National University of Computer and Emerging Sciences

Laboratory Manual

for

Programming Fundamentals

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Lab Manual 07

Hint: Take inputs in main function, pass as parameters to functions and print result return by functions in main. Use arrays wherever required

Problem 1

Write a function to sort any given integer array using bubble sort and returns the maximum and minimum from these integers. Also write int main to test it.

Sample Input: **{60 41 82 93 51 48 35 9 76}**
Sample Output: **Max = 93 Min = 9**

Problem 2

Write a function that searches a integer in given array using binary search and retuens the bool value as, 1 or 0 depending integer is present in given array or not.

Sample Input: { 4,6,7,1,9,5,2,,8,3} , 10

Output: **No, given integer is not present in the given array**

Sample Input: { 4,6,7,1,9,5,2,,8,3} , 5

Sample Output: **Yes,given integer is present in the given array**

Problem 3

Write a program that lets the user perform arithmetic operations on fractions. Fractions are of the form a/b, where "a" and "b" are integers, b is not equal to 0. Your program must be menu driven, allowing the user to select the operation (+, - *, or /) and input the numerator and denominator of each fraction. Furthermore, your program must run until the user quits and must consist of at least the following functions:

menu: This function informs the user about the program's purpose, explains how to enter data, how to quit and allows the user to select the operation.

addFractions: This function takes as input four integers representing the numerators and denominators of two fractions, adds the fractions, and returns the result.

subtractFractions: This function takes as input four integers representing the numerators and denominators of two fractions, subtracts the fractions, and returns result.

multiplyFractions: This function takes as input four integers representing the numerators and denominators of two fractions, multiplies the fractions, and the result.

divideFractions: This function takes as input four integers representing the numerators and denominators of two fractions, divides the fractions, and returns result.

Problem 4

The cost to become a member of a fitness center is as follows:

* The senior citizens (age>50years) discount is 20%.
* If the membership is bought and paid for 12 or more months, the discount is 10
* If more than five personal training sessions are bought and paid for, the discount on each session is 15%.

Write a menu-driven program that determines the cost of a new membership. Your program must contain

* a **function** that displays the program and discounts available
* a **function** to get all of the necessary information to determine the membership cost, and
* a **function** to determine the membership cost.

Use appropriate parameters to pass information in and out of a function. (Do not use any global variables.)

Problem 5

You often need to convert Rupees into coins of 5, 2, and 1. You task is to develop a C++ program to compute a mix of coins of 5, 2 and 1 against the given amount of money. Remember that you may not always have enough coins. So the program should be able to covert the money into the coins available. For example, if you don't have the coins of 5-rupees, then for 7 rupees the program should compute a mix of 2-rupees and 1-rupee coins. The program should also take as input the number of 5-rupees, 2-rupees and 1-rupee coins available. The program should display the amount of money in terms of numbers of 5-rupees coins, 2-rupees coins and 1-rupee coins if possible with the available set of coins. Otherwise print the message "Sorry!! No such combination exists.

You should get the number of coins by using functions

For example:

getCoinsOf5 (….) // for getting coins of 5

getCoinsOf2 (….) /// for getting coins of 2

or you can make just one function getCoins(…) for getting coins however this function will run only 1 time for one type of coin. For example, you will the tell function that for which coin number (5,2 or 1) it needs to be executed and then you can get result for that particular coin number.

Sample Input:

Enter Limit: 48

Enter Coins of 5 available: 7

Enter Coins of 5 available: 8

Enter Coins of 5 available: 5

Sample Output:

Coin(s) of 5 needed: 7

Coin(s) of 2 needed: 6

Coin(s) of 1 needed: 1

Problem 6:

Consider you have 8 shoes pairs with sizes 6 to 13. You find them

not in order. So, arrange them from smallest to largest by using

selection sort.

Selection Sort

The selection sort algorithm sorts an array by repeatedly finding the minimum

element (considering ascending order) from unsorted part and putting it at the

beginning. The algorithm maintains two subarrays in a given array.

1) The subarray which is already sorted.

2) Remaining subarray which is unsorted.

In every iteration of selection sort, the minimum element (considering ascending

order) from the unsorted subarray is picked and moved to the sorted subarray.

Sample Run:

```
arr[] = 64 25 12 22 11
```

```
// Find the minimum element in arr[0...4]

// and place it at beginning

11 25 12 22 64

// Find the minimum element in arr[1...4]
// and place it at beginning of arr[1...4]
11 12 25 22 64

// Find the minimum element in arr[2...4]
// and place it at beginning of arr[2...4]
11 12 22 25 64

// Find the minimum element in arr[3...4]
// and place it at beginning of arr[3...4]
11 12 22 25 64
```