# Programming Fundamentals

# SPRING 2019

Assignment# 3

## Date: 18/04/2019 Deadline: 24/04/2019

**Create C++ program for each of the following Problems:**

1. **Ask user to enter two numbers, then add them and print the sum.**

**Ask user to input a character and classify if the character is:**

1. **Alphabet**
2. **Digit**
3. **Ask user to input a character and classify if the character is:**
4. **Alphabet**
5. **Digit**
6. **Space Character**
7. **Escape Character**
8. **Other Special Character**

**Hint: To input every kind of character, you can use getCh() or getChe() functions to input the character instead of “cin>>”.**

1. **Ask user to input an integer number then, identify if the number is an even number or odd number.**
2. **Ask user to input a character then, the character must be a digit, then check if the digit is even or odd.**
3. **Ask user to input characters in an infinite loop, for each character, classify if the character is:**
4. **Alphabet**
5. **Digit**
6. **Space Character**
7. **Other Special Character**

**Break the loop if the character is Escape Character.**

1. **Show the menu to the user as:**

Menu

Press a to Add two numbers

Press s to Subtract two numbers

Press 2 to calculate the Square of a number

Press 3 to calculate the Squareroot of a number

Press Escape to Exit the program.

Waiting for Input: \_

1. **Then input the choice from the user and perform the respective operation.**
2. **After completing the operation program should display the menu again and the process should be repeated until user press Escape key.**

**Hint:**

* **Do while Loop is suitable for such situations, where you must perform the operation at-least once.**
* **Switch is suitable for menu driven programs, to implement the user’s chosen operation from a menu.**

1. **Ask user to input an integer number then, identify if the number is prime number or not.**

**Hint: Every number is fully divisible by 1 and also by the number itself.**

**i.e.,**

* **5 can be divided by 1 (5/1 == 5, 5%1 == 0) and 5 (5/5 == 1, 5%5 == 0)** 
  + **5 can not be fully divided by any other number**
    - **5%2 == 1**
    - **5%3 == 2**
    - **5%4 == 1**
* **6 can be divide by 1 (6/1 == 6, 6%6 == 0) and 6 (6/6 == 1, 6%6 == 0)**
  + **6 can be fully divide by 2 and 3 also**
    - **6%2 == 0**
    - **6%3 == 0**

**A number which can only be fully divided by 1 and the number itself, is a prime number.**

**Prime numbers: 1,2,3,5,7,11,13,17,19 … n**

1. **Ask user to enter a number and print all the even numbers upto that number.**

**i.e.,**

* **If user enters 8 then print, 2, 4, 6**
* **If user enters 9 then print, 2, 4, 6, 8**
* **If user enters 10 then print, 2, 4, 6, 8**

1. **Ask user to enter a number and print factorial of that number.**

**i.e., factorial of 10 is !10 = 1\*2\*3\*4\*5\*6\*7\*8\*9\*10**

1. **Ask user to enter a number and print the following Patterns, according to that number:**
   1. **A simple series of incrementing stares.**

Input: 4

\*

\* \*

\* \* \*

\* \* \* \*

Intput: 5

\*

\* \*

\* \* \*

\* \* \* \*

\* \* \* \* \*

* 1. **A simple series of incrementing numbers.**

Input: 4

1

1 2

1 2 3

1 2 3 4

Intput: 5

1

1 2

1 2 3

1 2 3 4

1 2 3 4 5

* 1. **A simple series of numbers.**

Input: 4

1

2 2

3 3 3

4 4 4 4

Intput: 5

1

2 2

3 3 3

4 4 4 4

5 5 5 5 5

* 1. **A simple series of decrementing stares.**

Input: 4

\* \* \* \*

\* \* \*

\* \*

\*

Intput: 5

\* \* \* \* \*

\* \* \* \*

\* \* \*

\* \*

\*

* 1. **A simple series of decrementing numbers.**

Input: 4

4 3 2 1

4 3 2

4 3

4

Intput: 5

5 4 3 2 1

5 4 3 2

5 4 3

5 4

5

* 1. **A series of incrementing stares with spaces.**

Input: 4

\*

\* \*

\* \* \*

\* \* \* \*

Intput: 5

\*

\* \*

\* \* \*

\* \* \* \*

\* \* \* \* \*

* 1. **A diamond, only for odd numbers.**

Input: 3

\*

\* \*

\*

Intput: 5

\*

\* \*

\* \* \*

\* \*

\*

1. **Create an array of 5 integer numbers. Input all numbers in array, from user and then print them.**
2. **Create an array of 5 integer numbers. Input all number in array, from user and** 
   1. **Ask user to enter another number “x”**
   2. **Find the number “x” in the array**
      1. **If “x” found in array, print the index, where number is found.**
      2. **Else print “Number <x> Not Found in Array”**

