Department of Computer Science

Mid Term Summer 2020

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ID	**14263**
SUBJECT	**OBJECT ORIENTED PROGRAMMING**
DEPARTMENT	**BS(SOFTWARE-ENGINEERING)**

Subject: Object Oriented Programming

Time: 180 mins

BS (CS,SE) Instructor: M.Ayub Khan

There are total **3** questions in this paper. Max Marks: 30

Note:

At the top of the answer sheet there must be the ID, Name and semester of the concerned Student.

Students must have to provide the output of their respective programs. Students have same answers or programs will be considered fail. Programs in Python or codes should be explained clearly.

As this paper is online so incase of any ambiguity my Whatsapp no. is 034499121116.

Each question carry equal marks.
Please answer briefly.

Q1. What is Class and role of object in a Class, explain in detail with the help of a suitable program ?

ANSWER NO 1

CLASS:

In object-oriented programming, a class is an extensible program-code-template for creating objects, providing initial values for state (member variables) and implementations of behavior (member functions or methods).A class is a logical entity that determines how an object will behave and what the object will

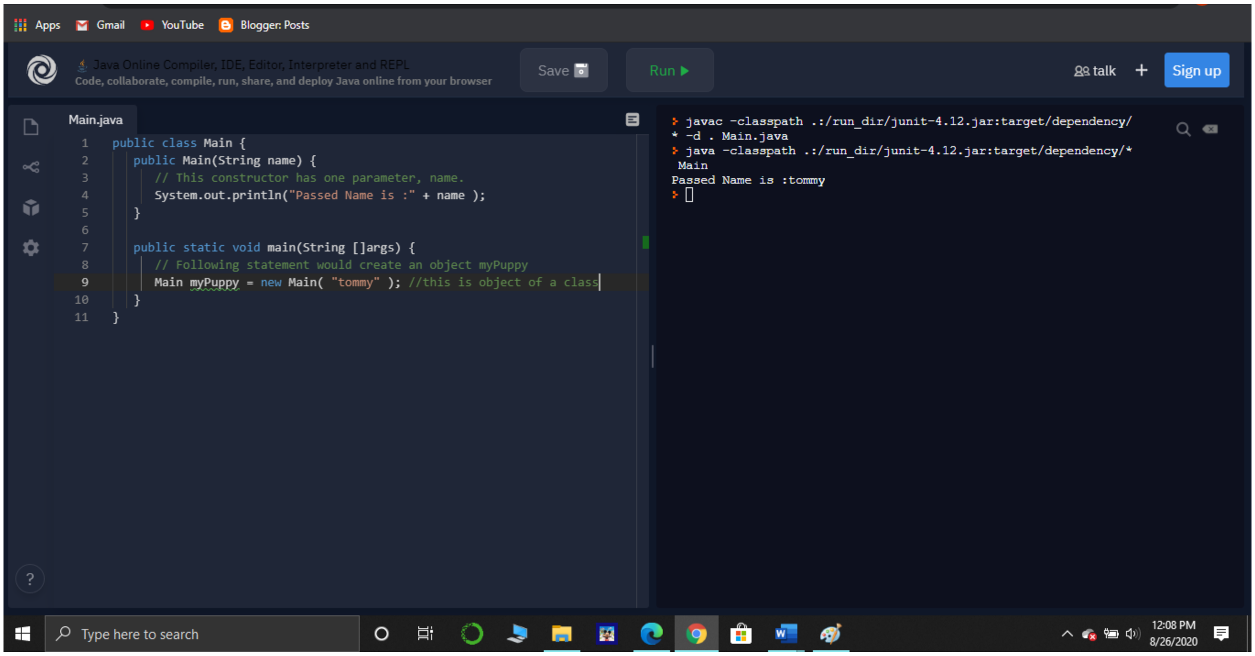
contain. In other words, it is a set of instruction to build a specific type of object. Class doesn't consume any space.
OR
Collection of objects is called class. It is a logical entity.

ROLE OF OBJECT IN CLASS:

Any entity that has state and behavior is known as an object. It can be physical or logical.
An object is an entity which consists of methods and properties to make a particular type of data useful. When you call an object, you are asking the object to invoke or execute one of its methods. An object can be a data structure, a variable or a function. It has a memory location allocated. The object is designed as class hierarchies. Objects can communicate without knowing the details of each other's data or code. The only necessary thing is the type of message accepted and the type of response returned by the objects. When an object is called the concerned class is executed and its functionality is performed then the class returns the result to the object.

