An Elite-guided Weighted Simulated Annealing Algorithm for the Clique Partitioning Problem

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Additional Computational Results

Comparison of EWSA and the State-of-the-Art Algorithms

For each algorithm and each instance, we report the objective value of the best solution $Best$ and the average objective value Avg on 20 independent runs. We also record the time for finding the best solution in each run, and calculate the average time over 20 runs for each instance. In addition, we use $Hits$ to record the number of hitting the best solution over 20 runs. Note that the best objective values marked with $*$ indicate that EWSA improves the previous best known solutions (BKS), while the best objectives among all algorithms are indicated in bold. Table 1, Table 2, and Table 3 show the comparison results of EWSA, FSS (Jovanovic, Sanfilippo, and Voß 2023), and MDMCP (Lu, Zhou, and Hao 2022) on instances of the first category. Then, Table 4 and Table 5 show the comparison results of EWSA, SACC (Gao et al. 2022), FSS, and MDMCP on instances of the second category. The results indicate that there are no significant difference sof solutions among EWSA and other algorithms on those instances,which are small in scale and easy to solve, sunch as the first category instances. While, EWSA significantly outperforms the other algorithms on challenging large instances.

Comparison of EWSA and the variants

Tables 6 and 7 present the comparison results of the best and average objective values for EWSA and variants on 26 instances, respectively. The variants are described as follows:

- **EWSA**$_w$: disable the weighting strategy in WSA.
- **EWSA**$_{c1}$: only using $config_1$.
- **EWSA**$_{c2}$: only using $config_2$.
- **EWSA**$_{em}$: disable the elite solution preservation mechanism and only keep the historical best solution.
- **EWSA**$_{pr}$: use adaptive partitioning instead of the partition restriction strategy.

From Tables 6 and 7, we can observe that EWSA outperforms other variants, because EWSA obtains better results with the most number of times in terms of both the average and best objective values.

