MAJOR PROJECT #3: OVERVIEW REPORT

In problems arising in computer science, mathematics, engineering, and many other disciplines we often need to represent arbitrary relationships among data objects. Directed and undirected graphs are natural models of such relationships. One common problem is that of finding the shortest path from one node in a directed graph to some other node.

For this Project: You will be modeling a railroad system that allows users to travel from town to town. There are two major types of information the user may wish to obtain from the system.

1. What route will allow me to ride the train the shortest amount of time?
2. What route will get me to my destination in the shortest amount of time?(not required!!!)

Phase I: (300 points) Due April 30th 9:00 AM
To answer question 1 you will need to model the railroad system in terms of a directed graph. The user will be allowed to enter their start and end stations and you will give them the shortest path in the form of a schedule. You will also give them the total travel time on the trains.

Phase II: (For those who want to accept the challenge ☺)
To answer question 2 you will have to take into account the time the traveler has to wait at each station to take a train. You will have to know the users starting time. Since trains leave at different times of the day you cannot assume that the traveler will be able to make every connection.

The program will use two text data files to build its information about trains.

stations.dat : This file holds information about the train stations
<format> : S#: Station number [0..99] <blank> **SN**: Station name [A-Z] with max length of 25

Example Line : 0 MADISON

trains.dat : This file holds information about the trains
<format> : DS# AS# Dt At
DS#: Depart Station number in range 0-99 **AS#**: Arrival Station number in range 0-99
Dt: Departure time in range 0-1440 minutes **At**: Arrival time in range 0 – 1440 minutes

Example Line : 0 3 215 1232

Note: *no train runs over midnight from 1 day to the next!*

You are allowed to develop your own user interface however the user should be presented with a main menu as follows:

MAIN MENU:

1. **List Stations and #s.**
2. **Find Shortest Travel Time on Trains**
3. **Find Shortest Time Overall**
4. **EXIT**

You must supply users with City choices. You cannot assume they know their numbers!!