Ontario Engineering Competition

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Programming Competition

User Manual

GPC Power Monitoring and Control System

Carleton University Team 1

**Charles Bergeron**

**Christopher Briglio**

**David Briglio**

**Daniel Sauvé**

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# GPC Power Monitoring and Control System

The GPC Power Monitoring and Control System is a program designed to autonomously route and monitor power distribution for all of GPC's power grid. The system was built to handle power outages within the grid by dynamically calculating the shortest path from all houses to available power sources, and the associated costs. It is also focused on minimizing costs by taking into account power consumption and transmission costs when calculating power distribution paths. The program was designed to be a simple, user friendly experience providing all relevant, up-to-date information at the click of a button.

# Running The Program

Take the program folder and place it on your computer. Once you have all the necessary files on the computer you may run the programs using the .exe file included in the main directory.

Select a feature by entering a number from the displayed menu, and hitting “Enter”. Any following instructions or input required from the user will be prompted on screen.

Ensure that Java version 8 or later is installed on your computer. To check if Java 8 is installed on your computer, please visit [https://www.**java**.com/**verify**/](https://www.java.com/verify/%20)to check if Java is installed on your machine, and if it is up to date. To download Java, visit <https://www.java.com/en/download/>.

# Path Finding Algorithm - Dijkstra's

The path finding algorithm implemented by the program is based off Dijkstra's Algorithm. Dijkstra's algorithm is an algorithm to find the shortest path between nodes on a graph. It is based on specifying a source node and finding the shortest path to all other nodes within the graph producing a shortest path tree. Our program uses this algorithms and specifies the weight between nodes based on the power price rates and link distance as our heuristic. By doing this, our program ensure that GPC maximizes profits of power distribution by minimizing the cost to transfer power across the grid.