

# Parallelizing techniques - 3

## Requirement

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

## Solution

Split the work to be done, ie the backtracking starting from one node, to a different thread. Thus, the backtracking will be executing in parallel for each node. The improvements that can be further done in case of a big amount of processors is to split the first step taken by each backtracking process in a different thread. For example, if from node A is a vertex to B and C, a thread will backtrack starting from A-B and another one from A-C. This can also be split further.

Synchronization methods: I have used a mutex when a path was found to add it to the list of paths.

## Hardware

Processor: Intel(R) Core(™) i7-8750H CPU @ 2.20GHz 2.21 GHz

RAM: 16 GB

System type: 64-bit OS

Platform: Windows 10

## Tests

Number of nodes	Number of vertices	Number of threads	Time taken
5	13	5	0.0031099 s
6	18	6	0.579442 s
6	18	1	1.24602 s
5	13	1	0.0017151 s