

Don Bosco Institute of Technology, Kurla(W)
Department of Electronics and Tele-Communication Engineering
ECL304 - Skill Lab: C++ and Java Programming
Sem III
2021-22

Lab Number:	4
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Title:

4.1 Write a Java program to Create a class Student with two method getData() and printData(). getData() to get the value from the user and display the data in printData(). Create the two objects s1,s2 to declare and access the values from class StudentTest.

4.2 Write a Java program for Basic bank Management System

Learning Objective:

- Students will be able to write C++ and java program for using classes and objects.

Learning Outcome:

- Ability to execute a simple C++ and Java program by accepting and displaying values using functions
- Understanding the classes and objects concept in C++ and Java.

Course Outcome:

Understand object-oriented programming concepts and implement using C++ and Java.

Faculty: Ms. Deepali Kayande

Theory:

(1) Explanation about Constructor:

Ans: A constructor in Java is a special method that is used to initialize objects. The constructor is called when an object of a class is created. It can be used to set initial values for object attributes.

In Java, a constructor is a block of codes similar to the method. It is called when an instance of the class is created. At the time of calling constructor, memory for the object is allocated in the memory. It is a special type of method which is used to initialize the object. Every time an object is created using the new() keyword, at least one constructor is called. It calls a default constructor if there is no constructor available in the class.

In such case, Java compiler provides a default constructor by default. There are two types of constructors in Java: no-arg constructor, and parameterized constructor.

There are three rules defined for the constructor.

1. Constructor name must be the same as its class name
2. A Constructor must have no explicit return type
3. A Java constructor cannot be abstract, static, final, and synchronized

There are two types of constructors in Java:

1. Default constructor (no-argument constructor)
2. Parameterized constructor

The default constructor is used to provide the default values to the object like 0, null, etc., depending on the type. A constructor which has a specific number of parameters is called a parameterized constructor. The parameterized constructor is used to provide different values to distinct objects. However, you can provide the same values also.

(2) Explain about classes and objects in Java:

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Ans:

Class:

A class is a user defined blueprint or prototype from which objects are created. It represents the set of properties or methods that are common to all objects of one type. In general, class declarations can include these components, in order:

Modifiers: A class can be public or has default access (Refer this for details).

class keyword: class keyword is used to create a class.

Class name: The name should begin with an initial letter (capitalized by convention).

Superclass: The name of the class's parent (superclass), if any, preceded by the keyword extends. A class can only extend (subclass) one parent.

Interfaces: A comma-separated list of interfaces implemented by the class, if any, preceded by the keyword implements. A class can implement more than one interface.

Body: The class body surrounded by braces, {}.

Constructors are used for initializing new objects. Fields are variables that provides the state of the class and its objects, and methods are used to implement the class and its objects. There are various types of classes that are used in real time applications such as nested classes, anonymous classes, lambda expressions.

Object:

An entity that has state and behaviour is known as an object e.g., chair, bike, marker, pen, table, car, etc. It can be physical or logical (tangible and intangible). The example of an intangible object is the banking system.

An object has three characteristics:

- **State:** represents the data (value) of an object.

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- **Behaviour:** represents the behaviour (functionality) of an object such as deposit, withdraw, etc.
- **Identity:** An object identity is typically implemented via a unique ID. The value of the ID is not visible to the external user. However, it is used internally by the JVM to identify each object uniquely.

An object is an instance of a class. A class is a template or blueprint from which objects are created. So, an object is the instance(result) of a class. Object can be defined as:

An object is a real-world entity.

An object is a runtime entity.

The object is an entity which has state and behaviour.

The object is an instance of a class.

When an object of a class is created, the class is said to be instantiated. All the instances share the attributes and the behaviour of the class. But the values of those attributes, i.e. the state are unique for each object. A single class may have any number of instances.

So in software development, methods operate on the internal state of an object and the object-to-object communication is done via methods.

(3) How to access class attributes and methods? Explain with example:

Ans: To access class attributes:

We used the term "variable" for x in the any example, It is actually an attribute of the class. Or we could say that class attributes are variables within a class, another term for class attributes is fields.

