Laboratory 6
– Parallelizing techniques –

1. Goal:

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

2. Requirement:

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

3. Computer Specification:

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

RAM: 16 GB

System Type: 64-bit

4. Implementation:

Algorithm:

- generate all possible paths starting from each node, and check one if it is a Hamiltonian cycle
- in parallelized version we have one thread executing the backtracking for one node

Parallelization – Java Thread Pool with ArrayBlockingQueue.

5. Performance Test:

- Note: level ‘x’ = graph of rank x

Algorithm	Level 25	Level 50	Level 75	Level 100
sequential	35	95	256	562
parallelized	4	21	72	165

6. Sum up:

- The parallelized methods run faster than the sequential ones (as expected).