

Problem ID	Model 1			Model 2			Model 3			Model 4			ub*
	Solution	Time to best	Gap (%)	Solution	Time to best	Gap (%)	Solution	Time to best	Gap (%)	Solution	Time to best	Gap (%)	
myciel3	21	0	0	21	0	0	21	0	0	21	0	0	21
myciel4	45	0	0	45	0	0	45	0	0	45	5	0	45
myciel5	93	0	0	104	0	0	93	8	0	93	6524	0	93
myciel6	189	27	0	215	0	13.76	189	13	0	215	188	13.76	189
myciel7	381	176	0	438	3	14.96	392	978	2.89	418	5137	9.711286089	381
anna	276	0	0	282	5023	2.17	276	4	0	276	17	0	276
david	237	0	0	252	4950	6.33	237	4	0	237	7	0	237
games120	443	0	0	449	323	1.35	443	708	0	446	195	0.68	443
huck	243	0	0	243	4180	0	243	0	0	243	14	0	243
Jean	217	0	0	218	2054	0.46	217	1	0	217	4	0	217
miles250	325	0	0	329	1277	1.23	325	3	0	327	20	0.62	325
miles500	705	1	0	708	8	0.43	716	2762	1.56	745	7077	5.67	705
queen5.5	75	0	0	75	0	0	75	0	0	75	0	0	75
queen6.6	138	0	0	138	802	0	138	2	0	148	5176	7.25	138
queen7.7	196	0	0	229	15	16.84	196	14	0	220	5585	12.24	196
queen8.8	291	64	0	325	84	11.68	319	559	9.62	325	4453	11.68	291
DSJC125.1	326	6439	0	356	7007	9.20	350	1127	7.36	340	105	4.29	326
DSJC125.5	1219	4112	20.45	1277	6424	26.19	1203	4196	18.87	1248	2530	23.32	1012
DSJC125.9	2665	6830	6.47	2969	4638	18.62	2759	5582	10.23	3101	6968	23.89	2503
DSJC250.1	1141	6022	17.63	-	-	-	1122	7124	15.67	1139	7200	17.42	970
DSJC250.5	-	-	-	-	-	-	4129	6204	28.63	8250	7061	157.01	3210
DSJC250.9	-	-	-	-	-	-	-	-	-	-	-	-	8277
DSJC500.1	3766	1887	32.79	-	-	-	3493	6542	23.17	9224	7146	225.25	2836
DSJC500.5	-	-	-	-	-	-	-	-	-	-	-	-	10886
DSJC1000.1	12928	891	-	-	-	-	-	-	-	-	-	-	8991
flat1000_50	-	-	-	-	-	-	-	-	-	-	-	-	25500
flat1000_60	-	-	-	-	-	-	-	-	-	-	-	-	30100
flat1000_76	-	-	-	-	-	-	-	-	-	-	-	-	37164

Table 2: Computational results of Model 1, Model 2, Model 3 and Model 4 using Gurobi