EXAMPLE-PROGRAM:

```
public class Main {

  public Main(String name) {

    // This constructor has one parameter, name.

    System.out.println("Passed Name is :" + name );

  }

  public static void main(String []args) {

    // Following statement would create an object myPuppy

    Main myPuppy = new Main( "tommy" );

  }

}
```



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```java
public class Main {
    public Main(String name) {
        // This constructor has one parameter, name.
        System.out.println("Passed Name is :" + name );
    }

    public static void main(String []args) {
        // Following statement would create an object myPuppy
        Main myPuppy = new Main( "tommy" ); //this is object of a class
    }
}
```

```
> javac -classpath .:/run_dir/junit-4.12.jar:target/dependency/
* -d . Main.java
> java -classpath .:/run_dir/junit-4.12.jar:target/dependency/*
 Main
Passed Name is :tommy
> 
```

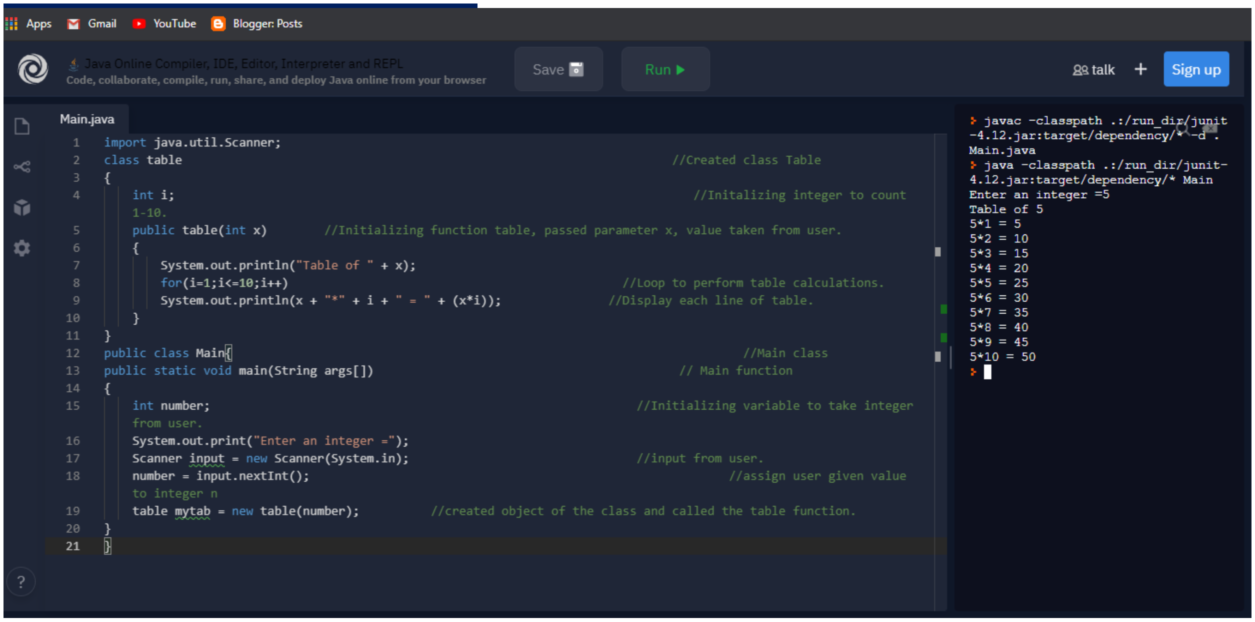
Q2. Write a program about table printing which takes input from the user on the basis of OOP and explain in detail.

ANSWER NO 2

PROGRAM:

```
import java.util.Scanner;
class table                                              //Created class Table
{
   int i;                                                //Initalizing integer to count 1-10.
   public table(int x)       //Initializing function table, passed parameter x, value
taken from user.
   {
      System.out.println("Table of " + x);
      for(i=1;i<=10;i++)                                 //Loop to perform table
calculations.
      System.out.println(x + "*" + i + " = " + (x*i));             //Display each line of
table.
   }
}
public class Main{                                                  //Main class
public static void main(String args[])                                // Main function
{
   int number;                                              //Initializing variable to take
integer from user.
   System.out.print("Enter an integer =");
   Scanner input = new Scanner(System.in);                          //input from user.
   number = input.nextInt();                                        //assign user given
value to integer n
   table mytab = new table(number);        //created object of the class and called
the table function.
}
}
```

PROGRAM & OUTPUT:



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Main.java
?

