Computer Science 711 S2 − (2021)

Assignment 2

Due: August 16th (11:59pm)

Requirements

This assignment requires you to use OpenMP (with C or C++ language) to give a parallel formulation of a simple graph algorithm. The problem is to compute the radius for a sequence of digraphs (given as input in adjacency list format). Recall that the radius of the graph is the minimum eccentricity of any vertex and the eccentricity of a vertex v the maximum distance from v to any other vertex. We use our CompSci 220 adjacency list format where the first line is the order n of a digraph. This is followed by n lines listing the out-neighbors. Vertices are indexed with labels 0 to $n-1$. The input sequence of graphs is terminated by a digraph of order 0 (not processed). The output for each input graph should be a single integer denoting the radius or the text string 'None' if there is no center vertex for that digraph. [read from keyboard/stdin/cin; print to console/stdout/cout]

Sample Input:

```
3
1 2
2
0
4
2
0
0 3

5
1 2
2 0
0 1
4
3
0
```

Sample Output:

```
1
3
None
```

Submission

These problem requirements will require you to submit a program to the computer science automarker `https://www.automarker.cs.auckland.ac.nz/`. It will test whether your program compiles under the gcc/g++ OpenMP environment.

You also need to write a 4–5 page report, where you explain your algorithm, test data, and performance results of your experiments. Submit this report as a PDF file to Canvas (Parallel Computing Programming Assignment).

Each of the two parts of this assignment gives 9 marks of your total grade (18 marks total).