ASSIGNMENT #01
Operators, Conditional Statements, Loops, Functions, Arrays, Pointers and Structures
Object Oriented Programming – Lab

Due Date: 8th May 2021

Total Marks: 80

A note of warning: Start work on assignments as soon as they are given. Do not underestimate the demanding nature of this course. Expect the system to crash the night before your program is due. Aim to have it done the day before.

Submit the assignment on **Google Classroom and printed form.** Do not email me assignments after due date. It will not be accepted in any case. Students are required to submit actual content written in Pdf. Hand written/ Scanned assignments will not be accepted.

Note: Name of the file should start with your Serial Number followed by Roll number, Name and at the end assignment number (**10_p190001_Name_Assign#01)**

i.e. 10_p190001_Ali_Assign#01

Operators

1) Write a C++ program that will convert dollar to rupees (Dollar to Rupees Conversion Calculator).
2) Write a C++ program that will convert rupees to dollar (Rupees to Dollar Conversion Calculator).
3) Write a C++ program that will convert centigrade to Fahrenheit.
4) Take student name and marks of your 2nd semester from user and then generate DMC which will contain obtained marks out of total and percentage.
5) In lab manual 2.3 math functions (Other Math Functions) are listed in the form of table you all are directed to implement all these functions using C++ program.

Conditional Statements

if else

1. Find positive and negative numbers using if else statement.
2. Find even and odd numbers using if else statement.
3. Find leap year using if else statement.
4. Write a C++ program which will get two numbers from user and find large number between them using if else statement.
   Leap year Hints: common year has 365 days (feb 28 days)
   Leap year has 366 days (feb 29 days)
   year%4==0 leap year

if-else-if else

1. Find positive, negative and neutral numbers using if-else-if else statement.
2. Take value of temperature from user and find status of weather accordingly.
3. Take value of percentage from user and find grades based on percentage value.
4. Make a calculator using if-else-if else statement which perform the addition, subtraction, multiplication, division and remainder operations. Take values and operator from user on runtime.

Conditional Operator (?:)

Write a C++ program which will get two numbers from user and find large number between them using conditional operator.

5. Find positive and negative numbers using conditional operator.
6. Find even and odd numbers using conditional operator.

Switch Statement

1. Make a C++ calculator using switch statement which perform the following addition, subtraction, multiplication, division and remainder value. Take value and operator from user on runtime.
2. Write a C++ program using switch statement which get month name from user and display month number accordingly.

Loops

for loop

1. Write a C++ program which display first 10 number using for loop.
2. Write a C++ program which display even and odd number using for loop.
3. Take a number from user and make a table of that number using for loop.
4. Take a number from user and find factorial of that number using for loop.

while loop

1. Write a C++ program which display first 10 number using while loop.
2. Write a C++ program which display even and odd number using while loop.
3. Take a number from user and make a table of that number using while loop.
4. Take a number from user and find factorial of that number using while loop.
5. Make a calculator using if-else-if else statement which perform the addition, subtraction, multiplication, division and remainder operations. Take values and operator from user on runtime. Use while loop for user choice. Means after performing one operation program will ask from user “do you want to do another calculation(yes/no)?”. If user press yes then user will enter number 1, number 2 and operator for calculation and if user press no then terminate the loop.

do while loop

1. Write a C++ program which display first 10 number using do while loop.
2. Write a C++ program which display even and odd number using while loop.
3. Take a number from user and make a table of that number using do while loop.
4. Take a number from user and find factorial of that number using do while loop.
5. Make a calculator using if-else-if else statement which perform the addition, subtraction, multiplication, division and remainder operations. Take values and operator from user on runtime. Use do while loop for user choice. Means after performing one operation program will ask from user “do you want to do another calculation(yes/no)? ”. If user press then user will enter number 1, number 2 and operator for calculation and if user press no then terminate the loop.

