CSU22012 Final Project

Design Document

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**Introduction:** This is the design document for my bus management system in course CSU22012, Algorithms and Data Structure. The main goal of this program is to use the data provide and help the user to get different information and suggestions from the data, e.g. which way to get from a stop to another stop is shorter.

**Section 1:**

For this part I first load all the useful information in three txt file in to the hash maps with key of I (number sequences), using three while loop and three scanner. Load the needed information into the two array to use in the shortest path. When loading the cost in transfers file I add an if statement to check is the length of the string equal to 3, if it equal to 3 this mean we don’t have a minimal transfer time (cost = 2) so we skip this section. If is not equal to 3 then we add the minimal transfer time to the hash map.

**Section 2:**

For this part the main thing is how to use TST to print out all the stop information needed. I create a new class call busStop to implement the whole thing using TST. I got the whole TST class from google (reference at the end). First I use a string to read in each line of the stop file and split using .split function. This allows me to move FLAGSTOP, NB, SB, WB, EB to the end of the string and I use a string builder to form my new string and put the details we need to print inside the new string. Then I put this string into a map and set the stop ID as the key so when I need this information I can just take everything out using the key, then print it out using my print function which also use TST.

**Section 3:**

This part is similar to section 2 but I didn’t use TST, instead I write a new class to print out each line of the string as it is in the file. First create two array list, one contains all the information from the file and second one contain the information we need to output. Then we check is the user input matches with numbers 0-9 to check is it a valid input, if it is we compare this value to each line of our input file to see which line matches the arrival time we want. Before this you also have to split the string as before and instead of only split with “,”, I also split the array with “, “, .equals only matches string value that exactly the same, if user input “5:25:00”, it will take in as “5:25:00”, but in the file because the time is in HH:MM:SS form, the value in the string is “ 5:25:00”, then if we use .equals it will say “5:25:00” does not matches with “ 5:25:00”, so I add a split with “, “(with a space at the end), when I get values like “ 5:25:00” it will split into “5:25:00” then it matches with the user input. The reset of the work is simple, just write a print function to print out the string then we get what we want.

**Section 4:**

This is the front end part of the program. For this I just use the terminal to input and output all the information. I decide to use a while loop so this can keep running until the user quit the program by themselves. This can be easily done just by set a Boolean value. They I give user four options, 0 to quit the program, 1 for section 1 (shortest path), 2 for section 2 (search bus stop by name), 3 for section 3 (search by arrival time). When user input 0 then set the Boolean value to true to end the while loop and the program. 1 we take the two input and enter the Dijkstra part, 2 we take the input using a scanner and we turn the input into all upper case because is all upper case in the file. Then we just call the class we write and print out all the stops matches. 3 take the user input using .trim and call the class to search arrival time. I also use try and catch to catch any exceptions occur, and all the print we need to communicate with the user.

**References:**

https://algs4.cs.princeton.edu/52trie/TST.java.html

<https://github.com/Rodeby/CSU22012>

**GitHub link:**

https://github.com/hua1013/CSU22012-final-project