	1861.91	12	246.65	340.00	0	0	1	0	0
3159.09	1608.32	7	100.95	1001.82	0	0	0	1	0
3168.92	1992.10	8	96.95	428.65	0	0	0	0	1
3197.59	1583.32	7	100.95	1041.82	0	0	0	1	0
3239.59	1974.52	8	96.95	566.23	0	0	0	0	1

3244.92	705.04	1	263.07	156.22	0	1	0	0	0
3292.09	1859.30	12	248.25	340.00	0	0	1	0	0
3315.25	788.16	3	104.47	456.23	0	0	0	0	1
3340.34	1604.15	7	100.95	1012.82	0	0	0	1	0
3382.01	1003.00	7	276.38	358.03	1	0	0	0	0
3427.25	778.40	3	109.88	501.23	0	0	0	0	1
3428.91	785.22	3	112.88	465.18	0	0	0	0	1
3472.50	1630.80	8	100.95	315.00	0	0	0	1	0
3480.26	2048.14	9	404.23	290.00	0	0	0	1	0
3490.01	1969.31	8	96.95	586.23	0	0	0	0	1
3512.59	995.09	6	276.38	363.03	1	0	0	0	0
3526.92	813.13	1	290.47	246.18	0	0	0	0	1
3526.92	813.13	1	312.47	238.32	0	0	0	0	1
3534.83	1039.22	6	300.22	260.00	0	0	1	0	0
3535.42	813.34	2	267.47	249.55	0	0	0	0	1
3661.34	994.93	6	276.38	368.03	1	0	0	0	0
3676.59	1006.65	6	276.38	335.32	1	0	0	0	0
3676.68	997.53	6	276.38	365.13	1	0	0	0	0
3700.25	1499.91	12	251.35	333.65	0	0	1	0	0
3700.25	1499.91	12	255.35	330.00	0	0	1	0	0
3735.75	1059.96	6	273.22	240.00	0	0	1	0	0
3779.10	1159.67	7	194.22	240.00	0	0	0	1	0
3790.09	1499.29	12	251.35	343.65	0	0	1	0	0
3790.09	1499.29	12	258.25	340.55	0	0	1	0	0
3809.84	1009.25	6	276.38	325.32	1	0	0	0	0
3819.99	1042.76	6	300.22	265.00	0	0	1	0	0
3840.01	1156.37	7	193.55	255.00	0	0	0	1	0
3866.17	1493.40	12	337.35	345.55	0	0	1	0	0
3877.00	1033.93	6	300.22	270.00	0	0	1	0	0
3889.91	2600.60	11	384.13	385.00	0	1	0	0	0
3893.42	1159.25	7	193.55	250.00	0	0	0	1	0
3923.08	2624.61	10	369.17	356.22	0	1	0	0	0
3923.25	1048.80	6	273.22	260.00	0	0	1	0	0
3959.50	2598.16	11	384.13	391.22	0	1	0	0	0
4106.83	1386.23	6	292.55	264.77	0	1	0	0	0
4134.18	1131.05	7	194.22	275.00	0	0	0	1	0
4195.09	1127.75	7	193.55	290.00	0	0	0	1	0
4223.99	1394.59	6	263.07	260.00	0	1	0	0	0

4237.34	2618.10	14	389.77	531.75	1	0	0	0	0
4248.50	1130.63	7	193.55	285.00	0	0	0	1	0
4290.16	1391.93	6	263.07	261.22	0	1	0	0	0
4344.08	1379.39	6	263.07	274.77	0	1	0	0	0
4393.09	2248.87	13	296.18	526.33	1	0	0	0	0
4393.09	2248.87	13	365.18	491.75	1	0	0	0	0
4427.83	1389.00	6	263.07	271.22	0	1	0	0	0
4606.33	1383.43	6	263.07	280.00	0	1	0	0	0
4738.08	2475.01	12	319.90	470.00	0	0	0	1	0
4745.67	2238.46	13	365.18	511.75	1	0	0	0	0
4761.00	2241.06	13	365.18	501.75	1	0	0	0	0
4770.09	2243.63	13	389.77	526.75	1	0	0	0	0
4927.17	2481.05	12	319.90	513.53	0	0	0	1	0
4951.58	2488.23	12	319.90	460.00	0	0	0	1	0

Table C.21: Non-dominated solutions obtained for problem instance HHC_75_300_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-1210.92	3395.80	13	451.08	175.00	0	0	1	0	0
-1202.25	3746.79	13	451.07	185.00	0	0	1	0	0
-1026.92	3001.28	12	451.07	140.00	0	0	1	0	0
-984.59	3158.52	12	376.30	170.00	0	0	0	1	0
-918.75	3392.85	13	451.08	180.00	0	0	1	0	0
-708.34	3148.37	12	376.30	180.00	0	0	0	1	0
-555.01	3149.02	12	376.30	180.62	0	0	0	1	0
-452.25	3011.68	12	426.60	165.00	0	0	1	0	0
-414.33	377.10	1	451.07	15.00	0	0	0	1	0
-395.92	3474.41	13	435.27	225.00	0	0	0	0	1
-241.09	2376.18	11	372.73	155.00	0	0	0	1	0
-60.67	354.76	2	363.40	30.00	0	1	0	0	0
-60.67	354.76	2	418.40	26.60	0	1	0	0	0
9.51	2466.93	12	365.07	185.80	1	0	0	0	0