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		EWSA				FSS				MDMCP			
Instance	Best known	Best	Avg	Time	Hits	Best	Avg	Time	Hits	Best	Avg	Time	Hits
am-100-10	10700	**10700**	**10700.0**	8.0	20	**10700**	**10700.0**	1.6	20	**10700**	**10700.0**	7.7	20
am-100-20	11700	**11700**	**11700.0**	8.1	20	**11700**	**11700.0**	1.9	20	**11700**	**11700.0**	5.1	20
am-100-3	10000	**10000**	**10000.0**	7.9	20	**10000**	**10000.0**	1.7	20	**10000**	**10000.0**	9.9	20
am-125-10	16500	**16500**	**16500.0**	12.5	20	**16500**	**16500.0**	4.0	20	**16500**	**16500.0**	16.5	20
am-125-20	17750	**17750**	**17750.0**	11.7	20	**17750**	**17750.0**	3.5	20	**17750**	**17750.0**	9.5	20
am-125-3	15625	**15625**	**15625.0**	12.0	20	**15625**	**15625.0**	3.8	20	**15625**	**15625.0**	18.2	20
am-150-10	23550	**23550**	**23550.0**	16.0	20	**23550**	**23550.0**	37.0	20	**23550**	**23550.0**	26.1	20
am-150-20	25050	**25050**	**25050.0**	16.3	20	**25050**	**25050.0**	22.5	20	**25050**	**25050.0**	17.9	20
am-150-3	22500	**22500**	**22500.0**	16.6	20	**22500**	**22500.0**	31.3	20	**22500**	**22500.0**	27.7	20
am-25-10	800	**800**	**800.0**	1.2	20	**800**	**800.0**	0.0	20	**800**	**800.0**	0.2	20
am-25-20	1050	**1050**	**1050.0**	1.1	20	**1050**	**1050.0**	0.0	20	**1050**	**1050.0**	0.2	20
am-25-3	625	**625**	**625.0**	1.3	20	**625**	**625.0**	0.0	20	**625**	**625.0**	0.3	20
am-50-10	2850	**2850**	**2850.0**	2.7	20	**2850**	**2850.0**	0.3	20	**2850**	**2850.0**	1.5	20
am-50-20	3350	**3350**	**3350.0**	2.6	20	**3350**	**3350.0**	0.2	20	**3350**	**3350.0**	0.9	20
am-50-3	2500	**2500**	**2500.0**	2.7	20	**2500**	**2500.0**	0.2	20	**2500**	**2500.0**	1.4	20
am-75-10	6150	**6150**	**6150.0**	5.1	20	**6150**	**6150.0**	0.8	20	**6150**	**6150.0**	3.4	20
am-75-20	6900	**6900**	**6900.0**	4.8	20	**6900**	**6900.0**	0.7	20	**6900**	**6900.0**	2.5	20
am-75-3	5625	**5625**	**5625.0**	5.0	20	**5625**	**5625.0**	0.8	20	**5625**	**5625.0**	4.8	20
boc_1	58	**58**	**58.0**	1.1	20	**58**	**58.0**	0.1	20	**58**	**58.0**	0.2	20
boc_10	70	**70**	**70.0**	0.9	20	**70**	**70.0**	0.1	20	**70**	**70.0**	0.1	20
boc_2	61	**61**	**61.0**	2.4	20	**61**	**61.0**	0.1	20	**61**	**61.0**	0.2	20
boc_3	60	**60**	**60.0**	0.9	20	**60**	**60.0**	0.1	20	**60**	**60.0**	0.2	20
boc_4	50	**50**	**50.0**	1.1	20	**50**	**50.0**	0.1	20	**50**	**50.0**	0.2	20
boc_5	72	**72**	**72.0**	0.8	20	**72**	**72.0**	0.0	20	**72**	**72.0**	0.1	20
boc_6	76	**76**	**76.0**	0.8	20	**76**	**76.0**	0.1	20	**76**	**76.0**	0.1	20
boc_7	78	**78**	**78.0**	0.8	20	**78**	**78.0**	0.1	20	**78**	**78.0**	0.1	20
boc_8	61	**61**	**61.0**	1.1	20	**61**	**61.0**	0.1	20	**61**	**61.0**	0.1	20
boc_9	89	**89**	**89.0**	0.8	20	**89**	**89.0**	0.0	20	**89**	**89.0**	0.1	20
boe_91	80	**80**	**80.0**	1.3	20	**80**	**80.0**	0.2	20	**80**	**80.0**	0.2	20
bridges	3867	**3867**	**3867.0**	1.8	20	**3867**	**3867.0**	0.1	20	**3867**	**3867.0**	0.3	20
bur_69	98	**98**	**98.0**	0.9	20	**98**	**98.0**	0.1	20	**98**	**98.0**	0.2	20
bur_75	67	**67**	66.8	75.5	15	**67**	**67.0**	0.4	20	**67**	**67.0**	0.3	20
bur_91	72	**72**	**72.0**	1.7	20	**72**	**72.0**	0.4	20	**72**	**72.0**	0.3	20
can_97	157	**157**	**157.0**	1.3	20	**157**	**157.0**	0.4	20	**157**	**157.0**	0.2	20
cars	1501	**1501**	**1501.0**	0.8	20	**1501**	**1501.0**	0.0	20	**1501**	**1501.0**	0.1	20
ce50-20	58	**58**	**58.0**	1.4	20	**58**	**58.0**	0.2	20	**58**	**58.0**	0.3	20
ce50-30	79	**79**	**79.0**	1.3	20	**79**	**79.0**	0.1	20	**79**	**79.0**	0.1	20
ce50-40	105	**105**	**105.0**	1.3	20	**105**	**105.0**	0.1	20	**105**	**105.0**	0.1	20
ce50-50	163	**163**	**163.0**	0.8	20	**163**	**163.0**	0.1	20	**163**	**163.0**	0.1	20
ce50-60	257	**257**	**257.0**	0.7	20	**257**	**257.0**	0.0	20	**257**	**257.0**	0.1	20
ce60-20	73	**73**	**73.0**	1.8	20	**73**	**73.0**	0.4	20	**73**	**73.0**	0.4	20
ce60-40	151	**151**	**151.0**	1.5	20	**151**	**151.0**	0.1	20	**151**	**151.0**	0.1	20
ce60-60	373	**373**	**373.0**	0.8	20	**373**	**373.0**	0.0	20	**373**	**373.0**	0.1	20
ce70-20	93	**93**	**93.0**	2.1	20	**93**	**93.0**	0.5	20	**93**	**93.0**	0.5	20
ce70-60	491	**491**	**491.0**	1.0	20	**491**	**491.0**	0.0	20	**491**	**491.0**	0.0	20
ce80-20	107	**107**	**107.0**	2.5	20	**107**	**107.0**	0.7	20	**107**	**107.0**	0.5	20
ce80-60	657	**657**	**657.0**	1.1	20	**657**	**657.0**	0.0	20	**657**	**657.0**	0.1	20
cetacea	967	**967**	**967.0**	0.4	20	**967**	**967.0**	0.0	20	**967**	**967.0**	0.0	20
cha_86	102	**102**	**102.0**	1.0	20	**102**	**102.0**	0.1	20	**102**	**102.0**	0.1	20
cha_87	347	**347**	**347.0**	7.0	20	**347**	**347.0**	0.2	20	**347**	**347.0**	0.2	20
companies	81802	**81802**	**81802.0**	1.6	20	**81802**	**81802.0**	0.0	20	**81802**	**81802.0**	0.0	20
corr40-1	2191	**2191**	**2191.0**	0.7	20	**2191**	**2191.0**	0.0	20	**2191**	**2191.0**	0.1	20
corr40-10	2301	**2301**	**2301.0**	0.8	20	**2301**	**2301.0**	0.0	20	**2301**	**2301.0**	0.1	20
corr40-2	1852	**1852**	**1852.0**	0.7	20	**1852**	**1852.0**	0.0	20	**1852**	**1852.0**	0.0	20
corr40-3	2310	**2310**	**2310.0**	0.9	20	**2310**	**2310.0**	0.1	20	**2310**	**2310.0**	0.0	20
corr40-4	2084	**2084**	**2084.0**	0.7	20	**2084**	**2084.0**	0.0	20	**2084**	**2084.0**	0.0	20
corr40-5	2245	**2245**	**2245.0**	1.0	20	**2245**	**2245.0**	0.1	20	**2245**	**2245.0**	0.0	20
corr40-6	2516	**2516**	**2516.0**	0.8	20	**2516**	**2516.0**	0.0	20	**2516**	**2516.0**	0.0	20
corr40-7	2294	**2294**	**2294.0**	0.8	20	**2294**	**2294.0**	0.0	20	**2294**	**2294.0**	0.0	20
corr40-8	2184	**2184**	**2184.0**	3.0	20	**2184**	**2184.0**	0.0	20	**2184**	**2184.0**	0.0	20
corr40-9	2129	**2129**	**2129.0**	0.7	20	**2129**	**2129.0**	0.0	20	**2129**	**2129.0**	0.0	20
corr60-1	3678	**3678**	**3678.0**	1.0	20	**3678**	**3678.0**	0.0	20	**3678**	**3678.0**	0.1	20
corr60-10	3570	**3570**	**3570.0**	1.1	20	**3570**	**3570.0**	0.0	20	**3570**	**3570.0**	0.1	20
corr60-2	3445	**3445**	**3445.0**	1.0	20	**3445**	**3445.0**	0.1	20	**3445**	**3445.0**	0.1	20
corr60-3	3595	**3595**	**3595.0**	1.0	20	**3595**	**3595.0**	0.1	20	**3595**	**3595.0**	0.1	20
corr60-4	3565	**3565**	**3565.0**	0.9	20	**3565**	**3565.0**	0.0	20	**3565**	**3565.0**	0.1	20
corr60-5	3313	**3313**	**3313.0**	1.2	20	**3313**	**3313.0**	0.0	20	**3313**	**3313.0**	0.1	20
corr60-6	3295	**3295**	**3295.0**	1.1	20	**3295**	**3295.0**	0.0	20	**3295**	**3295.0**	0.1	20
corr60-7	3506	**3506**	**3506.0**	0.7	20	**3506**	**3506.0**	0.1	20	**3506**	**3506.0**	0.1	20
corr60-8	3540	**3540**	**3540.0**	1.1	20	**3540**	**3540.0**	0.0	20	**3540**	**3540.0**	0.1	20
corr60-9	3372	**3372**	**3372.0**	1.0	20	**3372**	**3372.0**	0.1	20	**3372**	**3372.0**	0.1	20
NoB		**71**	**70**			71	71			71	71		

Table 1: Comparison results of EWSA, FSS and MDMCP on 71 instances with proven optimal solutions.

