User's Manual – Centralized Traffic Control

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**Introduction:**

The Centralized Traffic Control will be the primary control center for the user of the transit system. The user will be able to monitor the entire system and make some higher level decisions about the system. This will consist of a graphical user interface with a display of the track layout and status as well as more specific information below it.

**System Requirements:**

The user must be running the software on a machine that has the Java Runtime Environment with Java 1.7 or higher. The GUI uses JavaFX.

**Functions:**

Each main function of the CTC is present in one of the five window views (as seen in the images). These functions are monitor the system, schedule train, route train, open/close track for maintenance, and add/remove track.

**1. Monitor the transit system**

This is done on the main window. (See image in user interface) A display is shown on the top which includes the track layout with white and yellow lines indicating track blocks. Yellow, bolded lines indicate a track block located at a station. Red lines indicate a track block that is currently closed for maintenance. Rectangles above the lines represent trains that are currently on those tracks. Each train has a unique name that is visible when moused over the rectangle representing it.

Below the visual display is a table of the trains currently on the track. For each train, the table displays its name, coordinate location, status of running or stopped, speed, and authority. There is also a Schedule and a Route button for each train, which can be used to either schedule the train or route the train. These buttons will take the user to a new view.

Below the table are two buttons. One is Track Maintenance, which takes the user to the screen that closes or opens a track. The other is Add/Remove Track, which allows the user to permanently add or remove a track. These buttons also take the user to a new view.

**2. Schedule Train**

This window includes the same graphical display as the main window, except that only one train is visible. It also includes a table of the current schedule for this train, which is a list of all the stations the train should hit and what times it arrives at and leaves each station. One table entry consists of a station name, an Arrive By time, and a Leave At time. Each station will have a unique name, which can be determined by mousing over the station in the graphical display. The last entry in the table is not completely filled, and the user may edit it and hit submit if he wants to add an entry. Each entry currently in the table also has an X, which can be clicked to remove that entry.

For all of the windows except the main one, there is a Cancel and a Submit button. The Cancel button discards any changes that were made by the user and brings him back to the main window. The Submit button saves all changes and brings the user back to the main window.

**3. Route Train**

This window includes the same graphical display as the main window, except it only shows the chosen train visible. There is a text box in which the user may input track block numbers in the order he wishes the train to travel. The tracks in the display will change to arrows according to the route that was inserted by the user. As an alternative, the user may click on tracks in order to populate the text box. If the user tries to submit an invalid input, an error message will appear.

**4. Track Maintenance**

This window includes the same graphical display as the main window. It also includes a table of all the tracks currently closed for maintenance. A user may add a new track for maintenance by typing in the track number in the last row of the table and hitting Submit right next to it. An alternative to typing in the number would be to click on the track in the display. If the user tries to submit an invalid track number, an error message will appear on the side. The user may also reopen a closed track by clicking Reopen in that entry.

**5. Add/Remove Track**

This window includes the same graphical display as the main window. It also includes a textbox for adding a new track to the system. The user enters the coordinates of the endpoints of the track and hits Add. If the user entered a valid track, it will appear on the display. Else, it will display an error message. The user can also remove a track by typing in a track number under Remove Track and hitting Remove. The user can also click on one of the tracks to have it fill in the number.