Programming and Data Structures – Section 15

Pre-Lab Practice Exercises for the Lab class on 05-01-2023

(Topics: Dynamic memory allocation, passing single Dimensional Array as parameter to a function, searching, sorting)

- **Write programs for the following problems yourself before coming to Lab on 05-01-2023**
- **No need to submit the solutions. These are purely for your practice.**

1.Write C program which will have the following functions.

a. **main**: The main function first ask the user to enter the value of an integer number **n** indicating the of elements in the experiment (0<**n**<100). Dynamically allocate an integer array named **arr** of size **n**. Fill the single dimensional integer array **arr** of size **n** with random integral numbers in the range 10 to 50 by calling the **rand()** library function. Display the array contents nicely formatted. Then call the functions **reverse** and **detTriplet and sort.**

b. **Reverse**: The function named **reverse** should take an integer array and its size as parameters and reverses the elements of the integer array, so that the last element becomes the first, the second from the last becomes the second, and so forth. he function should reverse the elements in place – that is, without using another array. Display the contents of the array.

c. **detTriplet**: The function **detTriplet** should take and integer array and its size as parameters and determine all the triplets that add upto 40 and display the corresponding array indices and the values stored in those locations.

d. **sort**: The function **sort** should take and integer array and its size as parameters and arrange all elements in descending . It should then display the elements of the sorted array.

2.Write a C program which will have the following functions.

a. **main**: The main function first ask the user to enter the value of a number **n** indicating the of elements in the experiment (0<n<100). Dynamically allocate an integer array named **arr** of size **n** and fill it with integer numbers between 1 to 50 by using the function **rand()** and display the array. Call the functions shuffle followed by exchange 10 times, each time displaying the contents of the array properly formatted.

b. **shuffle**: The function shuffle should take an integer array and its size as its arguments and shuffle it. For example, for the input array 1,2,3,4,5,6,7,8,9 it would shuffle it into 1,6,2,7,3,8,4,9,5.

c. **exchange**: The function exchange should take an integer array and its size as arguments and exchange each adjacent pair. For example, for the input array 1,2,3,4,5,6,7,8,9 it should exchange it into 2,1,4,3,6,5,8,7,9.

Test your programs by giving different inputs and checking if you are getting correct outputs.
Appropriately document your code.

No need to submit your code for these problems . These problems are purely for your practice, these would prepare you for the Lab on 05-01-2023.
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