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Report on Offline-3(Exam Scheduling Using Local Search)

In this offline we have used a local search algorithm to schedule exams using several constructive heuristics and two perturbative heuristics. For each constructive heuristics, penalty 1 is the penalty after applying the constructive heuristic only, penalty 2 is the penalty after applying Kempe chain and penalty 3 is the penalty after applying Pair swap heuristic.

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| Benchmark Data | Known Best Solution | | Scheme 1  (Largest Enrollment + Kempe Chain + Pair Swap) | | | | | | | | |
| Exponential Penalty | | | | Linear Penalty | | | | |
| Time Slots | Penalty | Time Slots | Penalty 1 | Penalty 2 | Penalty 3 | | Time Slots | Penalty 1 | Penalty 2 | Penalty 3 |
| CAR91 | 35 | 4.42 | 36 | 13.7759 | 6.63216 | 6.44452 | | 36 | 8.4414 | 4.1295 | 4.11698 |
| CAR92 | 32 | 3.74 | 34 | 10.8422 | 5.15213 | 5.05207 | | 34 | 6.83229 | 3.26011 | 3.23036 |
| KFU93 | 20 | 12.96 | 21 | 54.4122 | 17.9039 | 16.258 | | 21 | 34.1802 | 10.2677 | 10.1926 |
| TRE92 | 23 | 7.75 | 22 | 16.3308 | 10.7834 | 10.4459 | | 22 | 10.4296 | 6.76066 | 6.67033 |
| YOR83 | 21 | 34.84 | 24 | 63.7885 | 35.7386 | 35.0797 | | 24 | 40.5399 | 22.9522 | 22.9522 |

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| Benchmark Data | Known Best Solution | | Scheme 2  (Largest Degree + Kempe Chain + Pair Swap) | | | | | | | | |
| Exponential Penalty | | | | Linear Penalty | | | | |
| Time Slots | Penalty | Time Slots | Penalty 1 | Penalty 2 | Penalty 3 | | Time Slots | Penalty 1 | Penalty 2 | Penalty 3 |
| CAR91 | 35 | 4.42 | 34 | 11.6292 | 7.48954 | 7.17718 | | 34 | 7.42916 | 4.64327 | 4.62673 |
| CAR92 | 32 | 3.74 | 32 | 10.5233 | 5.72132 | 5.52028 | | 32 | 6.71242 | 3.61008 | 3.56545 |
| KFU93 | 20 | 12.96 | 20 | 46.2109 | 20.5179 | 17.8981 | | 20 | 28.5474 | 12.0576 | 11.8422 |
| TRE92 | 23 | 7.75 | 23 | 16.0261 | 10.3867 | 9.94292 | | 23 | 10.2086 | 6.57267 | 6.41724 |
| YOR83 | 21 | 34.84 | 23 | 65.6982 | 38.7577 | 36.44 | | 23 | 41.39 | 23.9469 | 23.6642 |

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| Benchmark Data | Known Best Solution | | Scheme 3  (Smallest Saturation + Kempe Chain + Pair Swap) | | | | | | | | |
| Exponential Penalty | | | | Linear Penalty | | | | |
| Time Slots | Penalty | Time Slots | Penalty 1 | Penalty 2 | Penalty 3 | | Time Slots | Penalty 1 | Penalty 2 | Penalty 3 |
| CAR91 | 35 | 4.42 | 34 | 11.4426 | 7.16714 | 6.98966 | | 34 | 7.38592 | 4.56292 | 4.53385 |
| CAR92 | 32 | 3.74 | 32 | 10.5598 | 5.66182 | 5.52668 | | 32 | 6.73544 | 3.57196 | 3.51572 |
| KFU93 | 20 | 12.96 | 20 | 46.4004 | 21.0398 | 19.1884 | | 20 | 28.5867 | 12.8637 | 12.7665 |
| TRE92 | 23 | 7.75 | 23 | 16.0138 | 10.1304 | 9.85144 | | 23 | 10.2082 | 6.46905 | 6.42366 |
| YOR83 | 21 | 34.84 | 23 | 65.6472 | 38.1615 | 36.8427 | | 23 | 41.3603 | 24.2997 | 24.1658 |

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| Benchmark Data | Known Best Solution | | Scheme 4  (Random Ordering + Kempe Chain + Pair Swap) | | | | | | | | |
| Exponential Penalty | | | | Linear Penalty | | | | |
| Time Slots | Penalty | Time Slots | Penalty1 | Penalty2 | Penalty3 | | Time Slots | Penalty 1 | Penalty 2 | Penalty 3 |
| CAR91 | 35 | 4.42 | 48 | 9.2443 | 4.97932 | 4.68675 | | 48 | 5.92379 | 3.12832 | 3.07621 |
| CAR92 | 32 | 3.74 | 47 | 7.72735 | 3.67343 | 3.41093 | | 47 | 4.86237 | 2.2454 | 2.20729 |
| KFU93 | 20 | 12.96 | 26 | 34.8955 | 13.3948 | 12.2845 | | 26 | 21.9069 | 8.50552 | 7.78613 |
| TRE92 | 23 | 7.75 | 29 | 12.8044 | 8.49312 | 7.19395 | | 29 | 8.09766 | 4.82714 | 4.77212 |
| YOR83 | 21 | 34.84 | 28 | 49.5154 | 29.5632 | 28.6791 | | 28 | 31.5579 | 18.9756 | 18.6844 |