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Assignment 1

**PART A**

1. **Step by step programs to learn Classes and Objects in C++**

**C++ Class**

A class is a blueprint for the object.  
  
We can think of a class as a sketch (prototype) of a house. It contains all the details about the floors, doors, windows, etc. Based on these descriptions we build the house. House is the object.

**Create a Class**

A class is defined in C++ using keyword class followed by the name of the class.

The body of the class is defined inside the curly brackets and terminated by a semicolon at the end.

class className {

// some data

// some functions

};

class Room {

public:

double length;

double breadth;

double height;

double calculateArea(){

return length \* breadth;

}

double calculateVolume(){

return length \* breadth \* height;

}

};

Here, we defined a class named Room.

The variables length, breadth, and height declared inside the class are known as **data members**. And, the functions calculateArea() and calculateVolume() are known as **member functions** of a class.

## C++ Objects

When a class is defined, only the specification for the object is defined; no memory or storage is allocated.

### Syntax to Define Object in C++

className objectVariableName;

We can create objects of Room class (defined in the above example) as follows:

// sample function

void sampleFunction() {

// create objects

Room room1, room2;

}

int main(){

// create objects

Room room3, room4;

}

Here, two objects room1 and room2 of the Room class are created in sampleFunction(). Similarly, the objects room3 and room4 are created in main().

As we can see, we can create objects of a class in any function of the program. We can also create objects of a class within the class itself, or in other classes.

Also, we can create as many objects as we want from a single class.

### C++ Access Data Members and Member Functions

We can access the data members and member functions of a class by using a . (dot) operator. For example,

room2.calculateArea();

This will call the calculateArea() function inside the Room class for object room2.

Similarly, the data members can be accessed as:

room1.length = 5.5;

In this case, it initializes the length variable of room1 to 5.5.

#include <iostream>

using namespace std;

// create a class

class Room {

public:

double length;

double breadth;

double height;

double calculateArea() {

return length \* breadth;

}

double calculateVolume() {

return length \* breadth \* height;

}

};

int main() {// create object of Room class

Room room1;

// assign values to data members

room1.length = 42.5;

room1.breadth = 30.8;

room1.height = 19.2;

// calculate and display the area and volume of the room

cout << "Area of Room = " << room1.calculateArea() << endl;

cout << "Volume of Room = " << room1.calculateVolume() << endl;

return 0;

}

Out is the following

Area of Room = 1309

Volume of Room = 25132.8

Do the following exercise.

1. Make the following attributes private and make modifications to the program

double length;

double breadth;

double height;

Hint : - Create set\_length(),set\_breadth(), set\_beight() functions and call them from the driver main().

1. Add constructor to following functions. See the sample code and make modifications.

* Create a default constructor
* Create a parameterized constructor. Create an object in driver class which takes the following values.

double length = 10.8;

double breadth = 8.6;

double height = 15.5;

* Create a copy constructor. This takes the object created in parameterized constructor as in input.

**PART B**

1. Create a class circle with the following data members and member functions. Create the following instances of circle and display their values assigned to the data members.

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