20.84	730.64	3	393.87	30.00	0	0	0	0	1
29.75	411.37	2	426.83	20.00	0	0	0	0	1
47.67	375.18	0	3.73	15.00	0	1	0	0	0
126.58	2367.60	11	376.30	166.62	0	0	0	1	0
182.25	1856.04	6	106.15	171.15	1	0	0	0	0
186.50	358.58	0	12.08	55.00	0	0	0	1	0
224.84	854.86	5	308.32	80.00	1	0	0	0	0
228.73	390.67	1	6.20	28.80	0	1	0	0	0
240.17	1862.00	6	137.15	172.85	1	0	0	0	0
284.59	2460.49	12	376.48	190.00	1	0	0	0	0
293.33	2870.95	12	382.30	205.00	1	0	0	0	0
376.92	343.71	3	298.48	38.12	0	1	0	0	0
376.92	343.71	3	305.52	36.60	0	1	0	0	0
446.67	345.54	0	96.47	30.00	0	0	0	0	1
573.34	841.07	4	117.00	363.35	0	1	0	0	0
573.34	841.07	4	121.00	359.35	0	1	0	0	0
573.34	841.07	4	172.00	350.43	0	1	0	0	0
634.00	718.84	4	331.92	35.00	0	1	0	0	0
641.57	368.93	0	0.33	40.00	0	0	1	0	0
642.09	368.67	0	5.67	40.00	0	0	1	0	0
654.50	367.90	2	10.72	25.00	0	1	0	0	0
656.11	487.73	2	2.07	30.00	0	0	0	0	1
689.42	360.53	1	20.93	90.00	0	0	0	1	0
721.76	363.99	2	10.72	45.00	0	1	0	0	0
806.67	837.68	4	155.83	360.43	0	1	0	0	0
806.67	837.68	4	113.75	369.35	0	1	0	0	0
843.83	374.35	1	55.33	30.00	1	0	0	0	0
927.34	338.20	1	94.25	70.00	0	0	0	0	1
1003.25	459.53	3	20.55	55.00	0	0	0	0	1
1090.65	364.59	1	0.33	50.00	0	0	1	0	0
1091.18	364.33	1	5.17	50.00	0	0	1	0	0
1193.09	824.75	5	182.92	379.35	0	0	0	0	1
1197.42	370.47	1	76.03	45.00	1	0	0	0	0
1576.43	708.89	0	287.72	130.00	0	0	0	1	0
1589.85	1576.27	9	457.75	399.30	0	0	0	0	1
1706.59	719.55	0	255.05	155.37	0	0	0	1	0
1773.10	1574.92	10	457.75	408.58	0	0	0	0	1
1813.84	734.06	4	172.95	404.82	0	0	0	0	1

1838.93	709.70	0	191.05	160.00	0	0	0	1	0
1889.42	732.68	4	172.95	446.82	0	0	0	0	1
2029.43	719.78	4	172.95	462.83	0	0	0	0	1
2129.68	712.51	1	183.07	170.37	0	0	0	1	0
2190.75	727.85	1	252.32	140.00	0	0	1	0	0
2230.93	1570.19	9	386.35	429.60	0	0	0	0	1
2459.92	1566.29	8	138.02	200.00	1	0	0	0	0
2640.76	1075.06	3	273.35	185.00	0	0	1	0	0
2652.51	1931.92	12	386.35	311.58	0	0	0	0	1
2828.67	674.07	1	286.63	137.53	0	0	0	0	1
2839.35	1568.75	7	293.25	220.00	1	0	0	0	0
2900.50	1101.05	3	167.73	155.00	1	0	0	0	0
2929.00	665.43	1	284.13	147.53	0	0	0	0	1
2945.42	1057.24	7	277.27	240.00	0	0	0	1	0
2971.84	1571.76	7	298.48	216.52	1	0	0	0	0
2976.10	1578.18	7	244.80	210.00	1	0	0	0	0
3001.92	675.30	1	286.63	140.00	0	0	0	0	1
3010.34	1045.53	6	277.27	260.00	0	0	0	1	0
3010.67	1962.66	6	375.42	210.00	1	0	0	0	0
3023.42	1049.48	7	277.27	250.00	0	0	0	1	0
3049.00	669.21	1	286.63	147.53	0	0	0	0	1
3064.92	1065.02	4	110.37	276.25	1	0	0	0	0
3109.42	1053.27	8	277.27	270.00	0	0	0	1	0
3114.84	1077.02	4	127.37	200.00	1	0	0	0	0
3117.84	1055.01	7	277.27	255.00	0	0	0	1	0
3233.92	1075.66	4	153.00	196.25	1	0	0	0	0
3248.76	1035.99	7	244.22	270.00	0	0	0	1	0
3317.75	1077.61	4	158.32	206.25	1	0	0	0	0
3326.42	1079.14	4	114.32	206.25	1	0	0	0	0
3391.26	1407.41	5	273.35	310.00	0	0	1	0	0
3399.42	1448.02	8	202.58	255.00	1	0	0	0	0
3415.26	1939.89	8	165.37	260.00	1	0	0	0	0
3476.51	1921.99	8	138.02	306.25	1	0	0	0	0
3554.93	1449.24	8	244.80	261.25	1	0	0	0	0
3611.01	1450.14	8	259.23	261.25	1	0	0	0	0
3614.84	1074.68	4	117.08	216.25	1	0	0	0	0
3659.43	1929.47	8	165.37	290.00	1	0	0	0	0
3764.92	1917.53	8	138.02	316.25	1	0	0	0	0