We can access attributes by creating an object of the class, and by using the dot syntax (.), If you don't want the ability to override existing values, declare the attribute as final.

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To access class methods:

myMethod() prints a text (the action), when it is called. To call a method, write the method's name followed by two parentheses () and a semicolon; we will often see Java programs that have either static or public attributes and methods. We created a static method, which means that it can be accessed without creating an object of the class, unlike public, which can only be accessed by objects.

EXAMPLE: (To access class attributes)

Create an object called "myObj" and print the value of x:

```
public class Main
{
    int x = 5;

    public static void main(String[] args)
    {
        Main myObj = new Main();
        System.out.println(myObj.x);
    }
}
```

EXAMPLE: (To access class methods)

```
public class Main {
    static void myStaticMethod() {
        System.out.println("Static methods can be called without creating objects");
    }

    public void myPublicMethod() {
        System.out.println("Public methods must be called by creating objects");
    }
}
```

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```
public static void main(String[] args) {  
    myStaticMethod();  
    myPublicMethod();  
    Main myObj = new Main();  
    myObj.myPublicMethod();  
}  
}
```

PROGRAM 1: Write a Java program to Create a class Student with two method getData() and printData(). getData() to get the value from the user and display the data in printData(). Create the two objects s1,s2 to declare and access the values from class StudentTest.

Algorithm:

Step 1: START

Step 2: Create class Student; with parameters which are needed as rollnum, name, branch, cgpa etc.

Step 3: Give two methods as getdata(), and printdata() in a class student.

Step 4: In main function create two objects s1,s2 to declare access values from class student.

Step 5: END

Program:

```
import java.util.Scanner;  
class Student {
```

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```
Scanner in=new Scanner(System.in);
```

```
String name;
```

```
int roll_no;
```

```
float cgpa;
```

```
char div;
```

```
char branch;
```

```
void getdata()
```

```
{  
    System.out.println("Enter your name:");  
    name=in.next();  
    System.out.println("Enter your roll number:");  
    roll_no=in.nextInt();  
    System.out.println("Enter your CGPA:");  
    cgpa=in.nextFloat();  
    System.out.println("Enter your Division:");  
    div=in.next().charAt(0);  
    System.out.println("Enter branch:");  
    branch=in.next().charAt(0);  
}
```

```
void getdata(String n,int r,float c,char d, char b)
```

```
{  
    name=n;  
    roll_no=r;
```

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```
        cgpa=c;

        div=d;

        branch=b;

    }

    void printdata()
    {
        System.out.println("Name of the student: "+name);
        System.out.println("Roll-no of the student: "+roll_no);
        System.out.println("Cgpa of the student: "+cgpa);
        System.out.println("Division of the student: "+div);
        System.out.println("branch of the student: "+branch);
    }

};

public class Student_data_Lab3 {

    public static void main(String[] args)
    {
        Student s1=new Student();
        Student s2=new Student();
        s1.getdata();
        s1.printdata();
        s2.getdata();
        s2.printdata();
    }
}
```


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```
    }  
}
```

Input given:

For 2 Students information to be output (as declare in code):

- 1. Enter roll number**
- 2. Enter name**
- 3. Enter branch**
- 4. Enter your score in (cgpa)**

Output Screenshot:

```
<terminated> Student_data_Lab3 [Java Application] C:\Users\Bhagyesh\.p2  
Enter your name:  
BHAGYESH  
Enter your roll number:  
5  
Enter your CGPA:  
8.59  
Enter your Division:  
b  
Enter branch:  
extc  
Name of the student: BHAGYESH  
Roll-no of the student: 5  
Cgpa of the student: 8.59  
Division of the student: b  
branch of the student: e  
Enter your name:  
mohit  
Enter your roll number:  
15  
Enter your CGPA:  
7  
Enter your Division:  
c  
Enter branch:  
comps  
Name of the student: mohit  
Roll-no of the student: 15  
Cgpa of the student: 7.0  
Division of the student: c  
branch of the student: c
```

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PROGRAM 2: Write a Java program for Basic bank Management System.