		EWSA				FSS				MDMCP			
Instance	Best known	Best	Avg	Time	Hits	Best	Avg	Time	Hits	Best	Avg	Time	Hits
CPn45-1	11545	**11545**	**11545.0**	1.7	20	**11545**	**11545**	0.0	20	**11545**	**11545.0**	0.1	20
CPn45-2	12345	**12345**	**12345.0**	1.2	20	**12345**	**12345**	0.1	20	**12345**	**12345.0**	0.3	20
CPn45-3	11880	**11880**	**11880.0**	1.2	20	**11880**	**11880**	0.1	20	**11880**	**11880.0**	0.1	20
CPn45-4	10506	**10506**	**10506.0**	3.9	20	**10506**	**10506**	0.2	20	**10506**	**10506.0**	0.2	20
CPn35-1	7837	**7837**	**7837.0**	0.9	20	**7837**	**7837.0**	0.1	20	**7837**	**7837.0**	0.1	20
CPn35-2	7215	**7215**	**7215.0**	0.8	20	**7215**	**7215.0**	0.0	20	**7215**	**7215.0**	0.1	20
CPn35-3	7633	**7633**	**7633.0**	0.6	20	**7633**	**7633.0**	0.0	20	**7633**	**7633.0**	0.0	20
CPn35-4	7652	**7652**	**7652.0**	0.8	20	**7652**	**7652.0**	0.0	20	**7652**	**7652.0**	0.1	20
gro_80	53	**53**	**53.0**	1.1	20	**53**	**53.0**	0.1	20	**53**	**53.0**	0.1	20
hayes-roth	2800	**2800**	**2800.0**	3.3	20	**2800**	**2800.0**	1.5	20	**2800**	**2800.0**	0.7	20
ira_95	38	**38**	**38.0**	0.6	20	**38**	**38.0**	0.0	20	**38**	**38.0**	0.0	20
kin_80	41	**41**	**41.0**	0.9	20	**41**	**41.0**	0.1	20	**41**	**41.0**	0.1	20
lecturers	14317	**14317**	**14315.9**	421.5	6	14316	14311.2	732.4	1	14316	14315.4	562.9	11
lee_97	115	**115**	**115.0**	1.9	20	**115**	**115.0**	0.1	20	**115**	**115.0**	0.1	20
lung-cancer	3472	**3472**	**3472.0**	0.5	20	**3472**	**3472.0**	0.0	20	**3472**	**3472.0**	0.0	20
lymphography	19174	**19174**	**19174.0**	3.6	20	**19174**	**19174.0**	0.5	20	**19174**	**19174.0**	0.2	20
mas_97	41	**41**	**41.0**	0.7	20	**41**	**41.0**	0.0	20	**41**	**41.0**	0.0	20
mcc_72	43	**43**	**43.0**	1.0	20	**43**	**43.0**	0.0	20	**43**	**43.0**	0.1	20
micro	966	**966**	**966.0**	0.6	20	**966**	**966.0**	0.0	20	**966**	**966.0**	0.0	20
mil_91	46	**46**	**46.0**	6.7	20	**46**	**46.0**	2.3	20	**46**	**46.0**	0.3	20
nai_96a	117	**117**	**117.0**	1.4	20	**117**	**117.0**	0.0	20	**117**	**117.0**	0.0	20
nai_96b	93	**93**	**93.0**	1.6	20	**93**	**93.0**	0.2	20	**93**	**93.0**	0.1	20
nai_96c	91	**91**	**91.0**	1.4	20	**91**	**91.0**	0.2	20	**91**	**91.0**	0.1	20
nai_96d	74	**74**	**74.0**	1.8	20	**74**	**74.0**	0.3	20	**74**	**74.0**	0.2	20
neg-c-00	752	**752**	**752.0**	0.8	20	**752**	**752.0**	0.1	20	**752**	**752.0**	0.0	20
neg-c-10	649	**649**	**649.0**	0.9	20	**649**	**649.0**	0.1	20	**649**	**649.0**	0.0	20
neg-c-20	604	**604**	**604.0**	0.9	20	**604**	**604.0**	0.1	20	**604**	**604.0**	0.0	20
neg-c-30	582	**582**	**582.0**	0.9	20	**582**	**582.0**	0.1	20	**582**	**582.0**	0.0	20
neg-c-40	577	**577**	**577.0**	0.7	20	**577**	**577.0**	0.1	20	**577**	**577.0**	0.0	20
neg-c-50	549	**549**	**549.0**	0.8	20	**549**	**549.0**	0.1	20	**549**	**549.0**	0.1	20
neg-c-60	463	**463**	**463.0**	0.9	20	**463**	**463.0**	0.1	20	**463**	**463.0**	0.1	20
neg-c-70	452	**452**	**452.0**	0.9	20	**452**	**452.0**	0.1	20	**452**	**452.0**	0.1	20
neg-c-80	317	**317**	**317.0**	0.9	20	**317**	**317.0**	0.3	20	**317**	**317.0**	0.2	20
neg-s-80	473	**473**	**473.0**	1.0	20	**473**	**473.0**	0.5	20	**473**	**473.0**	0.2	20
primary-tumor	323614	**323614**	**323614.0**	5.2	20	**323614**	**323614.0**	0.1	20	**323614**	**323614.0**	0.2	20
rog_05	60	**60**	**60.0**	1.9	20	**60**	**60.0**	0.6	20	**60**	**60.0**	0.3	20
sei_88	54	**54**	**54.0**	0.6	20	**54**	**54.0**	0.0	20	**54**	**54.0**	0.0	20
soup	4625	**4625**	**4625.0**	13.5	20	**4625**	**4625.0**	46.2	20	**4625**	**4625.0**	16.3	20
soybean-21	3041	**3041**	**3041.0**	0.6	20	**3041**	**3041.0**	0.0	20	**3041**	**3041.0**	0.0	20
soybean-35	14613	**14613**	**14613.0**	0.6	20	**14613**	**14613.0**	0.0	20	**14613**	**14613.0**	0.0	20
soybean-large	316469	**316469**	**316469.0**	6.6	20	**316469**	**316469.0**	0.3	20	**316469**	**316469.0**	0.6	20
sponge	25677	**25677**	**25677.0**	1.2	20	**25677**	**25677.0**	0.0	20	**25677**	**25677.0**	0.0	20
sul_91	46	**46**	**46.0**	0.7	20	**46**	**46.0**	0.0	20	**46**	**46.0**	0.0	20
ta-evaluation	1108	**1108**	**1108.0**	3.3	20	**1108**	**1108.0**	3.0	20	**1108**	**1108.0**	0.8	20
uno	798	**798**	**798.0**	0.9	20	**798**	**798.0**	0.1	20	**798**	**798.0**	0.1	20
uno_1a	12197	**12197**	**12197.0**	2.4	20	**12197**	**12197.0**	0.3	20	**12197**	**12197.0**	0.2	20
uno_1b	11775	**11775**	**11775.0**	2.0	20	**11775**	**11775.0**	0.0	20	**11775**	**11775.0**	0.0	20
uno_2a	72820	**72820**	**72820.0**	2.5	20	**72820**	**72820.0**	0.0	20	**72820**	**72820.0**	0.1	20
uno_2b	71818	**71818**	**71818.0**	2.5	20	**71818**	**71818.0**	0.0	20	**71818**	**71818.0**	0.1	20
uno_3a	73068	**73068**	**73068.0**	2.5	20	**73068**	**73068.0**	0.0	20	**73068**	**73068.0**	0.1	20
uno_3b	72629	**72629**	**72629.0**	1.7	20	**72629**	**72629.0**	0.0	20	**72629**	**72629.0**	0.0	20
wildcats	1304	**1304**	**1304.0**	0.5	20	**1304**	**1304.0**	0.0	20	**1304**	**1304.0**	0.0	20
workers	964	**964**	**964.0**	0.6	20	**964**	**964.0**	0.0	20	**964**	**964.0**	0.0	20
zoo	16948	**16948**	**16948.0**	1.5	20	**16948**	**16948.0**	0.0	20	**16948**	**16948.0**	0.0	20
NoB		**54**	**54**			53	53			53	53		

Table 2: Comparison results of EWSA, FSS and MDMCP on 54 instances with proven optimal solutions.