3809.35	2238.97	7	357.25	252.53	0	0	0	0	1
3890.76	1062.83	5	286.63	373.58	0	0	0	0	1
3899.42	1445.68	8	176.23	271.25	1	0	0	0	0
3986.92	1795.57	7	273.35	325.00	0	0	1	0	0
3990.77	2314.67	13	265.25	350.00	1	0	0	0	0
3997.59	1792.44	7	273.35	335.00	0	0	1	0	0
4013.34	1047.24	4	286.63	406.83	0	0	0	0	1
4127.92	1056.76	4	286.63	356.83	0	0	0	0	1
4192.19	2303.73	13	265.25	370.00	1	0	0	0	0
4233.19	2300.44	13	298.48	386.52	1	0	0	0	0
4237.44	2306.86	13	251.37	380.00	1	0	0	0	0
4410.01	2253.45	12	312.95	393.58	0	0	0	0	1
4495.02	2263.98	12	304.30	404.58	0	0	0	0	1
4546.85	2228.62	12	305.82	411.58	0	0	0	0	1
4733.85	2257.34	12	330.30	386.58	0	0	0	0	1
4862.60	2633.16	12	304.30	461.58	0	0	0	0	1
5258.34	1351.19	6	191.33	364.77	0	1	0	0	0
5262.25	1356.39	6	199.32	366.67	0	1	0	0	0
5262.25	1356.39	6	260.10	361.57	0	1	0	0	0
5264.92	1364.19	6	260.10	391.57	0	1	0	0	0
5468.50	1355.93	6	191.33	394.40	0	1	0	0	0
5907.42	2970.86	11	276.88	485.00	0	1	0	0	0
6107.75	2946.53	11	303.80	494.90	0	1	0	0	0
6135.17	2943.25	11	303.80	504.90	0	1	0	0	0
6202.42	2939.34	11	303.80	514.90	0	1	0	0	0
6350.42	2945.83	11	312.88	514.90	0	1	0	0	0

Table C.22: Non-dominated solutions obtained for problem instance HHC_100_200_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-794.75	1809.77	4	129.90	130.00	0	1	0	0	0
-598.41	3265.73	10	377.12	270.00	0	0	0	0	1

-596.41	3252.72	10	377.65	285.00	0	0	0	0	1
-525.00	849.29	2	429.22	45.00	0	0	0	0	1
-523.42	3361.51	11	198.92	509.08	0	0	0	0	1
-503.34	3263.17	10	426.63	275.00	0	0	0	0	1
-502.33	856.68	2	392.43	20.00	0	0	1	0	0
-469.67	876.55	3	363.70	55.00	1	0	0	0	0
-379.58	2604.55	8	305.25	180.00	1	0	0	0	0
-324.33	330.74	0	7.20	40.00	0	1	0	0	0
-260.33	369.95	0	0.05	30.00	0	1	0	0	0
-254.50	346.16	0	0.43	30.00	0	0	1	0	0
-207.75	881.57	3	400.50	55.00	1	0	0	0	0
-190.50	377.19	0	1.63	10.00	0	1	0	0	0
-161.50	375.25	0	7.58	10.00	0	0	0	0	1
-148.51	3356.57	11	198.92	519.08	0	0	0	0	1
-131.00	343.51	0	5.45	15.00	0	0	1	0	0
-127.67	353.48	0	1.32	20.00	0	0	1	0	0
-125.51	3356.63	11	198.92	519.08	0	0	0	0	1
-112.92	966.38	4	309.93	90.00	0	1	0	0	0
-103.50	2151.12	7	48.35	243.43	0	0	0	1	0
-103.50	2151.12	7	77.35	224.02	0	0	0	1	0
-75.75	2505.97	9	288.50	235.00	0	0	0	0	1
-64.49	2642.44	9	355.70	258.98	0	0	0	1	0
-64.33	380.68	0	6.12	10.00	0	0	0	0	1
-57.17	352.27	0	6.92	30.00	0	0	1	0	0
-50.25	2588.93	8	305.25	200.00	1	0	0	0	0
-30.67	379.35	0	10.28	10.00	0	0	0	0	1
-18.80	2984.12	9	356.53	279.40	0	0	0	1	0
58.25	1343.19	4	126.58	155.00	0	0	1	0	0
67.84	836.37	3	360.72	86.62	0	0	1	0	0
73.67	356.22	1	3.13	35.00	0	1	0	0	0
150.92	819.29	3	360.72	96.62	0	0	1	0	0
158.21	384.15	0	8.35	30.00	1	0	0	0	0
171.26	377.63	0	10.07	30.00	1	0	0	0	0
174.59	938.31	4	305.50	119.50	0	1	0	0	0
249.41	3351.68	11	198.92	529.08	0	0	0	0	1
253.25	822.86	4	341.00	110.00	0	0	0	1	0
255.09	833.22	4	329.43	90.00	0	0	0	0	1
260.42	832.14	4	364.45	90.00	0	0	0	0	1