**Hint: user Linear Search to find the number.**

1. **Create an array of 5 integer numbers. Input all number in array, from user and** 
   1. **Find Maximum number.**
2. **Create an array of 5 integer numbers. Input all number in array, from user and** 
   1. **Find Minimum number.**
3. **Create an array of 5 integer numbers. Input all number in array, from user and** 
   1. **Calculate Average of all numbers in the array.**
4. **Create an array of 5 integer numbers. Input all number in array, from user and** 
   1. **Count Even numbers in array**
   2. **Count Odd numbers in array**
   3. **Print Both counts**
5. **Create an array of 5 characters. Input all characters in array, from user and** 
   1. **Count Alphabets**
   2. **Count Digits**
   3. **Count Special Characters**
   4. **Print All of the three Counts**
6. **Create an array of 5 characters. Input all characters in array, from user and**
   1. **Convert all Small Alphabets to Capital Alphabets.**

**i.e., user inputs Aa\*c4, output should be: AA\*C4**

1. **We want to input an English paragraph from user. For this:**
   1. **Create an array for paragraph, of max 100 characters.**
   2. **Input array from user as String (i.e., using cin>> or getline() function) and**
   3. **Count the number of sentences in the array**
      1. **A sentence Ends with a period/Full Stop “.”.**
   4. **Count the number of words in the array**
      1. **A word ends with a space “ ”.**

**Hint: if user inputs the following paragraph,**

**“This is simple sample paragraph, for testing. Count the words and sentences in this paragraph.”**

**The above paragraph has:**

* **15 words**
* **2 sentences**

1. **Create an array of 10 integer numbers. Input all number in array, from user and** 
   1. **Copy all the integers from array into another array**
2. **Create an array of 10 integer numbers. Input all number in array, from user and** 
   1. **Copy only even integers from array into another array**

|  |  |
| --- | --- |
| **0** | **20** |
| **1** | **0** |
| **2** |  |
| **3** |  |
| **4** |  |

|  |  |
| --- | --- |
| **0** | **15** |
| **1** | **9** |
| **2** | **-10** |
| **3** | **0** |
| **4** | **20** |

1. **Create an array of 10 integer numbers. Input all number in array, from user and** 
   1. **Copy only odd integers from array into another array**
2. **Create an array of 5 integer numbers. Input all number in array, from user and** 
   1. **Copy all integers from array into another array, but in reverse order.**

|  |  |
| --- | --- |
| **0** | **15** |
| **1** | **9** |
| **2** | **-10** |
| **3** | **0** |
| **4** | **20** |

|  |  |
| --- | --- |
| **0** | **20** |
| **1** | **0** |
| **2** | **-10** |
| **3** | **9** |
| **4** | **15** |

**\_\_\_\_\_\_\_\_\_\_\_The Following Questions are not Included in Mid Term Exam \_\_\_\_\_\_\_\_\_\_**

1. **Create an array of 10 integer numbers. Input all number in array, from user and** 
   1. **Sort the array in Ascending Order**

**Hint: Use Selection Sort Algorithm for the sorting.**

1. **Create an array of 10 integer numbers. Input all number in array, from user and** 
   1. **Sort the array in Descending Order**

**Hint: Use Selection Sort Algorithm for the sorting.**

1. **Create an array of 10 integer numbers. Input all number in array, from user and** 
   1. **Copy all even numbers into another array and Sort them.**
   2. **Copy all odd number into a third array and Sort them.**

|  |  |
| --- | --- |
| **0** | **8** |
| **1** | **10** |
| **2** | **16** |
| **3** | **18** |
| **4** | **22** |
| **5** | **28** |
| **6** |  |
| **7** |  |
| **8** |  |
| **9** |  |

|  |  |
| --- | --- |
| **0** | **7** |
| **1** | **9** |
| **2** | **13** |
| **3** | **15** |
| **4** |  |
| **5** |  |
| **6** |  |
| **7** |  |
| **8** |  |
| **9** |  |

**Hint: Use Selection Sort Algorithm for the sorting.**

Input Array

Third Array:

Sorted Odd Numbers

Second Array:

Sorted Even Numbers

|  |  |
| --- | --- |
| **0** | **10** |
| **1** | **9** |
| **2** | **15** |
| **3** | **7** |
| **4** | **8** |
| **5** | **16** |
| **6** | **13** |
| **7** | **18** |
| **8** | **22** |
| **9** | **28** |

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