		EWSA				FSS				MDMCP			
Instance	Best known	Best	Avg	Time	Hits	Best	Avg	Time	Hits	Best	Avg	Time	Hits
bur_73	126	***130**	**130.0**	24.7	20	**130**	**130.0**	4.2495	20	**130**	**130.0**	2.1	20
ce60-30	100	**100**	**100.0**	1.6	20	**100**	**100.0**	0.2015	20	**100**	**100.0**	0.3	20
ce60-50	200	**200**	**200.0**	1.1	20	**200**	**200.0**	0.1045	20	**200**	**200.0**	0.1	20
ce70-30	128	**128**	**128.0**	1.9	20	**128**	**128.0**	0.3825	20	**128**	**128.0**	0.4	20
ce70-40	177	**177**	**177.0**	1.8	20	**177**	**177.0**	0.119	20	**177**	**177.0**	0.2	20
ce70-50	266	**266**	**266.0**	1.4	20	**266**	**266.0**	0.2625	20	**266**	**266.0**	0.4	20
ce80-30	157	**157**	**157.0**	2.2	20	**157**	**157.0**	0.385	20	**157**	**157.0**	0.2	20
ce80-40	227	**227**	**227.0**	1.9	20	**227**	**227.0**	0.074	20	**227**	**227.0**	0.1	20
ce80-50	325	**325**	**325.0**	1.7	20	**325**	**325.0**	0.073	20	**325**	**325.0**	0.1	20
corr80-1	4724	**4724**	**4724.0**	1.3	20	**4724**	**4724.0**	0.076	20	**4724**	**4724.0**	0.1	20
corr80-2	4667	**4667**	**4667.0**	1.5	20	**4667**	**4667.0**	0.0965	20	**4667**	**4667.0**	0.1	20
corr80-3	4993	**4993**	**4993.0**	1.3	20	**4993**	**4993.0**	0.03	20	**4993**	**4993.0**	0.1	20
corr80-4	4504	**4504**	**4504.0**	1.0	20	**4504**	**4504.0**	0.112	20	**4504**	**4504.0**	0.1	20
corr80-5	5090	**5090**	**5090.0**	1.3	20	**5090**	**5090.0**	0.0435	20	**5090**	**5090.0**	0.1	20
corr80-6	4465	**4465**	**4465.0**	1.6	20	**4465**	**4465.0**	1.2775	20	**4465**	**4465.0**	0.9	20
corr80-7	5088	**5088**	**5088.0**	1.3	20	**5088**	**5088.0**	0.034	20	**5088**	**5088.0**	0.1	20
corr80-8	4757	**4757**	**4757.0**	1.4	20	**4757**	**4757.0**	0.051	20	**4757**	**4757.0**	0.1	20
corr80-9	4430	**4430**	**4430.0**	1.2	20	**4430**	**4430.0**	0.0425	20	**4430**	**4430.0**	0.1	20
corr80-10	5071	**5071**	**5071.0**	1.4	20	**5071**	**5071.0**	0.2725	20	**5071**	**5071.0**	0.1	20
CPn50-1	13562	**13562**	**13562.0**	4.4	20	**13562**	**13562.0**	0.1865	20	**13562**	**13562.0**	0.3	20
CPn50-2	14080	**14080**	**14080.0**	2.7	20	**14080**	**14080.0**	0.1975	20	**14080**	**14080.0**	0.9	20
CPn50-3	13172	**13172**	**13172.0**	4.9	20	**13172**	**13172.0**	0.244	20	**13172**	**13172.0**	0.8	20
CPn50-4	13728	**13728**	**13728.0**	4.5	20	**13728**	**13728.0**	0.568	20	**13728**	**13728.0**	1.8	20
CPn65-1	20028	**20028**	**20028.0**	18.2	20	**20028**	**20028.0**	0.612	20	**20028**	**20028.0**	1.4	20
CPn65-2	20753	**20753**	**20753.0**	5.3	20	**20753**	**20753.0**	0.147	20	**20753**	**20753.0**	0.5	20
CPn65-3	20463	**20463**	**20463.0**	3.0	20	**20463**	**20463.0**	0.2695	20	**20463**	**20463.0**	0.2	20
CPn65-4	20000	***20093**	**20093.0**	11.9	20	**20093**	**20093.0**	1.3675	20	**20093**	**20093.0**	2.5	20
CPn100-1	37188	***37562**	**37562.0**	15.2	20	**37562**	**37562.0**	3.5085	20	**37562**	**37562.0**	11.7	20
CPn100-2	37460	***37990**	**37990.0**	13.8	20	**37990**	**37990.0**	1.672	20	**37990**	**37990.0**	4.3	20
CPn100-3	39766	**39766**	**39766.0**	20.0	20	**39766**	**39766.0**	5.136	20	**39766**	**39766.0**	14.4	20
CPn100-4	38192	**38192**	38187.6	66.7	19	**38192**	**38192.0**	21.043	20	**38192**	38187.6	58.8	19
kat_97	175	**175**	**175.0**	3.4	20	**175**	**175.0**	1.386	20	**175**	**175.0**	0.5	20
neg-tt-80	592	**592**	**592.0**	1.5	20	**592**	**592.0**	1.0805	20	**592**	**592.0**	0.3	20
Wang250	419	**419**	**419.0**	100.7	20	**419**	418.9	63.22	17	**419**	**419.0**	9.3	20
Wang800	1777	***1793**	**1790.6**	544.8	1	1787	1781.0	794.0955	1	1792	1787.3	524.4	1
Wang1150	3236	***3244**	3237.7	1473.8	1	3242	3234.1	4208.457	1	3243	**3240.1**	1922.4	1
NoB		**36**	**34**			34	33			34	**34**		

Table 3: Comparison results of EWSA, FSS and MDMCP on 36 instances without proven optimal solutions.

