PDS Lab Section 11

Lab Day 11 – February 17, 2021

The top two lines of your programs must contain the following information:
//Roll No.: <Type in your roll no.>
//Name: <Type in your name>

You have to give different names to your C files and upload them in Moodle. Please read the instructions given below.
Document your programs meaningfully using appropriately named variable and sufficient amount of comments as suggested in an earlier email. There will be marks for documentation.

1. Write the following text storage program in C. In the main() function, define an array of 10 string pointers and name it as sptr. Write the following functions. For all of these, consider use of only lower case characters.

   a) **create**: Read up to 10 words of various lengths from the keyboard one at a time, dynamically allocate just enough memory for each word entered, and store them so that the next element of sptr points to it [Note that each element of sptr is a string pointer]. Display all the words that have been entered so far.
   b) **lengthStat**: Display the number of words that are of length between 1-2 letters, 3-5 letters, larger than 5 letters.
   c) **letterStat**: Find and display the number of occurrences of all the vowels 'a' to 'u' in proper format by considering all the words together.
   d) **removeDuplicate**: Find all duplicate words, deallocate the duplicates, and display the updated list of words.

   Name your C program file as LD11_1_<roll_no>.c. **[20 Marks]**

2. Write a C program with the following functions:
   a) **main:** Dynamically allocate a two dimensional integer array whose dimensions would be input by the user. Fill the array with randomly generated numbers between 0 and 100. Display the array in a properly formatted form. Call the function **findMinMax** with the 2D array as a parameter.
   b) **findMinMax:** Find the smallest and the largest of all the numbers present in the array and display them along with the row and column numbers at which they are present.

   Name your C program file as LD11_2_<roll_no>.c. **[10 Marks]**

3. Write a C program with the following functions:
   a) **main:** Fill a 5×5 integer array named **dist** with random values between 0 and 1000 such that the upper triangle and lower triangle are symmetrical. Assume that the array **dist** represents the distance between 5 cities in Km (Value 0 implies no connectivity). Display the generated array with proper formatting. Next, call the following two functions **dist2cities** and **dist2thr3city** with the 2D array as a parameter.
   b) **dist2cities**: Read from keyboard two integers in the range 0 to 4 (say **s** and **t**). Determine the direct distance between the cities at **s** to **t** and display it. Also display the smallest distance between any two cities.
   c) **dist2thr3city**: Read from keyboard three integers in the range 0 to 4 (say **s**, **r** and **t**), find the distance between **s** to **t** through **r** and display it. Also display the smallest distance to reach a different city from any one city via a third city.

   Name your C program file as LD11_3_<roll_no>.c. **[15 Marks]**

Submit your .c file in Moodle against the assignment submission link for Lab Day 11.