Nested for loop

1. Write a C++ program that will display * in the following pattern.

```
*****
****
***
**
*
```

2. Write a C++ program that will display numbers in the following pattern.

```
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1
```

3. Write a C++ program to print the output as shown below. Use "setw" manipulator.

```
   *
  **
 *****
*******
```

4. Write a C++ program to print the output as given below by using the "for" loop structure and "setw" manipulator.

```
xxxxx
xxxx
xxx
xx
x
```

Arrays

1D Arrays

1. Write a C++ program that will add two single dimensional array elements. Take values from user at runtime.
2. How to generate random number in C++, write a simple C++ program that will generate random number from 1 to 100?
3. Write a C++ program that will add two single dimensional arrays elements using random numbers?
4. Write a C++ program that will find maximum number in an array?
5. Write a C++ program that will find minimum number in an array?

2D Arrays

1. Write a C++ program that will create 2D array using random numbers and then show these values.
2. Write a C++ program that will find maximum and minimum number in 2D array. Note array elements must be random values.
3. Write a C++ program that will add two 2D arrays elements. Take values from user at runtime. Note display values of 1^{st}, 2^{nd} and their resultant array.
   Hints: A will be the 1^{st} array, B will be the 2^{nd} array and C will be resultant array.
   Note: Follow Mathematics Matrix Addition Rules
4. Write a C++ program that will multiply two 2D arrays elements. Take values from user at runtime. Note display values of 1^{st}, 2^{nd} and their resultant array.
   Hints: A will be the 1^{st} array, B will be the 2^{nd} array and C will be resultant array.
   Note: Follow Mathematics Matrix Multiplication Rules

Functions

1. Write function in C++ that will calculate table of a number in C++. Number must be passed from calling function as an argument to function parameters.

2. Write function in C++ that will find factorial of a number. Number must be passed from calling function as an argument to function parameters.

3. Update your calculator using functions (Calculator you implemented in do while loop section question no. 05. Create separate functions for addition, subtraction, division, multiplication and remainder operations).

4. Write user defined function ***arrayFunction()*** in C++ which will initialize array by taking values from user at run time and then call this function in main function which will return this array from the calling function to the called function (to the main function) and then show all items of this array in main function using loop.

5. Write a program that check the type of the value and determine the data type of the value. In this program, you will develop a Type checking program (Type Checker).

```
int main() {
    printType('A');
    return 0;
}
```

If the argument of printType(true) is true or false, it will invoke a function inside and print a message "true is a boolean". If it is int 463287462 then it should display "4632874 is Integer". The sample output format is as follows:

1.24353 is double data type

334345345 is an integer data type

1 is boolean data type

A is a character data type

Pointers

Q No.1: Write a program to input data into an array (**Take value from user at runtime for inserting into array using loop**) and find out the maximum value and minimum value from array through pointer?

Q No.2: Write a program to convert Fahrenheit to Celsius degrees by passing pointers as arguments to the function?

(**Take value from user at runtime**)

Q No.3: Write a program to convert kilogram into grams by passing pointers as arguments to the function?

(**Take values from user at runtime**)

Q No.4: Write a program to find out the length of string by using pointers?

(**Take string value from user at runtime**)

Q No.5: Write a program to copy one string to another string by using pointers?

(**Take string value from user at runtime**)

Q No.6: Write a program to combine two strings by using pointers?

(**Take both strings value from user at runtime**)

Structures

Note: *For all task, you have to define the Structures, Function with structures and arrays whenever appropriate.*

1. Create a structure called employee that contains two members: an employee number (type int) and the employee's compensation (in dollars; type float). Ask the user to fill in this data for three employees, store it in three variables of type struct employee, and then display the information for each employee.

2. Create a structure called time. Its three members, all type int, should be called hours, minutes, and seconds. Write a program that prompts the user to enter a time value in hours, minutes, and seconds. The program should then store the time in a variable of type struct time, and finally print out the total number of seconds.