		EWSA				SACC				FSS				MDMCP			
Instance	Best known	Best	Avg	Time	Hits	Best	Avg	Time	Hits	Best	Avg	Time	Hits	Best	Avg	Time	Hits
rand100-100	24296	**24296**	**24296.0**	5.1	20	**24296**	**24296.0**	0.1	20	**24296**	**24296.0**	0.7	20	**24296**	**24296.0**	0.4	20
rand100-5	1407	**1407**	**1407.0**	2.5	20	**1407**	1406.4	0.0	19	**1407**	**1407.0**	0.3	20	**1407**	**1407.0**	0.2	20
rand200-100	74924	**74924**	**74924.0**	16.1	20	**74924**	**74924.0**	5.9	20	**74924**	**74924.0**	17.2	20	**74924**	**74924.0**	14.8	20
rand200-5	4079	**4079**	**4079.0**	19.5	20	**4079**	**4079.0**	5.0	20	**4079**	**4079.0**	8.9	20	**4079**	**4079.0**	5.7	20
rand300-100	152709	**152709**	**152709.0**	9.4	20	**152709**	**152709.0**	0.5	20	**152709**	**152709.0**	0.4	20	**152709**	**152709.0**	0.7	20
rand300-5	7732	**7732**	**7732.0**	46.1	20	**7732**	**7732.0**	14.9	20	**7732**	**7732.0**	41.6	20	**7732**	**7732.0**	33.8	20
rand400-100	222757	**222757**	**222757.0**	122.3	20	**222757**	**222757.0**	65.0	20	**222757**	**222757.0**	25.0	20	**222757**	**222757.0**	47.9	20
rand400-5	12133	**12133**	**12133.0**	81.0	20	**12133**	**12133.0**	30.7	20	**12133**	**12133.0**	33.0	20	**12133**	**12133.0**	70.4	20
rand500-100	309125	**309125**	**309067.0**	195.5	16	**309125**	308914.2	38.2	3	**309125**	308983.4	104.4	8	**309125**	308954.5	130.8	5
rand500-5	17127	**17127**	**17127.0**	64.9	20	**17127**	**17127.0**	45.6	20	**17127**	**17127.0**	126.7	20	**17127**	17126.8	149.0	19
regnier300-50	32164	**32164**	**32164.0**	6.8	20	**32164**	**32164.0**	0.1	20	**32164**	**32164.0**	0.2	20	**32164**	**32164.0**	0.5	20
sym300-50	17592	**17592**	**17592.0**	69.1	20	**17592**	**17592.0**	38.4	20	**17592**	**17592.0**	21.6	20	**17592**	**17592.0**	17.9	20
zahn300	2504	**2504**	**2504.0**	13.7	20	**2504**	**2504.0**	2.3	20	**2504**	**2504.0**	1.7	20	**2504**	**2504.0**	2.6	20
gauss500-100-1	265070	**265070**	**265070.0**	94.6	20	**265070**	265059.9	122.1	19	**265070**	**265070.0**	75.1	20	**265070**	265059.9	140.4	19
gauss500-100-2	269076	**269076**	269034.4	145.7	15	**269076**	269067.9	169.8	19	**269076**	**269076.0**	49.2	20	**269076**	**269076.0**	66.2	20
gauss500-100-3	257700	**257700**	257645.1	148.0	15	**257700**	257619.2	221.9	12	**257700**	**257677.6**	132.0	18	**257700**	257659.6	147.4	16
gauss500-100-4	267683	**267683**	**267683.0**	88.4	20	**267683**	**267683.0**	41.2	20	**267683**	**267683.0**	6.5	20	**267683**	**267683.0**	33.2	20
gauss500-100-5	271567	**271567**	271566.1	96.7	19	**271567**	**271567.0**	12.1	20	**271567**	**271567.0**	4.5	20	**271567**	**271567.0**	6.6	20
p500-100-1	308896	**308896**	**308896.0**	134.3	20	**308896**	308895.1	142.9	18	**308896**	308895.6	125.9	19	**308896**	308895.6	163.5	19
p500-100-2	310241	**310241**	**310237.1**	123.6	19	**310241**	310233.2	185.8	18	**310241**	310217.6	167.9	14	**310241**	310198.1	95.9	9
p500-100-3	310477	**310477**	**310477.0**	73.8	20	**310477**	**310477.0**	39.1	20	**310477**	310474.1	113.5	19	**310477**	310444.6	122.5	9
p500-100-4	309567	**309567**	309553.5	142.0	19	**309567**	**309567.0**	106.5	20	**309567**	**309567.0**	142.9	20	**309567**	309533.3	254.6	10
p500-100-5	309135	**309135**	**309135.0**	126.2	20	**309135**	**309135.0**	38.5	20	**309135**	**309135.0**	20.8	20	**309135**	**309135.0**	35.7	20
p500-100-6	310280	**310280**	310278.7	124.5	19	**310280**	**310280.0**	33.8	20	**310280**	**310280.0**	18.3	20	**310280**	**310280.0**	31.0	20
p500-100-7	310063	**310063**	310055.7	183.3	17	**310063**	**310063.0**	117.2	20	**310063**	310060.1	61.5	19	**310063**	**310063.0**	126.0	20
p500-100-8	303148	**303148**	**303148.0**	126.0	20	**303148**	**303148.0**	100.1	20	**303148**	**303148.0**	85.9	20	**303148**	**303148.0**	97.8	20
p500-100-9	305305	**305305**	**305305.0**	40.7	20	**305305**	**305305.0**	12.8	20	**305305**	**305305.0**	7.3	20	**305305**	**305305.0**	10.6	20
p500-100-10	314864	**314864**	**314864.0**	71.5	20	**314864**	**314864.0**	14.1	20	**314864**	**314864.0**	11.0	20	**314864**	**314864.0**	15.8	20
p500-5-1	17691	**17691**	**17691.0**	39.5	20	**17691**	**17691.0**	25.1	20	**17691**	**17691.0**	30.5	20	**17691**	**17691.0**	47.4	20
p500-5-2	17169	**17169**	17168.7	137.2	18	**17169**	**17169.0**	19.5	20	**17169**	17168.3	165.7	15	**17169**	17167.5	120.9	10
p500-5-3	16816	**16816**	16815.7	139.1	17	**16816**	**16815.5**	133.7	9	**16816**	**16816.0**	193.8	19	**16816**	**16816.0**	181.6	19
p500-5-4	16808	**16808**	**16808.0**	64.0	20	**16808**	**16808.0**	15.4	20	**16808**	**16808.0**	27.4	20	**16808**	**16808.0**	49.7	20
p500-5-5	16957	**16957**	**16957.0**	33.3	20	**16957**	**16957.0**	17.0	20	**16957**	**16957.0**	28.8	20	**16957**	**16957.0**	69.4	20
p500-5-6	16615	**16615**	**16615.0**	97.5	20	**16615**	**16615.0**	25.6	20	**16615**	**16615.0**	44.1	20	**16615**	**16615.0**	95.2	20
p500-5-7	16649	**16649**	**16649.0**	102.1	20	**16649**	**16649.0**	78.6	20	**16649**	**16649.0**	77.2	20	**16649**	16648.6	142.0	16
p500-5-8	16756	**16756**	**16756.0**	117.8	20	**16756**	**16756.0**	29.6	20	**16756**	**16756.0**	52.0	20	**16756**	16755.7	144.3	18
p500-5-9	16629	**16629**	**16629.0**	97.4	20	**16629**	**16629.0**	47.1	20	**16629**	**16629.0**	43.6	20	**16629**	16628.5	121.2	19
p500-5-10	17360	**17360**	**17360.0**	14.5	20	**17360**	**17360.0**	5.2	20	**17360**	**17360.0**	2.8	20	**17360**	**17360.0**	4.7	20
unif700-100-1	515016	**515016**	**515016.0**	201.2	20	**515016**	**515016.0**	142.5	20	**515016**	**515016.0**	88.7	20	**515016**	**515016.0**	272.7	20
unif700-100-2	519441	**519441**	**519441.0**	81.1	20	**519441**	**519441.0**	152.6	20	**519441**	**519441.0**	76.3	20	**519441**	**519441.0**	133.9	20
unif700-100-3	512351	**512351**	512280.7	290.2	18	**512351**	**512310.4**	349.1	19	**512351**	512229.1	379.0	17	**512351**	511699.1	435.8	4
unif700-100-4	513582	**513582**	513582.0	161.1	19	**513582**	**513582.0**	125.5	20	**513582**	513499.6	215.9	16	**513582**	513271.8	493.7	12
unif700-100-5	510585	**510585**	**510483.8**	474.3	11	**510585**	510454.2	341.0	8	**510585**	510470.4	310.7	9	**510585**	510391.5	341.7	2
unif800-100-1	639675	**639675**	**639675.0**	245.6	20	**639675**	**639675.0**	152.9	20	**639675**	**639675.0**	201.4	20	**639675**	639577.7	381.8	13
unif800-100-2	630704	**630704**	**630704.0**	489.8	20	**630704**	**630704.0**	209.9	20	**630704**	630703.3	297.5	13	**630704**	630701.2	466.4	17
unif800-100-3	629375	**629375**	**629124.2**	433.7	3	**629375**	629049.1	459.4	1	629108	629006.4	482.5	6	629108	628911.3	525.6	3
unif800-100-4	624728	**624728**	**624595.1**	510.9	14	**624728**	624366.2	368.2	7	**624728**	624401.4	399.9	3	**624728**	624141.6	458.2	1
unif800-100-5	625905	**625905**	625796.7	436.0	12	**625905**	625846.2	289.3	16	**625905**	**625905.0**	155.1	20	**625905**	**625905.0**	216.4	20
NoB		**48**	**37**			**48**	37			47	36			47	29		

