Ai-SOFT CHALLENGE 2024: Inventory Routing Problem (IRP) Complementary Rules

Shiraz University

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Competition Rules

Rule 1: Participants must have academic/industrial affiliation.
Rule 2: Participants are allowed to work in groups of at most three members.
Rule 3: Participants must implement a technique to tackle the problem on a single thread. They can use any programming language that runs under Windows or Linux. Open-source libraries can be utilized, provided that they operate on a single thread.
Rule 4: A dataset of 10 instances with different sizes was available from the opening day. The 20 new instances provided along with this file are to determine the finalists. We will use a third dataset to rank the top competitors (i.e., the finalists). The instances belonging to the first two datasets are called *Public1* and *Public2*, while the third set is known as set *Hidden*. The competitors can be sure that the maximum number of customers, periods, and vehicles in all the instances are 200, 12, and 30, respectively.
Rule 6: We recommend proposing an anytime algorithm that can be stopped at any desired time. In this implementation, when a better solution is discovered, the old solution file is replaced with the new one. In this way, you can be sure to have an output file before the program is interrupted because of the considered timeout limit.
Rule 7: A time limit must be set by the competitors to obtain a solution for each instance. The time limit will be standardized to take into account different machines and platforms according to the CPU marks provided by PassMark Single Thread Performance [1]. Thus, experiments are better to be performed on the processors that are listed in PassMark. As mid-range desktop processors have marks around 2,000, we will use this mark to define the standardized times. This indicates that if a run is conducted on a processor with a score of 2,500, the allowed time will be adjusted to 0.8 of the standard time, meaning less time is permitted than on a standard processor.

The time limit for each instance is 5 minutes on a processor with a CPU mark of 2,000. If we let C denote the CPU mark for a given processor, the scaling factor S associated with that processor is $S = \frac{2{,}000}{C}$. Thus, the time limit allowed for each instance on a processor with the scaling factor S is $S \times 5$ minutes. This time limit ($S \times 5$ minutes) must be set by the

[1] https://www.cpubenchmark.net/singleThread.html

competitors on the running time of their programs for each instance. It is up to competitors to perform their runs on a machine that is not heavily loaded.
Rule 8: The algorithm can be either deterministic or stochastic, but the results must be reproducible. In particular, the participants that use a stochastic algorithm should code their program so that each submitted solution can be reproducible (for example, by setting a fixed random seed).
Rule 9: For each Public2 instance, participants should submit a solution file which must be in the format specified in the "Solution Files" section of the previous document (i.e., the problem description file).
Rule 10: The set of at most ten finalists, having the highest rank among the other participants according to their results on the Public2 instances, will be selected after the competition deadline. Next, these finalists will be ranked based on the scores provided on the Hidden instances. The score of each algorithm is the average rank of that algorithm's solutions in all the instances. The organizers reserve the right to increase the number of finalists in case of a large participation.
Rule 11: The finalists have to send an execution file along with all the necessary files that their programs depend on. At first, the programs of the finalists will be run by the organizers on the Public2 instances to confirm that the submitted solutions are produced within the time limit (i.e., 5 minutes) by the algorithms. Then, their program will be run on the Hidden instances to find the winners of the competition. The solver submitted by the finalists must get the name of the instance file as input (i.e., SolverName InstanceFileName; for example, "solve Sabs1n20H3.dat").

Submission

The place that the competitors should enroll their teams and submit their solution files will be announced as soon as possible.

Contact Information

If the competitors have any questions about the competition they are welcome to be in contact with us via **aisoftch@shirazu.ac.ir**.