315.59	831.52	4	309.93	115.00	0	1	0	0	0
414.59	803.28	5	290.52	125.00	0	0	0	0	1
505.91	2113.85	7	44.60	275.00	0	0	0	1	0
611.83	1648.33	8	150.33	742.90	1	0	0	0	0
661.09	480.45	1	52.78	94.73	0	0	0	1	0
667.76	2363.76	7	404.82	309.58	0	0	0	0	1
725.08	812.51	5	286.33	135.00	0	0	0	1	0
767.83	1316.54	5	101.35	160.00	1	0	0	0	0
918.25	1698.79	5	101.35	190.00	1	0	0	0	0
929.75	2579.78	9	82.97	417.33	0	0	0	1	0
1010.33	2557.91	9	106.60	475.93	0	0	0	1	0
1030.00	1639.35	8	122.53	795.70	1	0	0	0	0
1143.41	770.59	6	68.25	230.00	0	0	0	1	0
1177.83	787.65	6	48.35	228.43	0	0	0	1	0
1351.08	315.82	2	49.23	135.00	0	0	0	1	0
1555.42	1157.17	7	157.33	396.20	0	0	0	0	1
1723.83	1669.31	6	321.10	211.95	0	1	0	0	0
1723.91	1609.43	8	143.33	916.10	1	0	0	0	0
1734.78	334.28	1	3.82	355.95	0	1	0	0	0
1757.25	1987.45	8	452.05	376.93	0	0	0	1	0
1787.24	750.39	6	44.60	260.00	0	0	0	1	0
1852.08	1606.69	8	136.52	941.90	1	0	0	0	0
1895.74	735.47	6	67.08	290.00	0	0	0	1	0
1917.83	1602.04	8	136.52	951.90	1	0	0	0	0
1973.91	684.16	1	258.15	115.00	0	0	1	0	0
2087.92	704.24	4	181.80	141.60	0	0	0	0	1
2124.84	705.22	3	242.05	140.00	0	0	0	0	1
2147.25	665.93	1	243.15	140.00	0	0	1	0	0
2150.75	691.78	1	295.43	131.32	0	1	0	0	0
2155.76	710.69	3	167.05	130.93	0	0	0	0	1
2162.92	689.91	2	256.43	141.10	0	1	0	0	0
2189.75	1146.28	7	186.52	834.70	1	0	0	0	0
2226.07	325.00	4	4.92	360.78	0	0	0	0	1
2233.75	321.16	4	51.08	316.20	0	0	0	0	1
2233.75	321.16	4	79.08	248.45	0	0	0	0	1
2236.00	698.29	1	292.77	141.80	0	1	0	0	0
2244.16	1098.27	7	136.23	836.98	0	0	0	1	0
2284.34	1227.34	6	172.60	336.93	0	0	0	1	0

2330.75	1565.60	5	250.63	210.00	1	0	0	0	0
2341.34	1688.39	6	253.53	255.00	1	0	0	0	0
2343.41	1568.29	5	251.38	205.00	1	0	0	0	0
2345.83	662.02	1	243.15	150.00	0	0	1	0	0
2373.51	695.06	3	242.80	160.93	0	0	0	0	1
2407.67	824.22	2	245.13	155.00	1	0	0	0	0
2407.67	827.08	2	245.13	150.00	1	0	0	0	0
2454.25	723.24	6	181.23	305.82	0	0	0	0	1
2464.08	1232.81	6	197.60	336.93	0	0	0	1	0
2484.09	4046.27	11	452.52	600.60	0	0	0	0	1
2485.58	817.00	3	191.52	160.00	1	0	0	0	0
2485.59	801.16	4	183.88	200.00	0	0	0	1	0
2492.49	1177.72	6	188.60	415.00	0	0	0	1	0
2508.34	694.39	4	46.08	296.90	0	0	0	0	1
2521.25	4052.00	11	452.52	570.60	0	0	0	0	1
2534.08	675.80	1	244.38	166.32	0	1	0	0	0
2535.09	1130.47	6	254.82	292.53	0	0	0	0	1
2535.67	1203.99	6	197.60	381.93	0	0	0	1	0
2596.17	742.95	3	66.17	316.93	0	0	0	1	0
2596.17	742.95	3	56.17	323.25	0	0	0	1	0
2618.67	4055.91	11	452.52	609.93	0	0	0	0	1
2666.35	2560.46	8	301.57	405.98	0	1	0	0	0
2682.67	1225.81	7	188.60	396.33	0	0	0	1	0
2709.68	794.23	4	183.88	215.00	0	0	0	1	0
2709.83	988.00	4	282.77	288.78	0	0	1	0	0
2726.16	1199.66	7	67.08	401.93	0	0	0	1	0
2745.01	2548.31	8	292.23	442.28	0	1	0	0	0
2775.09	2408.65	9	361.53	568.52	0	0	0	1	0
2789.67	2537.04	8	294.10	472.28	0	1	0	0	0
2799.92	3574.49	11	452.52	628.63	0	0	0	0	1
2806.74	1177.79	7	66.17	436.93	0	0	0	1	0
2812.00	4041.06	11	452.52	620.60	0	0	0	0	1
2822.26	3181.09	10	421.77	695.02	0	0	0	1	0
2847.18	1111.78	6	240.12	338.17	0	0	0	0	1
2868.07	1554.64	7	67.08	456.93	0	0	0	1	0
2890.59	2540.50	8	292.23	452.28	0	1	0	0	0
2895.51	2542.36	8	292.23	464.75	0	1	0	0	0
2917.76	3562.27	9	361.78	482.33	0	0	1	0	0