Table 4: Comparison results of EWSA, SACC, FSS and MDMCP on 48 instances without proven optimal solutions.

		EWSA				SACC				FSS				MDMCP			
Instance	Best known	Best	Avg	Time	Hits	Best	Avg	Time	Hits	Best	Avg	Time	Hits	Best	Avg	Time	Hits
p1000-1	885281	**885281**	**885252.2**	1019.8	18	**885281**	885029.5	721.1	5	885016	884826.9	1126.6	3	884970	884732.2	861.8	6
p1000-2	881751	**881751**	**881581.4**	782.3	14	**881751**	881525.8	872.7	14	**881751**	881487.9	844.2	12	**881751**	881173.0	1003.6	5
p1000-3	866587	***867008**	866178.9	728.4	1	866488	866227.6	916.3	3	866441	**866411.3**	867.3	16	866441	866330.5	1009.1	10
p1000-4	869374	**869374**	869345.8	596.6	19	**869374**	**869374.0**	464.1	20	**869374**	869069.3	792.3	12	**869374**	868645.1	1047.3	5
p1000-5	888960	**888960**	**888819.2**	855.9	12	**888960**	888579.9	924.2	2	**888960**	888665.1	963.4	5	**888960**	888520.8	1130.0	1
p1500-1	1619470	**1619470**	1619424.5	1374.9	3	**1619470**	**1619461.9**	1530.4	2	**1619470**	1619233.3	2067.9	2	1619461	1619135.9	2536.5	1
p1500-2	1649778	**1649778**	**1649773.4**	769.4	17	**1649778**	1649333.2	1539.3	16	**1649778**	1649768.0	2556.0	10	1649686	1648299.8	2260.7	1
p1500-3	1611197	**1611197**	**1611184.5**	952.9	18	**1611197**	1610649.3	1718.4	11	**1611197**	1609778.9	1699.8	4	**1611197**	1610057.9	2678.0	3
p1500-4	1641933	**1641933**	**1641901.5**	1540.0	16	**1641933**	1641724.9	1576.3	16	**1641933**	1641309.1	1591.4	7	**1641933**	1641474.2	2466.7	4
p1500-5	1595627	**1595627**	1595618.6	1198.9	18	**1595627**	**1595627.0**	1309.2	20	**1595627**	1594809.1	1668.3	7	**1595627**	1594785.7	2618.4	6
p2000-1	2508005	**2508005**	2507528.6	4500.3	5	**2508005**	2507580.0	4554.2	3	2507982	**2507873.9**	6582.7	7	2507239	2506119.2	6247.3	1
p2000-2	2495994	**2495994**	**2494944.7**	5439.4	1	**2495994**	2494752.5	4941.9	1	2494847	2494325.2	6180.2	1	2494710	2493994.8	4852.8	1
p2000-3	2544728	**2544728**	**2543893.3**	6273.9	2	2543724	2543164.8	4569.3	3	2543439	2542928.9	7217.3	3	2543214	2542418.4	5636.0	1
p2000-4	2528721	**2528721**	**2528580.0**	5042.4	15	**2528721**	2528048.7	5477.7	8	**2528721**	2528158.9	7157.2	1	2528618	2527260.8	6116.3	1
p2000-5	2514009	**2514009**	**2513336.9**	5079.6	12	**2514009**	2512017.8	4579.1	2	2513967	2511889.3	7457.3	1	2511126	2510119.9	4645.6	1
new_b2500.1	1064366	**1064366**	**1063760.4**	6609.8	2	**1064366**	1062794.0	5848.9	1	1064062	1062576.2	6742.4	1	1062047	1061062.1	5961.2	1
new_b2500.2	1064428	***1064732**	**1064363.6**	5046.5	1	1064428	1063377.8	5763.8	2	1064343	1063364.2	7746.9	1	1063034	1062147.1	6230.1	1
new_b2500.3	1083209	**1083209**	**1082607.9**	5879.8	2	**1083209**	1082297.1	5638.5	1	1082411	1081980.7	6320.5	1	1082139	1080818.0	5886.8	1
new_b2500.4	1066258	***1066750**	**1066222.2**	5111.9	2	1066258	1065600.6	5552.0	1	1066141	1065444.5	6477.9	1	1065429	1064811.6	4717.7	1
new_b2500.5	1066226	***1066500**	**1065996.8**	5536.1	1	1066226	1065391.8	5276.5	1	1065949	1064948.4	6312.5	1	1065122	1064059.4	5360.1	1
new_b2500.6	1067531	***1068270**	**1067017.8**	5629.4	1	1067531	1066423.0	5875.5	1	1067206	1066279.4	6772.7	1	1067031	1065276.5	6470.6	1
new_b2500.7	1068576	***1068760**	**1068417.1**	5288.7	1	1068324	1067665.9	5829.0	1	1068480	1067669.3	6651.6	1	1067642	1066906.3	4754.8	1
new_b2500.8	1070534	***1070850**	**1070280.7**	5965.5	1	1070534	1070132.1	4884.2	1	1070102	1069430.5	6120.5	1	1069949	1069163.7	5270.8	1
new_b2500.9	1071646	***1071931**	**1071608.7**	5867.0	1	1071447	1070680.9	6026.6	1	1071137	1070579.7	6710.2	1	1071286	1070087.6	4966.8	1
new_b2500.10	1066871	***1067254**	**1066802.5**	5848.6	1	1066871	1066642.8	6269.2	2	1066838	1066182.7	7298.3	1	1066694	1065931.9	6155.9	1
new_p3000.1	3259900	**3259900**	**3258992.6**	9354.4	2	**3259900**	3258066.2	11183.4	6	**3259900**	3255861.7	14519.9	1	3258688	3255210.4	11664.0	1
new_p3000.2	4102907	***4104060**	**4101845.5**	10291.7	1	4101652	4100589.8	7834.2	1	4102621	4098665.9	14377.2	1	4099687	4097170.9	11821.1	1
new_p3000.3	4122814	***4123241**	4121445.2	11409.0	1	4122814	**4121662.7**	10118.1	6	4122733	4117540.4	13466.8	1	4121343	4117445.9	11897.8	1
new_p3000.4	4588584	**4588584**	**4588540.2**	10996.8	5	**4588584**	4586545.0	10629.6	7	4588238	4584068.1	14755.7	1	4588373	4584604.7	10944.9	1
new_p3000.5	4639266	**4639266**	**4637814.9**	11833.7	1	**4639266**	4632508.0	11996.0	1	4638931	4631150.0	15534.0	1	4638921	4630733.9	9214.1	1
new_p4000.1	5021579	**5021579**	**5018805.1**	12235.1	2	**5021579**	5015852.0	12193.2	1	5018168	5015119.4	13650.2	1	5012722	5009946.5	12538.4	1
new_p4000.2	6381289	***6381936**	**6379151.0**	13413.5	1	6381090	6375097.9	10459.3	2	6381136	6376004.9	13657.2	1	6380297	6371856.0	11458.1	1
new_p4000.3	6388075	***6388234**	**6387384.1**	12300.2	1	6388024	6382777.9	12274.8	1	6387267	6381201.0	16628.9	1	6386998	6381953.1	11480.5	1
new_p4000.4	7130397	***7131146**	**7126664.0**	14328.3	1	7127592	7123288.1	10903.2	1	7129589	7123504.8	16949.4	1	7122672	7116761.1	13821.1	1
new_p4000.5	7048838	***7050732**	**7045973.4**	10897.2	1	7048838	7043396.7	11178.2	1	7047948	7041125.0	14884.9	1	7040927	7036193.8	13172.5	1
new_p5000.1	7011355	***7013489**	**7009781.8**	13196.5	1	7011355	7005544.5	10423.0	1	7011746	7004615.0	15350.1	1	7001781	6996553.5	12682.9	1
new_p5000.2	8850743	***8851575**	**8844829.1**	12438.8	1	8848190	8838727.6	12713.2	1	8844727	8839135.6	16909.7	1	8840084	8830082.2	13792.1	1
new_p5000.3	8978790	***8978921**	**8976569.4**	12587.2	1	8978790	8969701.8	12415.1	1	8973678	8967669.2	15100.4	1	8968616	8961737.9	14464.7	1
new_p5000.4	9957492	***9959907**	**9956119.9**	12843.8	1	9951747	9944681.4	11769.9	1	9958166	9947879.3	16738.8	1	9939475	9931651.9	12794.9	1
new_p5000.5	9845791	***9855134**	**9848116.1**	11825.8	1	9842989	9836746.4	11898.0	1	9851920	9836400.1	16820.5	1	9827427	9821373.6	11608.6	1
new_p6000.1	9218467	***9222250**	**9216672.0**	13675.7	1	9217584	9206922.5	10307.6	1	9217826	9207027.6	16001.7	1	9210854	9200734.1	15552.8	1
new_p6000.2	11733007	***11738114**	**11729399.5**	13278.7	1	11729985	11719095.2	12689.4	1	11732522	11723271.7	15763.2	1	11711600	11702099.9	13268.0	1
new_p6000.3	13058463	***13059413**	**13053003.5**	11906.9	1	13058463	13042774.6	12847.6	1	13052914	13041376.9	15495.6	1	13046195	13029294.6	13637.3	1
new_p7000.1	11638591	***11649618**	**11641535.9**	14868.0	1	11638146	11625022.6	14583.9	1	11634577	11628201.5	18396.2	1	11613191	11604039.0	13495.9	1
new_p7000.2	14699943	***14708026**	**14699843.7**	14327.7	1	14697515	14683896.6	15121.2	1	14695690	14686517.5	16735.0	1	14675940	14666454.1	17528.8	1
new_p7000.3	16408045	***16409389**	**16400943.9**	13997.4	1	16391377	16379753.1	13676.9	1	16395409	16368851.5	17255.3	1	16378525	16357101.8	14884.3	1
NoB		**46**	**40**			19	4			10	2			6	0		