```java
import java.util.Scanner;
class table                                                        //Created class Table
{
    int i;                                                          //Initalizing integer to count
    1-10.
    public table(int x)        //Initializing function table, passed parameter x, value taken from user.
    {
        System.out.println("Table of " + x);
        for(i=1;i<=10;i++)                                     //Loop to perform table calculations.
        System.out.println(x + "*" + i + " = " + (x*i));     //Display each line of table.
    }
}
public class Main{                                                      //Main class
public static void main(String args[])                             // Main function
{
    int number;                                                //Initializing variable to take integer
    from user.
    System.out.print("Enter an integer =");
    Scanner input = new Scanner(System.in);                    //input from user.
    number = input.nextInt();                                           //assign user given value
    to integer n
    table mytab = new table(number);          //created object of the class and called the table function.
}
}
```

```
> javac -classpath .:/run_dir/junit
-4.12.jar:target/dependency/* -d .
Main.java
> java -classpath .:/run_dir/junit-
4.12.jar:target/dependency/* Main
Enter an integer =5
Table of 5
5*1 = 5
5*2 = 10
5*3 = 15
5*4 = 20
5*5 = 25
5*6 = 30
5*7 = 35
5*8 = 40
5*9 = 45
5*10 = 50
> 
```

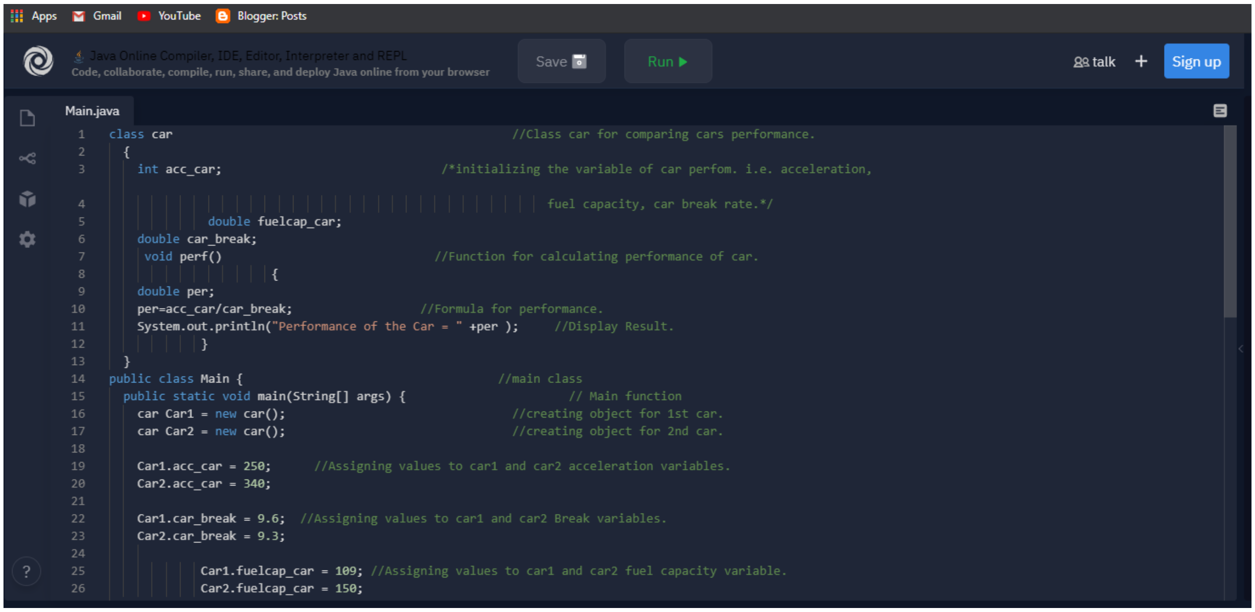
Q3. Write a program about any 2 cars which can calculate the performance of both of them and explain in detail.

PROGRAM:

```
class car                              //Class car for comparing cars performance.

       {

         int acc_car;                  /*initializing the variable of car perfom. i.e.
acceleration,

                                      fuel capacity, car break rate.*/
```

```
     double fuelcap_car;
     double car_break;
     void perf()                    //Function for calculating performance of car.
        {
         double per;
         per=acc_car/car_break;           //Formula for performance.
         System.out.println("Performance of the Car = " +per );     //Display Result.
        }
    }
public class Main {                          //main class
    public static void main(String[] args) {              // Main function
        car Car1 = new car();                      //creating object for 1st car.
        car Car2 = new car();                      //creating object for 2nd car.