2941.00	1206.63	8	161.17	837.47	0	0	0	1	0
2980.59	2786.64	9	361.53	594.85	0	0	0	1	0
2995.93	3563.29	9	361.78	482.68	0	0	1	0	0
3012.59	3585.30	9	361.78	474.25	0	0	1	0	0
3019.17	2491.50	9	315.00	619.13	1	0	0	0	0
3026.01	3567.40	9	361.78	484.25	0	0	1	0	0
3028.43	3558.02	9	361.78	499.25	0	0	1	0	0
3035.76	1105.34	5	259.95	347.28	0	1	0	0	0
3071.59	1077.33	6	240.12	374.58	0	0	0	0	1
3100.51	1092.53	5	259.95	404.72	0	1	0	0	0
3110.42	1221.18	8	161.17	818.80	0	0	0	1	0
3118.01	2497.45	9	315.00	614.13	1	0	0	0	0
3153.33	1163.84	5	242.63	580.08	1	0	0	0	0
3169.75	1103.53	5	259.95	352.28	0	1	0	0	0
3181.34	1097.52	5	259.95	357.28	0	1	0	0	0
3191.00	1199.31	8	161.17	853.80	0	0	0	1	0
3212.09	2486.29	9	315.00	639.13	1	0	0	0	0
3220.83	1343.77	4	305.83	323.50	0	0	1	0	0
3230.41	1158.82	5	267.87	605.08	1	0	0	0	0
3244.83	1348.98	4	305.83	333.50	0	0	1	0	0

Table C.23: Non-dominated solutions obtained for problem instance HHC_100_300_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-3651.24	4644.39	13	464.42	155.00	0	0	0	1	0
-3607.40	4665.43	13	458.87	155.00	0	0	0	1	0
-2822.18	4147.63	13	406.28	156.13	0	0	0	1	0
-2580.74	4621.82	14	456.27	215.00	0	0	0	0	1
-2516.41	4450.44	14	466.68	215.00	0	0	0	0	1
-2430.74	4468.53	14	466.68	215.00	0	0	0	0	1
-2377.51	3769.11	13	406.28	166.13	0	0	0	1	0
-2287.24	4616.87	14	456.27	220.00	0	0	0	0	1

-2229.34	3783.93	12	406.28	146.13	0	0	0	1	0
-2222.44	3862.30	12	460.33	145.00	1	0	0	0	0
-2118.44	3865.51	12	431.08	145.00	1	0	0	0	0
-1964.00	4447.23	14	455.10	250.98	0	0	1	0	0
-1877.02	3860.56	12	445.88	150.00	1	0	0	0	0
-1829.67	4102.93	13	455.10	215.98	0	0	1	0	0
-1769.59	4090.07	13	449.02	235.98	0	0	1	0	0
-1761.69	3863.00	12	460.33	155.00	1	0	0	0	0
-1747.09	4445.28	14	455.10	260.98	0	0	1	0	0
-1612.76	4100.98	13	455.10	225.98	0	0	1	0	0
-1520.27	3858.05	12	431.08	160.00	1	0	0	0	0
-989.76	1029.39	4	308.25	30.00	1	0	0	0	0
-900.51	1002.07	5	291.50	45.00	1	0	0	0	0
-865.08	1266.36	6	280.42	45.00	0	0	0	1	0
-819.59	1100.58	4	435.55	20.00	0	1	0	0	0
-806.42	1083.19	6	363.43	85.00	0	0	1	0	0
-792.34	1122.19	6	357.18	40.00	0	0	1	0	0
-775.09	1085.82	5	417.12	55.00	0	1	0	0	0
-757.41	1267.13	6	280.42	40.00	0	0	0	1	0
-712.08	1254.99	6	280.42	50.00	0	0	0	1	0
-705.34	1085.27	6	363.43	75.00	0	0	1	0	0
-692.84	3160.91	13	369.75	240.00	0	1	0	0	0
-680.43	3164.24	13	369.75	245.00	0	1	0	0	0
-680.43	3164.24	13	373.93	240.00	0	1	0	0	0
-663.25	815.76	4	346.00	65.00	0	0	0	0	1
-617.74	1253.32	6	323.42	50.00	0	0	0	1	0
-605.75	1263.23	6	318.42	50.00	0	0	0	1	0
-590.00	742.65	4	410.18	30.00	0	0	1	0	0
-575.75	844.47	4	322.18	55.00	1	0	0	0	0
-565.58	831.21	4	344.78	65.00	0	0	0	0	1
-561.42	720.82	3	435.55	15.00	0	1	0	0	0
-534.41	826.09	4	360.12	70.00	0	0	0	0	1
-516.18	3159.36	13	353.75	250.00	0	1	0	0	0
-460.18	725.98	4	401.08	43.92	0	1	0	0	0
-460.18	725.98	4	375.68	45.00	0	1	0	0	0
-460.18	725.98	4	409.05	40.00	0	1	0	0	0
-456.26	879.19	4	321.67	25.00	1	0	0	0	0
-410.76	3160.59	13	369.75	255.00	0	1	0	0	0