Table 5: Comparison results of EWSA, SACC, FSS and MDMCP on 46 instances without proven optimal solutions.

	EWSA		EWSA$_w$		EWSA$_{c2}$		EWSA$_{c1}$		EWSA$_{pr}$		EWSA$_{em}$	
Instance	Best	Hits	Best	Hits	Best	Hits	Best	Hits	Best	Hits	Best	Hits
new_b2500.10.txt	**1067254**	1	1067242	1	1066303	1	1066714	1	1066871	3	1066871	7
new_b2500.2.txt	**1064732**	1	1064241	2	1063978	1	1064076	1	1064471	1	1064428	2
new_b2500.4.txt	1066750	2	1066147	3	1066262	1	1066092	1	**1066764**	1	**1066764**	1
new_b2500.5.txt	**1066500**	1	1066462	2	1064623	1	1065946	1	1066462	1	1066263	1
new_b2500.6.txt	1068270	1	1067531	1	1065732	1	1067605	1	**1068272**	1	1068270	1
new_b2500.7.txt	1068760	1	1068656	1	1068164	1	1068544	1	**1068845**	1	1068700	1
new_b2500.8.txt	**1070850**	1	1070186	1	1070122	1	1070433	1	1070850	1	1070534	1
new_b2500.9.txt	**1071931**	1	1071498	1	1070903	1	1071609	1	**1071931**	3	**1071931**	1
new_p3000.2.txt	**4104060**	1	4103668	1	4099077	1	4101913	1	4103668	1	4103925	1
new_p3000.3.txt	**4123241**	1	4122814	6	4118495	1	4122394	1	4122814	3	**4123241**	5
new_p4000.2.txt	6381936	1	**6382251**	1	6368021	1	6378672	1	6382024	1	**6382251**	1
new_p4000.3.txt	**6388234**	1	6388234	2	6374234	1	6387212	1	6388224	1	**6388234**	1
new_p4000.4.txt	7131146	1	7130508	1	7121344	1	7128587	1	**7131873**	1	7131494	1
new_p4000.5.txt	**7050732**	1	7050288	1	7038795	1	7049231	1	7048859	1	**7050732**	1
new_p5000.1.txt	**7013489**	1	7013284	1	7000146	1	7009870	1	7013338	1	7012330	1
new_p5000.2.txt	**8851575**	1	8848012	1	8825665	1	8844962	1	8850142	1	8851500	1
new_p5000.3.txt	8978921	1	8978779	1	8952486	1	8976204	1	8978921	2	**8978970**	1
new_p5000.4.txt	**9959907**	1	9958166	1	9945895	1	9952725	1	9958289	1	9958745	1
new_p5000.5.txt	**9855134**	1	9855080	1	9821943	1	9853213	1	9855080	7	**9855134**	2
new_p6000.1.txt	9222250	1	**9224091**	1	9196759	1	9215934	1	9223979	1	9223073	1
new_p6000.2.txt	11738114	1	**11738244**	1	11709300	1	11729599	1	11736295	1	11737119	1
new_p6000.3.txt	13059413	1	**13062235**	1	13025164	1	13046348	1	13059413	1	13057881	1
new_p7000.1.txt	**11649618**	1	11641274	1	11610895	1	11641547	1	11645939	1	11648421	1
new_p7000.2.txt	**14708026**	1	14707214	1	14663142	1	14698056	1	14706918	1	14707001	1
new_p7000.3.txt	**16409389**	1	16401267	1	16362410	1	16399637	1	16404244	1	16409025	1
p1000-3.txt	**867008**	1	**867008**	1	**867008**	1	867005	1	**867008**	1	866587	1
NoB	**17**		5		1		0		6		8	