3. Use the time structure from above question and write a program that obtains two time values from the user, stores them in struct time variables, converts each one to seconds (type int), adds these quantities, converts the result back to hours-minutes- seconds, stores the result in a time structure, and finally displays the result in 12:59:59 format

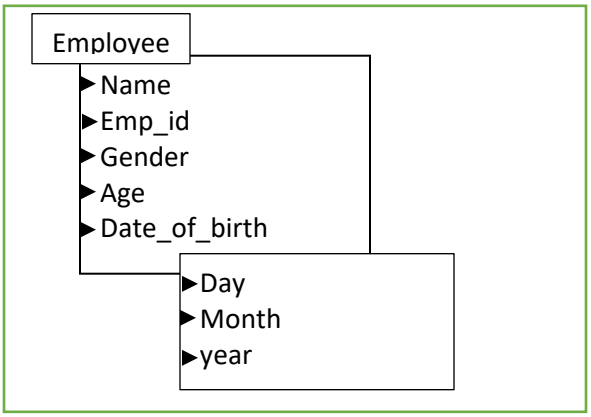
4. Create a structure called Volume that uses three variables of type Distance to model the volume of a room. Initialize a variable of type Volume to specific dimensions, then calculate the volume it represents, and print out the result. To calculate the volume, convert each dimension from a Distance variable to a variable of type float representing feet and fractions of a foot, and then multiply the resulting three numbers.

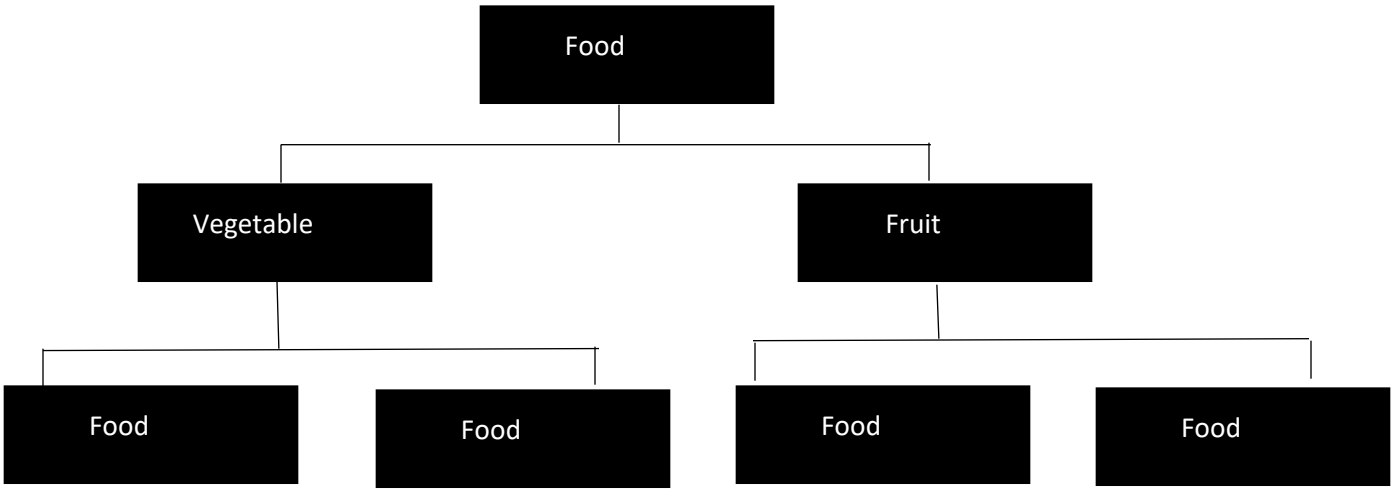
5. A phone number, such as (212) 767-8900, can be thought of as having three parts: the area code (212), the exchange (767), and the number (8900). Write a program that uses a structure to store these three parts of a phone number separately. Call the structure phone. Create two structure variables of type phone. Initialize one, and have the user

input a number for the other one. Then display both numbers. The interchange might look like this:

```
Enter your area code, exchange, and number: 415 555 1212
My number is (212) 767-8900
Your number is (415) 555-1212
```

6. Implement the given nested structure in the following figures. Note: Only write the definitions of structs nothing else. It is not a complete program.





Note: Program copied from someone or plagiarized will not be considered for grading. Zero percent tolerance with plagiarism.