Algorithm:

Step 1: START

Step 2: Create class bankcode, declare parameters which are needed as name, account number etc.

Step 3: Create Constructor, and functions like deposit(), withdraw(), display().

Step 4: In main function declare objects, and add do-while loop and in it use switch case to add input from user, add input option from given 3.

Step 5: END.

Program code:

```
import java.util.Scanner;

public class BankLab2 {

    Scanner in=new Scanner(System.in);

    String name;

    char account_type;

    int account_number,amount;

    float balance;

    public BankLab2(String n,int a, char t, float b) {

        // TODO Auto-generated constructor stub

        name = n;

        account_number=a;

        account_type=t;

        balance=b;

    }

}
```

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```
}  
int deposit()  
{  
System.out.println("Enter the amount to    deposit: ");  
int amount=in.nextInt();  
if(amount<0)  
{  
System.out.println("Invalid amount,Enter a valid amount");  
return 0;  
}  
balance=balance+amount;  
return 1;  
}  
int withdraw()  
{  
System.out.println("Your Balance= " +balance );  
System.out.println("Enter amount to withdraw: ");  
int amount=in.nextInt();  
if (balance<amount)  
{  
System.out.println("Insufficient Balance:    ");  
return 0;  
}  
if(amount<0)
```

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```
{
System.out.println("Invalid    amount" );
return 0;
}
balance=balance-amount;
return 1;
}
void display()
{
System.out.println("Name :"+name);
System.out.println("Account Number:" +account_number);
System.out.println("Account Type:" +account_type);
System.out.println("Balance: " +balance);
}
public static void main(String[] args) {
// TODO Auto-generated method stub
Scanner in=new Scanner(System.in);
BankLab2 b1=new BankLab2("salman",1,'s',2000);
BankLab2 b2=new BankLab2("makarand",2,'s',2000);
BankLab2 b3=new BankLab2("siddharth",3,'s',2000);
System.out.println("Menu");
System.out.println("1.Deposit");
System.out.println("2.Withdraw");
System.out.println("3.Display");
System.out.println("Enter option");
int op=in.nextInt();
```

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```
char ans;  
  
do  
{  
System.out.println("Please enter your account number:");  
int account_number=in.nextInt();  
switch(account_number)  
{  
case 1:      if(op==1)  
b1.deposit();  
if(op==2)  
b1.withdraw();  
if(op==3)  
b1.display();  
break;  
case 2:      if(op==1)  
b2.deposit();  
if(op==2)  
b2.withdraw();  
if(op==3)  
b2.display();  
break;  
case 3:      if(op==1)  
b3.deposit();  
if(op==2)  
b3.withdraw();  
if(op==3)
```

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```
b3.display();  
break;  
default: System.out.println("Enter value between 1 to 3");  
break;  
}
```

```
System.out.println("Do you want to continue?[Y/N]");  
ans=in.next().charAt(0); //char input in variable ans  
if(ans=='Y' || ans == 'y')  
{  
System.out.println("Menu");  
System.out.println("1.Deposit");  
System.out.println("2.Withdraw");  
System.out.println("3.Display");  
System.out.println("Enter option");  
op=in.nextInt();  
}  
}  
while(ans!='N');  
}  
}
```

INPUT:

- 1. Enter option from 1-3.**
- 2. Enter the display amount, withdraw amount.**
- 3. Enter y/n.**

OUTPUT:

```
Menu
1.Deposit
2.Withdraw
3.Display
Enter option
2
Please enter your account number:
3
Your Balance= 2000.0
Enter amount to withdraw:
1000
Do you want to continue?[Y/N]
y
Menu
1.Deposit
2.Withdraw
3.Display
Enter option
3
Please enter your account number:
3
Name :siddharth
Account Number:3
Account Type:s
Balance: 1000.0
Do you want to continue?[Y/N]
```