-410.76	3160.59	13	373.93	250.00	0	1	0	0	0
-409.34	745.67	4	406.83	35.00	0	0	1	0	0
-372.67	387.51	0	68.22	5.00	0	0	0	1	0
-285.33	371.90	0	2.07	30.00	0	0	1	0	0
-270.33	491.58	0	42.32	5.00	0	0	0	0	1
-202.00	379.45	0	3.27	30.00	0	0	0	1	0
-175.17	358.76	0	6.62	35.00	0	0	0	0	1
-174.17	378.84	0	8.00	10.00	0	0	1	0	0
-156.00	375.75	0	12.87	20.00	0	1	0	0	0
-38.50	352.81	0	42.57	20.00	0	0	0	0	1
-31.68	506.37	2	6.17	25.00	0	0	0	1	0
13.92	366.37	0	12.87	50.00	0	1	0	0	0
207.75	345.95	1	32.18	50.00	0	0	0	0	1
284.67	356.89	1	46.87	45.00	0	1	0	0	0
295.09	337.49	2	82.97	70.00	0	0	1	0	0
301.75	381.39	0	24.30	20.00	1	0	0	0	0
379.66	488.51	2	6.17	45.00	0	0	0	1	0
446.75	357.19	1	41.30	60.00	0	1	0	0	0
735.42	329.67	2	73.97	80.00	0	0	1	0	0
913.17	370.04	0	277.77	60.00	0	0	0	1	0
1159.67	1570.66	7	302.57	170.00	0	0	0	1	0
1162.24	2280.11	6	393.47	185.00	1	0	0	0	0
1192.84	2322.23	7	285.48	205.00	0	0	0	1	0
1262.09	1531.87	2	142.57	287.72	0	0	0	0	1
1305.67	852.13	2	277.77	95.00	0	0	0	1	0
1407.25	746.57	0	279.70	123.83	0	0	0	1	0
1413.41	2080.21	7	337.08	195.00	0	0	0	1	0
1445.50	2317.35	7	285.48	215.00	0	0	0	1	0
1475.09	1951.30	7	302.57	205.00	0	0	0	1	0
1499.42	1945.66	7	306.00	200.00	0	0	0	1	0
1558.75	855.80	2	250.43	127.65	0	0	0	1	0
1597.17	2313.46	7	285.48	225.00	0	0	0	1	0
1690.58	1959.04	6	322.25	187.75	0	0	0	1	0
1718.24	4299.63	14	357.57	435.92	0	0	0	1	0
1758.83	1933.10	6	285.48	210.00	0	0	0	1	0
1764.42	2313.44	7	280.42	235.00	0	0	0	1	0
1856.25	814.47	2	262.05	110.00	1	0	0	0	0
1901.66	843.28	2	287.60	100.00	0	0	1	0	0

1952.74	2901.31	7	294.65	246.43	0	0	1	0	0
1954.58	4296.85	14	357.57	450.92	0	0	0	1	0
1970.00	826.79	1	299.33	90.00	0	0	1	0	0
1979.07	3917.89	14	359.13	445.92	0	0	0	1	0
1985.08	4299.35	14	367.70	450.92	0	0	0	1	0
1988.99	804.70	2	262.05	115.00	1	0	0	0	0
2004.91	816.42	2	262.05	105.00	1	0	0	0	0
2033.59	774.78	1	134.83	190.40	0	0	0	0	1
2081.25	1094.88	2	246.35	145.00	0	1	0	0	0
2082.91	811.23	2	262.05	130.00	1	0	0	0	0
2091.74	766.47	3	262.05	140.00	1	0	0	0	0
2098.92	776.58	1	262.50	170.00	0	0	0	0	1
2114.58	4294.48	14	359.13	460.92	0	0	0	1	0
2124.25	1247.34	7	262.05	268.17	1	0	0	0	0
2135.17	1090.42	1	310.80	169.55	0	1	0	0	0
2219.91	666.78	3	249.23	185.00	0	0	1	0	0
2240.27	5056.39	14	456.27	693.85	0	0	0	0	1
2303.41	2444.19	7	322.38	238.60	0	0	1	0	0
2320.58	2520.91	6	294.65	231.43	0	0	1	0	0
2369.83	1239.59	6	261.15	426.73	1	0	0	0	0
2434.92	662.39	3	192.23	200.00	0	0	1	0	0
2483.77	5045.92	14	456.27	723.85	0	0	0	0	1
2541.17	1595.82	7	262.05	314.20	1	0	0	0	0
2541.17	1595.82	7	263.97	308.17	1	0	0	0	0
2575.42	2511.01	6	297.37	253.80	0	0	1	0	0
2576.00	1374.06	6	320.25	480.87	0	0	1	0	0
2602.40	3037.26	12	320.30	395.00	1	0	0	0	0
2644.24	3024.19	12	282.32	400.00	1	0	0	0	0
2652.07	2544.23	7	331.98	290.00	0	1	0	0	0
2733.84	1537.42	2	273.30	240.00	0	1	0	0	0
2758.07	3025.18	12	282.32	400.00	1	0	0	0	0
2761.67	1367.38	6	362.37	521.08	0	0	1	0	0
2773.98	2541.37	7	331.98	295.00	0	1	0	0	0
2825.99	2637.83	7	331.98	315.00	0	1	0	0	0
2844.59	1928.78	6	259.25	390.40	0	0	0	0	1
2849.66	1562.36	6	268.48	280.00	1	0	0	0	0
2858.41	3025.11	7	316.68	330.00	0	1	0	0	0
2929.40	3391.34	13	300.05	478.12	1	0	0	0	0

