PDS Lab, Section - 17, Date: 25th Jan 2021

Assignment - 7 [Pointers]

Instructions

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1. **Create a directory named as <rollno>_A7, 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>_A7**
3. **Zip the entire directory <rollno>_A7.**
4. **You should upload your zipped file <rollno>_A7.zip to the Moodle course web page latest by 5:00 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.**

Note: Since this assignment is on pointers, you MUST use pointers EXTENSIVELY while solving the problems in this assignment. Wherever there is a possibility to use pointers, use them in all such places.

Q1 : Write a C program to carry out the following:
(i) Input an array of positive integers int* input_array(int*, int*), whose size is controlled by either some maximum size or entry of a negative integer. The function should return the size of the input array.
(ii) Reverse the array using int* reverse_array(int*, int*).
(iii) Check whether the array elements are unique or duplicate int* check_unique_array(int *, int *).

Note: Use pointers for all operations.

Example:
Max size of an array = 10
Enter array elements = 23, 64, 998, 7, 23, -99
Length of the array = 5
Reversed array = 23, 7, 998, 64, 23
Array elements are not unique. **[30 Marks]**

Q2 : Write a C program to do the following using appropriate C functions:- (Use Pointers)
(i) Enter the input string without spaces char* enter_string()
(ii) Print the string void print_string(char*);
(iii) Compute number of vowels and consonants in the input string void compute_vowel_consonant(char*, int*, int*)
(iv) Print all permutations of a given string void permute_string(char*) (Use Pointers to swap characters)

Example:
Input String = abcd
Number of vowels = 1
Number of Consonants = 3
Permutations of the string abcd = abcd abdc acbd acdb adcb adbc bacd badc bcad bcda bdca bdac cbad cbda cabd cadb cdab cdba dbca dbac dcba dcab dacb dabc

[35 Marks]

Q.3: Write the following C functions in the context of accessing Structure datatypes (using pointers)
(i) Function to read (input) multiple student records {int roll_no, char name[20], int marks[3], int total_marks} from keyboard.
(ii) Function to compute total marks for each student and update in the record.
(iiI) Function for sorting the student records based on total marks struct student* sort_student_record(struct student*, int*)
Demonstrate the above functions by printing the original student records as well as sorted records.

Example:

Original Student Records:

Student [1] = 21	aaaaaa	93	85	78	256
Student [2] = 22	bbbbbb	73	65	68	206
Student [3] = 23	ccccccc	93	95	88	276

Sorted Student Records:

Student [1] = 22	bbbbbb	73	65	68	206
Student [2] = 21	aaaaaa	93	85	78	256
Student [3] = 23	ccccccc	93	95	88	276

[35 Marks]