        Car1.acc_car = 250;      //Assigning values to car1 and car2 acceleration
variables.
        Car2.acc_car = 340;

        Car1.car_break = 9.6;  //Assigning values to car1 and car2 Break variables.
        Car2.car_break = 9.3;

        Car1.fuelcap_car = 109; //Assigning values to car1 and car2 fuel capacity
variable.
        Car2.fuelcap_car = 150;
    System.out.println("Car 1st Performance");              //Printing Car1
performance.
    System.out.println("Accelerating Speed = " +Car1.acc_car + "km");
```

```
        System.out.println("Car Break = " +Car1.car_break + "km");
        System.out.println("Fuel Capacity = " +Car1.fuelcap_car + "gallons");
        Car1.perf();                    //Calling function performance with help of object for
car1.

        System.out.println("Car 2nd Performance");          //Printing Car2 performance.
        System.out.println("Accelerating Speed = " +Car2.acc_car + "km");
        System.out.println("Car Break = " +Car2.car_break + "km");
        System.out.println("Fuel Capacity = " +Car2.fuelcap_car + "gallons");
        Car2.perf();                 //Calling function performance with help of object for
car2.
        }
}
```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Main.java
?

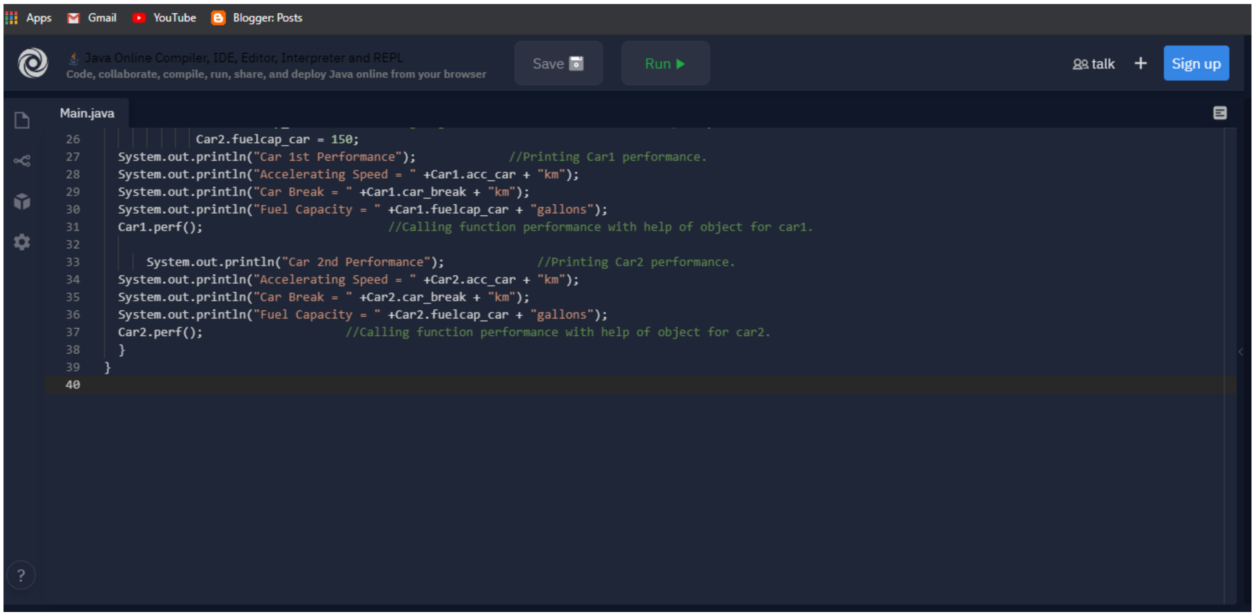
```
class car                                          //Class car for comparing cars performance.
  {
    int acc_car;                          /*initializing the variable of car perfom. i.e. acceleration,

                                              fuel capacity, car break rate.*/
              double fuelcap_car;
    double car_break;
     void perf()                          //Function for calculating performance of car.
                   {
    double per;
    per=acc_car/car_break;                //Formula for performance.
    System.out.println("Performance of the Car = " +per );     //Display Result.
             }
  }
public class Main {                                   //main class
  public static void main(String[] args) {                      // Main function
    car Car1 = new car();                               //creating object for 1st car.
    car Car2 = new car();                               //creating object for 2nd car.

