South China University of Technology

《Course》Experiment Report

Experiment Title： Experiment 3 The Prim Algorithm for MST

Name： Yeo King Student ID： 201969990051

Class： CST 2019 International Group： -

Collaborator： -

Teacher： Mr Yan Xiaoyang

|  |
| --- |
| **Description** |
| 【Objective and Requirement】  Objective：  (1)Understand what is the Minimum spanning trees (MST);  (2)Learn what kinds of algorithms can be used to find MST, such as: Kruskal and Prim  algorithms;  (3)Compare the difference between these two algorithms;    Requirement：   1. The template should be used for all kinds of data type, such as: integer, real, double, etc. in the program; 2. Programs should be made by Object-Oriented Programming (OOP) method; 3. Use using Kruskal’s algorithm and Prim’s algorithm to solve this problem. 4. And compare the results between these two algorithms and the difference of selection processes. 5. Write down the report in which there should be the execution results of the program.   【Environment】  Operating System：Windows |
| **Content** |
| The comparison of the result from the execution of Kruskal algorithm and Prim algorithm to find MST from  the graph :  Result For Kruskal’s Algorithm Result For Prim’s Algorithm    Comparison :  -The time complexity is O(ElogV) for Kruskal algorithm  -The time complexity is O(V2) for Prim algorithm  -The selection process are different too.  - Kruskal traverses one node only once while Prim will traverse one node more than one time to get the minimum  distance  -Kruskal’s algorithm runs faster in sparse graphs while Prim’s algorithm runs faster in dense graphs.  -Kruskal starts to build the Minimum Spanning Tree from the vertex carrying minimum weight in the graph.  -Prim starts to build the Minimum Spanning Tree from any vertex in the graph. |
| **Conclusion** |
| I have learnt to understand the MST and how to find it using Kruskal and Prim algorithm and compared the differences. |
| **Teacher’s Comments and Score** |
| Comment：  Score：           Signature：                                                 Date： |