

PDS Lab, Section - 17, Date: 18th Jan 2021

Assignment - 6 [Recursion, Number systems and Structures]

Instructions

1. Create a directory named as <rollno>_A6, where <rollno> is your roll number.
2. Give the name of the program as <p>.c where <p> implies the problems number, like 1.c 2.c 3.c etc. Store all the program under this Assignment in the directory <rollno>_A6
3. Zip the entire directory <rollno>_A6.
4. You should upload your zipped file <rollno>_A6.zip to the Moodle course web page latest by 5 PM (without penalty). The cutoff time will be till 5.30 PM with a penalty of 25% on your secured marks (i.e., if you secured 80 marks, after penalty you will get 60 marks). Beyond 5.30 PM, the moodle system will not allow you to submit, as a result you will get zero.

Q1. Create a structure namely PDS_LAB_ASSIGNMENT having data members as

- (i) date {day, month, year} where day(1 to 31), month (jan,feb,.....dec) (string of three characters only), year (2020,2021)
- (ii) topic (datatypes,arrays, functions , loops etc.) (input strings without spaces that will include only alphabets)
- (iii) No of questions in each assignment
- (iv) marks(floating-point) obtained in each assignment (out of 100).

Input **n** number of records by taking value of **n** from user. Consider date as another structure with 3 members {day, month, year}. Use this date structure as one of the member in PDS_LAB_ASSIGNMENT.

Calculate the following

- a) Average marks obtained in all assignments.
- b) Topics in which marks obtained are greater than average .
- c) Print date (DD.MM.YYYY) of the assignment which has the least number of questions.

- d) Write a function `marks_assignment` that will return the index of the assignment whose topic name is provided by the user, print the marks corresponding to that topic in main function. (Hint You can use `strcmp` function to compare the two strings)
- e) Write a function which returns the specific assignment from the array of assignments where the user provided date matches. This function should take the array of assignments, number of assignments and user specified date as input to the function. The returned assignment will be captured in the main() and print all the details of that assignment.

(40 Marks)

Q2. Take an integer array as input from the user. Write a recursive function to find the absolute difference of the consecutive two elements in that array from beginning to end of the array. To solve this problem, you need to write 2 functions: Function-1 computes the absolute difference between 2 numbers and return the same. Function-2 is a recursive function which computes the successive differences between the elements of an array from beginning to end of an array. Function-2 uses the Function-1 for calculating the difference between 2 numbers, and it should take only the integer array and its size as input arguments.

Example:

Input: N=5

A[5] = {5,6,8,12,18}

Output: The absolute difference of 5 and 6 is:1

The absolute difference of 6 and 8 is:2

The absolute difference of 8 and 12 is:4

The absolute difference of 12 and 18 is:6

(30 Marks)

Q3. Write a C program using recursive functions to compute the binary equivalent for a given decimal fractional number.

Hint: In the first step, separate integer and decimal parts of a given decimal fractional number. For each part write a separate C recursive function. `void int_to_bin(int, int[])`, `void frac_to_bin(int, int[])`. Consider the max size of the array is 16 for storing the binary equivalents of integer and fractional parts. While printing the binary equivalent of a given decimal fractional number in the main(), only required portion of binary digits to be displayed.

EX: Decimal Number = 13.625

Equivalent binary number = 1101.101

(30 Marks)