Graphic Era
HILL UNIVERSITY
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Term work

(Mid-Sem)

on

JAVA PROGRAMMING LANGUAGE

(PCS 408)

2021-22

Submitted to:

Dr. Prateek Srivastava

Assistant Professor
GEHU, D.Dun

Submitted by:

Ayush Maheshwari

University Roll. No.: 2018265
Class Roll. No./Section: 15/C

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

GRAPHIC ERA HILL UNIVERSITY, DEHRADUN

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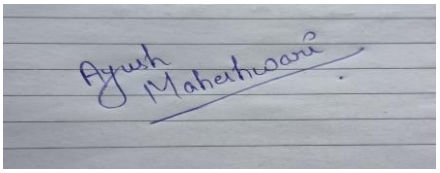
Atlast but not the least I greatly indebted to all other persons who directly or indirectly helped me during this course.

Ayush Maheshwari



University. Roll No.- 2018265

B.Tech CSE-C-IV Sem

Session: 2021-22

GEHU, Dehradun

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8	Create a class “Student” having following instance variables and methods. Instance variables: ID, Name, Branch, city and university While creating constructors with one, two, three, four and five arguments reuse the constructors by **construction chaining**	
9	Create two dimensional integer array and insert, search and traverse this array. **Note:** Use Scanner class to insert data.	
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11	Create a class “Shape” having area() method to calculate area. Overload the area() method for shapes like triangle, rectangle and circle.	
12	Create a class “Bank” having method getRateOfInterest(). Create child classes as HDFC, SBI and PNB and override getRateOfInterest() and return interest rates as 4.0, 4.5 and 5% correspondingly. **Use concept of Upcasting to implement this scenario.**	

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DEPARTMENT OF CSE

B.Tech. CSE

STUDENT LAB REPORT SHEET

Photograph
Passport Size

Name of Student ……Mob.No……..

Address Permanent ……

Father's Name ……Occupation ……MoNo……..……

Mother's Name …… …..Occupation……MoNo……..

Section ……Branch……Semester……..Class Roll No…… Grade A B C

Local Address……Email…… Marks 5 3 1

S.No.	Practical	D.O.P.	Date of Submission	Grade (Viva)	Grade (Report File)	Total Marks (out of 10)	Student's Signature	Teacher's Signature
1	Practical-01							
2	Practical-02							
3	Practical-03							
4	Practical-04							
5	Practical-05							
6	Practical-06							
7	Practical-07							
8	Practical-08							
9	Practical-09							
10	Practical-10							
11	Practical-11							
12	Practical-12							

