

PDP lab 6

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Goal

The goal of this lab is to implement a simple but non-trivial parallel algorithm.

Requirement

Solve the problem below:

Given a directed graph, find a Hamiltonian cycle, if one exists. Use multiple threads to parallelize the search.

The documentation will describe:

- the algorithms,
- the synchronization used in the parallelized variants,
- the performance measurements

Short description of the implementation

Starting from the first vertex, we check all of its neighbors that are not in the Hamiltonian cycle path, then we do the same for each neighbor calling the function recursively on a new thread. We do this until Hamiltonian cycle path has the same length as the graph's number of vertices.

Computer Specification

- CPU: Intel Core i7-10750H, 2.6 (5)Ghz
- RAM: 16 GB
- System Type: Windows 10 Home 64 bit

Testing

- Graph with 5 vertexes that has a Hamiltonian cycle: 0,011 seconds
- Graph with 5 vertexes that does not have a Hamiltonian cycle: 0,019 seconds
- Graph with 9 vertexes that has a Hamiltonian cycle: 0,023 seconds
- Graph with 9 vertexes that does not have a Hamiltonian cycle: 0,026 seconds