    Car1.acc_car = 250;      //Assigning values to car1 and car2 acceleration variables.
    Car2.acc_car = 340;

    Car1.car_break = 9.6;  //Assigning values to car1 and car2 Break variables.
    Car2.car_break = 9.3;

            Car1.fuelcap_car = 109; //Assigning values to car1 and car2 fuel capacity variable.
            Car2.fuelcap_car = 150;
```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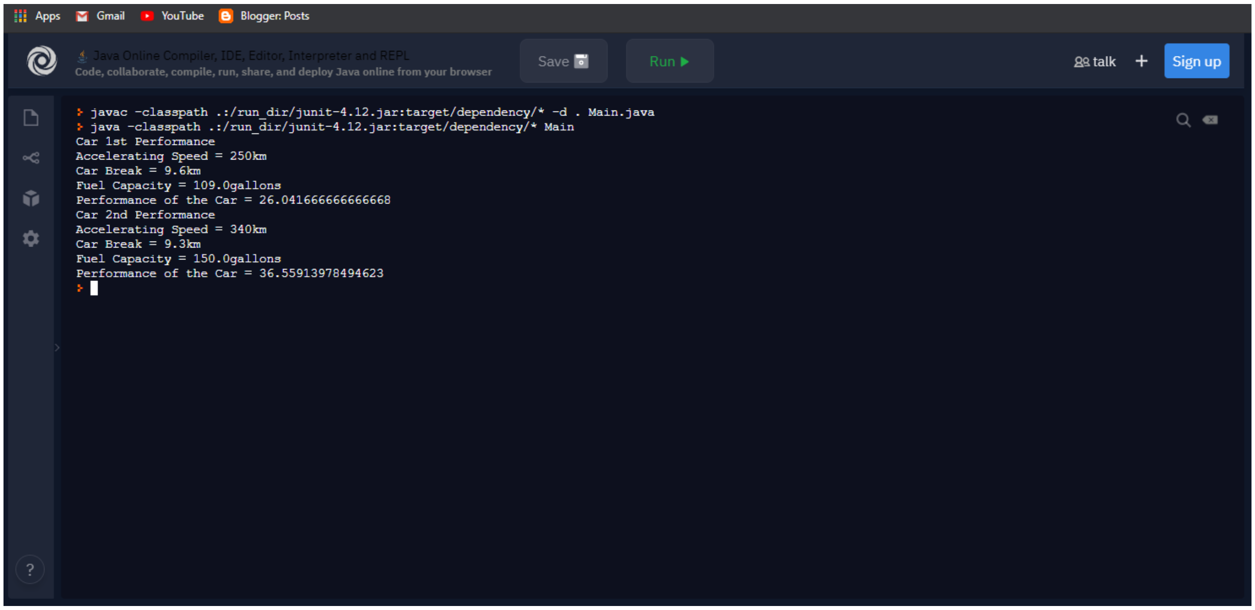
Main.java
?

```java
                Car2.fuelcap_car = 150;
    System.out.println("Car 1st Performance");          //Printing Car1 performance.
    System.out.println("Accelerating Speed = " +Car1.acc_car + "km");
    System.out.println("Car Break = " +Car1.car_break + "km");
    System.out.println("Fuel Capacity = " +Car1.fuelcap_car + "gallons");
    Car1.perf();                        //Calling function performance with help of object for car1.

        System.out.println("Car 2nd Performance");          //Printing Car2 performance.
    System.out.println("Accelerating Speed = " +Car2.acc_car + "km");
    System.out.println("Car Break = " +Car2.car_break + "km");
    System.out.println("Fuel Capacity = " +Car2.fuelcap_car + "gallons");
    Car2.perf();                  //Calling function performance with help of object for car2.
    }
  }

```

OUTPUT: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```
> javac -classpath .:/run_dir/junit-4.12.jar:target/dependency/* -d . Main.java
> java -classpath .:/run_dir/junit-4.12.jar:target/dependency/* Main
Car 1st Performance
Accelerating Speed = 250km
Car Break = 9.6km
Fuel Capacity = 109.0gallons
Performance of the Car = 26.041666666666668
Car 2nd Performance
Accelerating Speed = 340km
Car Break = 9.3km
Fuel Capacity = 150.0gallons
Performance of the Car = 36.55913978494623
> 
```