2944.41	1567.29	6	279.38	280.00	1	0	0	0	0
2975.76	1939.06	6	277.67	360.00	0	0	0	0	1
2983.41	2637.57	6	331.98	310.00	0	1	0	0	0
2997.48	3020.23	12	282.32	405.00	1	0	0	0	0
3008.17	2868.70	8	329.80	328.80	0	0	1	0	0
3014.49	3027.13	6	339.07	320.00	0	1	0	0	0
3021.17	1533.61	2	299.30	240.00	0	1	0	0	0
3147.90	3015.28	12	282.32	420.00	1	0	0	0	0
3302.00	3216.82	10	332.83	449.37	0	0	1	0	0
3302.00	3216.82	10	354.85	437.47	0	0	1	0	0
3711.08	4593.28	13	389.57	617.95	0	1	0	0	0
3914.82	4983.96	13	389.57	619.15	0	1	0	0	0
3940.83	4985.49	13	369.75	619.15	0	1	0	0	0
3953.82	4985.86	13	369.75	619.15	0	1	0	0	0
3975.99	4983.51	13	398.65	637.95	0	1	0	0	0
4023.49	4987.87	13	406.27	625.00	0	1	0	0	0

Table C.24: Non-dominated solutions obtained for problem instance HHC_100_400_40.

Objective function value					Obtained during				
Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Run 1	Run 2	Run 3	Run 4	Run 5
-1020.83	4493.88	14	447.20	200.27	0	0	1	0	0
-942.59	4495.17	14	442.72	182.40	1	0	0	0	0
-892.01	4116.43	13	419.22	162.40	1	0	0	0	0
-851.08	4230.54	14	467.12	200.00	0	1	0	0	0
-784.35	4130.84	13	445.48	162.40	1	0	0	0	0
-664.76	4133.01	13	442.72	162.40	1	0	0	0	0
-464.42	1232.68	4	364.58	45.00	0	0	0	1	0
-437.17	366.84	0	23.87	40.00	0	0	0	0	1
-418.66	744.72	2	455.92	15.00	0	1	0	0	0
-416.50	1229.25	5	419.73	55.27	0	0	1	0	0
-407.17	841.67	3	447.60	20.00	0	0	1	0	0
-383.17	507.51	1	466.68	5.00	1	0	0	0	0

-308.41	3720.89	13	450.20	165.00	0	1	0	0	0
-305.17	517.21	0	23.08	5.00	0	0	0	1	0
-288.67	504.03	0	1.52	20.00	1	0	0	0	0
-279.67	512.21	0	2.85	25.00	0	0	0	0	1
-255.75	741.74	3	455.92	30.00	0	1	0	0	0
-246.59	1079.29	4	330.93	50.00	0	0	0	1	0
-194.95	524.93	0	54.88	20.00	0	0	0	1	0
-169.00	1068.50	5	398.35	65.00	0	0	1	0	0
-129.99	4092.31	16	425.65	260.00	0	0	0	0	1
-92.67	882.90	4	419.22	35.00	1	0	0	0	0
-78.34	3718.35	13	380.72	167.40	1	0	0	0	0
-51.33	3735.13	14	425.65	210.00	0	0	0	0	1
8.58	723.69	3	452.35	45.00	0	1	0	0	0
23.58	1233.18	5	384.17	45.00	1	0	0	0	0
26.33	1230.78	5	419.22	45.00	1	0	0	0	0
35.25	351.14	1	59.25	25.00	0	0	0	1	0
71.01	3737.83	14	425.65	205.00	0	0	0	0	1
83.01	726.77	3	455.92	62.83	0	1	0	0	0
96.50	354.93	0	37.75	50.00	0	0	0	0	1
135.34	3732.08	15	425.65	230.00	0	0	0	0	1
144.33	3748.18	13	381.40	172.40	1	0	0	0	0
196.01	3610.90	14	408.52	220.00	0	0	0	0	1
206.84	378.45	1	43.43	30.00	0	0	1	0	0
218.09	356.48	2	56.82	20.00	0	0	1	0	0
219.43	1236.34	6	339.17	95.00	0	0	0	0	1
241.93	747.93	4	342.37	70.00	0	0	0	1	0
247.51	1265.65	6	348.50	85.00	0	0	0	0	1
275.09	349.89	1	133.97	40.00	1	0	0	0	0
312.09	351.52	1	126.90	20.00	1	0	0	0	0
334.25	345.14	1	141.00	30.00	0	1	0	0	0
347.34	708.73	3	452.35	77.83	0	1	0	0	0
362.25	333.96	2	63.25	50.00	0	0	0	1	0
384.50	856.74	4	404.47	40.00	0	1	0	0	0
430.92	335.25	2	71.33	45.00	0	0	0	1	0
448.84	340.77	2	105.00	45.00	0	1	0	0	0
462.17	763.29	4	367.40	52.40	1	0	0	0	0
544.84	768.15	4	380.72	62.40	1	0	0	0	0
548.76	884.93	5	339.17	80.00	0	0	0	0	1