Table 6: Best solutions over 20 runs and hit times of the variants on 26 instances.

	EWSA		EWSA$_w$		EWSA$_{c2}$		EWSA$_{c1}$		EWSA$_{pr}$		EWSA$_{em}$	
Instance	Avg	Time	Avg	Time	Avg	Time	Avg	Time	Avg	Time	Avg	Time
new_b2500.10.txt	**1066802.5**	5848.6	1066495.6	4638.7	1063376.2	5365.4	1066113.1	4995.2	1066723.6	5936.9	1066728.4	6815.7
new_b2500.2.txt	**1064363.6**	5046.5	1063578.0	6321.7	1061761.8	5155.7	1063421.0	5001.2	1064261.7	4966.6	1064098.8	6509.4
new_b2500.4.txt	**1066222.2**	5111.9	1065976.7	4754.2	1064364.3	4652.8	1065392.1	5174.5	1066142.4	4884.5	1065996.9	6328.7
new_b2500.5.txt	**1065996.8**	5536.1	1065561.0	5585.4	1063199.8	4750.8	1065063.2	4144.9	1065942.8	4866.4	1065587.1	6535.8
new_b2500.6.txt	1067017.8	5629.4	1066704.2	5017.0	1064300.6	4179.0	1066144.0	5662.7	**1067239.1**	4852.3	1066960.5	7404.8
new_b2500.7.txt	**1068417.1**	5288.7	1067873.3	5233.2	1066530.5	2599.6	1067638.7	4518.2	1068394.9	5247.8	1068094.7	6112.3
new_b2500.8.txt	**1070280.7**	5965.5	1069800.2	5006.3	1067633.0	3956.1	1069850.6	4487.2	1070218.3	5536.3	1070203.7	7456.1
new_b2500.9.txt	1071608.7	5867.0	1071036.1	5136.4	1068747.8	5239.4	1071048.0	5520.6	**1071739.2**	4193.4	1071370.8	7965.3
new_p3000.2.txt	4101845.5	10291.7	4101530.8	9927.4	4094137.3	10241.3	4099612.3	8861.6	**4102185.2**	10943.7	4101194.0	12517.1
new_p3000.3.txt	4121445.2	11409.0	4120614.1	10648.5	4113122.5	10579.6	4119939.9	7639.7	4121575.1	11052.8	**4121900.3**	13880.6
new_p4000.2.txt	6379151.0	13413.5	6377610.6	7088.8	6361682.4	10186.4	6375733.8	11088.0	**6379977.1**	12623.7	6378272.9	15473.4
new_p4000.3.txt	6387384.1	12300.2	6385256.6	11829.3	6365913.3	10267.7	6383927.0	10183.6	**6387661.7**	10231.0	6387582.6	14317.8
new_p4000.4.txt	7126664.0	14328.3	7124584.7	8797.4	7111428.7	10485.2	7123466.3	12228.0	**7127711.0**	12829.8	7126149.6	14404.9
new_p4000.5.txt	7045973.4	10897.2	7044088.9	10906.5	7025733.8	12541.5	7041562.1	7072.0	**7046294.2**	11892.6	7044644.4	14537.3
new_p5000.1.txt	**7009781.8**	13196.5	7007045.1	9126.9	6986874.3	10766.8	7004540.0	10092.8	7009447.3	11546.0	7008235.6	15889.0
new_p5000.2.txt	8844829.1	12438.8	8840500.9	12032.9	8814156.4	10761.8	8838230.3	9809.3	8844797.6	13605.5	**8844855.0**	15793.2
new_p5000.3.txt	8976569.4	12587.2	8968857.9	12220.8	8944096.7	10734.1	8970454.1	11221.5	**8977885.2**	12449.2	8975362.3	14843.0
new_p5000.4.txt	**9956119.9**	12843.8	9947601.3	13762.1	9923597.3	9567.5	9947424.2	9351.5	9954700.1	12694.3	9954235.8	15308.5
new_p5000.5.txt	9848116.1	11825.8	9838724.4	12110.8	9807020.5	8219.9	9841322.8	9050.5	**9849687.7**	10522.6	9844384.3	17236.7
new_p6000.1.txt	9216672.0	13675.7	9211299.5	11471.5	9182248.9	11745.5	9210921.7	10279.1	**9219075.9**	13784.4	9217882.3	15909.3
new_p6000.2.txt	**11729399.5**	13278.7	11723350.9	11576.4	11691341.5	7898.2	11723260.2	7957.8	11729181.5	12221.8	11728177.9	16469.8
new_p6000.3.txt	**13053003.5**	11906.9	13046607.8	11675.1	13011883.5	10341.1	13041126.3	9704.1	13050962.0	11814.5	13050293.1	15420.1
new_p7000.1.txt	**11641535.9**	14868.0	11629841.9	12379.9	11596528.2	11903.5	11630607.5	10526.0	11640833.6	13483.9	11639045.0	13798.0
new_p7000.2.txt	**14699843.7**	14327.7	14689526.2	12421.7	14638061.7	11209.3	14690571.1	12382.7	14698093.2	14926.1	14697084.0	16007.9
new_p7000.3.txt	**16400943.9**	13997.4	16383431.5	13850.4	16329493.2	12075.7	16388943.6	8177.4	16388362.9	13547.8	16396970.4	16480.6
p1000-3.txt	866178.9	728.4	**866413.8**	919.8	865963.1	992.8	866089.7	843.7	866372.0	962.5	866170.2	808.1
NoB	**13**		1		0		0		10		2	

Table 7: Average behavior of the variants on 26 instances.

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