



ARTIFICIAL INTELLIGENCE

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HOMEWORK 4 MONTE CARLO TREE SEARCH FOR ORIENTEERING PROBLEM

Grade

The project grade, corresponding to 30% of your final grade, is given by a weighted average of your performance in the homeworks (10%, 25%, 30% and 35%).

Deadline

This homework must be submitted **Tuesday 23 December 2022 at 23:59** (time in Lugano).

Instructions

Starting from the notebook [MCTS_for_the_OPTW.ipynb](#), solve the Orienteering Problem with Time Windows using Monte Carlo Tree Search (MCTS). More details on the implementation can be found in the paper "[MCTS survey](#)".

Implement the following *functions*:

1. the tree policy
2. the select best child
3. the backup

Evaluate your implementation with at least 3 *seeds*, and for the three *random instances* available in the mentioned notebook.

You should use 5 seconds for each call of the MCTS step.

Finally, you are invited to propose your own variant of the provided MCTS, commenting on the changes you made to achieve better results with respect to the baseline.

Submission

Deliver your code as a **Python Jupyter notebook file** and briefly discuss your results and concisely provides evidence that you have accomplished each of the tasks listed above. Please do not include in the submission images of your plots nor the files in the AI2022MA folder.

Before submitting, rename your file as: [<Name Surname>_MSCAI22_hw4.ipynb](#).

If you wish to deliver more than one file (code and report), please submit them in a single compressed folder with the same file name format: [<Name Surname>_MSCAI22_hw4.zip](#).