606.59	845.23	4	416.03	55.00	0	1	0	0	0
609.43	373.85	1	20.68	45.00	0	0	1	0	0
641.75	357.69	1	75.32	45.00	0	0	1	0	0
776.67	354.39	0	175.32	70.00	0	1	0	0	0
1166.92	318.95	1	169.83	105.28	0	1	0	0	0
1166.92	318.95	1	154.83	120.00	0	1	0	0	0
1251.25	312.38	1	154.83	135.00	0	1	0	0	0
1386.09	734.02	2	266.92	95.00	0	0	0	1	0
1496.76	735.81	2	266.92	110.00	0	0	0	1	0
1953.93	725.03	2	266.92	130.00	0	0	0	1	0
2052.50	776.58	2	251.23	211.20	0	0	0	0	1
2054.25	779.71	2	251.23	200.00	0	0	0	0	1
2064.00	3233.85	9	447.20	250.00	0	0	1	0	0
2301.51	720.34	2	315.92	160.00	0	0	0	1	0
2347.17	1076.29	5	193.77	132.40	1	0	0	0	0
2386.17	660.78	2	259.42	165.00	0	0	1	0	0
2539.27	2802.88	9	356.37	268.33	0	0	0	0	1
2576.09	1086.32	6	191.67	142.40	1	0	0	0	0
2610.84	1089.09	6	196.47	142.40	1	0	0	0	0
2667.75	1075.08	6	196.47	152.40	1	0	0	0	0
2710.00	1028.85	3	338.92	180.00	0	0	1	0	0
2772.00	1027.02	3	338.92	190.00	0	0	1	0	0
2846.25	1050.67	7	282.80	265.00	0	0	0	1	0
2847.42	1000.11	6	290.45	341.30	0	0	0	1	0
2895.75	1017.26	3	310.77	215.00	0	0	1	0	0
2961.84	1449.60	7	271.77	167.40	1	0	0	0	0
3027.92	1018.47	3	281.22	210.00	0	0	1	0	0
3030.67	1386.37	7	282.80	366.30	0	0	0	1	0
3105.51	1457.19	7	247.47	187.40	1	0	0	0	0
3128.51	1386.63	7	282.80	350.00	0	0	0	1	0
3135.83	3552.27	16	419.22	422.40	1	0	0	0	0
3146.83	3552.56	16	404.62	422.40	1	0	0	0	0
3162.42	1443.18	7	247.47	197.40	1	0	0	0	0
3173.67	1417.71	8	261.68	275.00	0	0	0	1	0
3213.66	3541.76	15	359.62	387.40	1	0	0	0	0
3215.84	1804.76	8	309.23	227.40	1	0	0	0	0
3320.84	3041.20	14	359.62	348.05	1	0	0	0	0
3407.18	4102.99	15	326.52	526.30	0	0	0	0	1

3421.92	4457.74	15	359.02	566.65	0	0	0	0	1
3493.67	1442.61	7	247.47	207.40	1	0	0	0	0
3495.26	1428.27	7	247.47	217.40	1	0	0	0	0
3524.00	3537.68	16	419.22	442.40	1	0	0	0	0
3539.58	1405.99	8	261.68	290.00	0	0	0	1	0
3590.83	3538.93	16	419.22	442.40	1	0	0	0	0
3601.83	3527.17	15	359.62	398.05	1	0	0	0	0
3679.09	3586.43	14	326.52	501.30	0	0	0	0	1
3759.76	1816.71	6	338.92	525.37	0	0	1	0	0
3805.19	4679.10	13	416.02	559.48	0	0	1	0	0
3815.93	4683.45	14	398.35	649.13	0	0	1	0	0
3891.93	1817.92	6	338.92	520.37	0	0	1	0	0
3900.01	1841.57	6	334.22	480.37	0	0	1	0	0
3900.01	1841.57	6	338.92	420.78	0	0	1	0	0
3903.93	1824.32	6	344.47	542.97	0	0	1	0	0
4151.85	4686.34	13	416.02	569.48	0	0	1	0	0
4631.33	1850.77	6	334.83	345.28	0	1	0	0	0
4866.92	1861.24	6	304.83	310.00	0	1	0	0	0
5021.17	2330.94	7	342.22	365.00	0	1	0	0	0
5050.84	4545.41	15	429.82	626.97	0	1	0	0	0
5103.59	2326.06	6	386.95	402.77	0	1	0	0	0
5132.42	2329.84	7	342.22	385.00	0	1	0	0	0
5225.59	4068.21	14	423.97	587.10	0	1	0	0	0
5316.50	4526.66	15	413.82	660.93	0	1	0	0	0
5355.09	4917.38	15	429.82	666.97	0	1	0	0	0
5408.25	2317.37	7	304.83	405.00	0	1	0	0	0
5447.59	4065.39	14	423.97	592.10	0	1	0	0	0
5540.42	4515.08	15	467.12	649.67	0	1	0	0	0
5551.17	2310.81	7	342.22	405.28	0	1	0	0	0
5552.09	4527.50	15	467.12	654.67	0	1	0	0	0

LIST OF PAPERS PUBLISHED

Yadav, N., & Tanksale, A. (2022). An integrated routing and scheduling problem for home healthcare delivery with limited person-to-person contact. *European Journal of Operational Research*, *303*(3), 1100-1125. https://doi.org/10.1016/j.ejor.2022.03.022

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