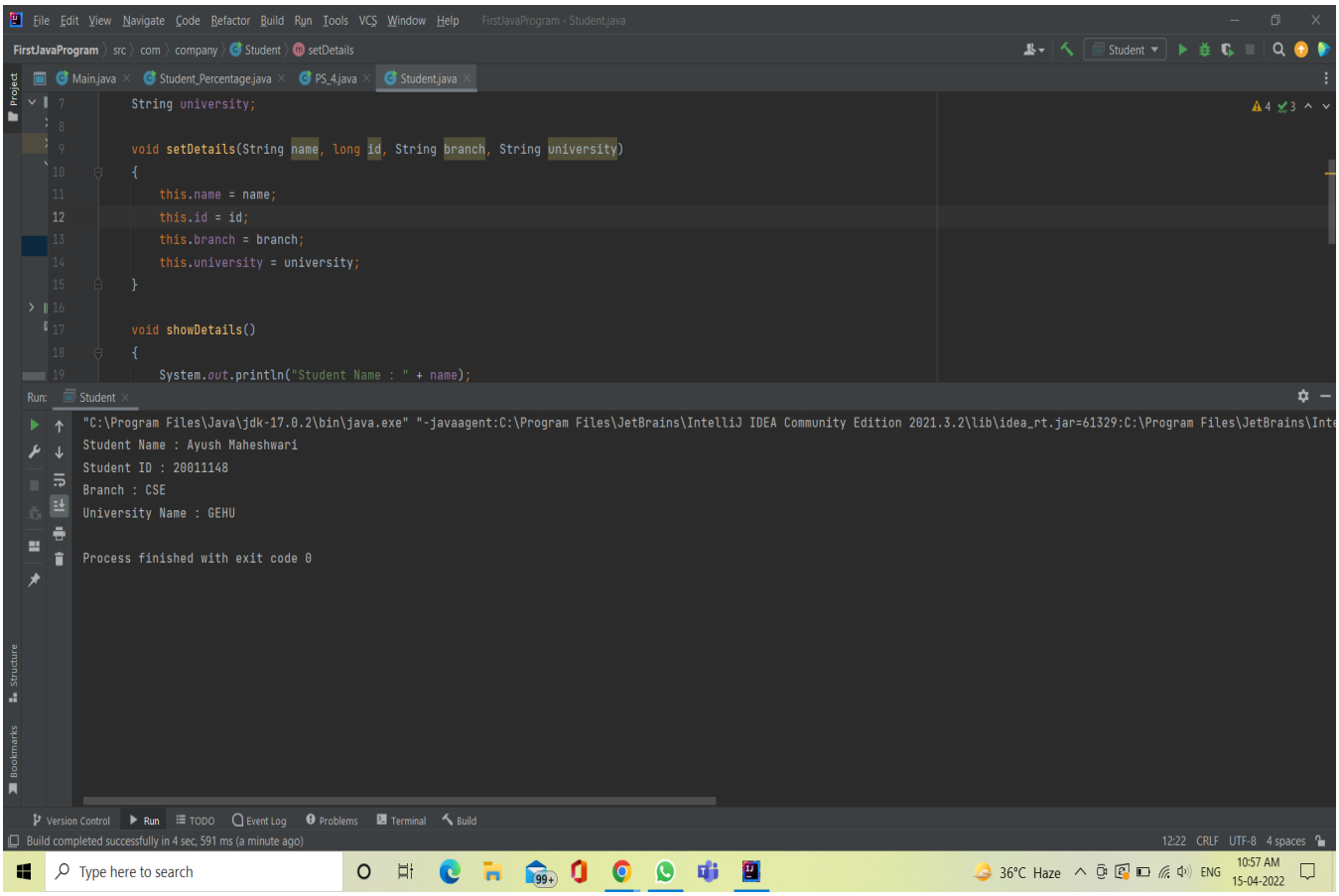
Practical No. 01

1. Create a class “Student” having following instance variables and methods.
   Instance variables: ID, Name, Branch and university
   Method: setDetails() and showDetails().
   The setDetails() method sets the values of ID, Name, Branch and University.
   And showDetails() method shows the value of each field.

Source Code :

```
public class Student {
   String name;
   long id;
   String branch;
   String university;

   void setDetails(String name, long id, String branch, String university)
   {
      this.name = name;
      this.id = id;
      this.branch = branch;
      this.university = university;
   }

   void showDetails()
   {
      System.out.println("Student Name : " + name);
      System.out.println("Student ID : " + id);
      System.out.println("Branch : " + branch);
      System.out.println("University Name : " + university);
   }

   public static void main(String[] args)
   {
      Student obj = new Student();
      obj.setDetails("Ayush Maheshwari", 20011148, "CSE", "GEHU");
      obj.showDetails();
   }
}
```

Output


String university;
void setDetails(String name, long id, String branch, String university)
{
this.name = name;
this.id = id;
this.branch = branch;
this.university = university;
}
void showDetails()
{
System.out.println("Student Name : " + name);
"C:\Program Files\Java\jdk-17.0.2\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2021.3.2\lib\idea_rt.jar=61329:C:\Program Files\JetBrains\Inte
Student Name : Ayush Maheshwari
Student ID : 20011148
Branch : CSE
University Name : GEHU
Process finished with exit code 0
Build completed successfully in 4 sec, 591 ms (a minute ago)
Type here to search
36°C Haze
ENG
10:57 AM
15-04-2022

Practical No. 02

2. Write a Java Program to demonstrate the working of a banking-system
   Instance variables: name, account_no, amount
   Instance methods: deposit(), withdraw(), checkBalance(), insert() and display().
   Here we can deposit and withdraw amount from our account using deposit() and withdraw() Methods respectively.
   The insert() method is to initialize state and display() method is to display state values.

Source Code :

```
import java.util.*;
class Account
{
   int account_number;
        String name;
        int amount;
        void insert(int acc,String n,int b)
        {
                account_number = acc;
                name = n;
                amount = b;
        }
        void deposit(int d)
        {
                amount += d;
        }

        void withdraw(int w)
        {
                if(w < amount)
        {
                        amount -= w;
                }
                else
                {
                         System.out.println("Error Insufficient balance!!!");
                }
        }
        void checkbalance()
        {
                System.out.println("Balance:"+amount);
        }
        void display()
        {
                System.out.println("Name of Account Holder:" + name);
                System.out.println("Account Number:" + account_number);
```

```
            System.out.println("Amount left:" + amount);
    }
        public static void main(String args[])
        {
            Account st = new Account();
            Scanner in = new Scanner(System.in);
            System.out.println("Enter 1. To Enter details \n\t2.To deposit Amount\n\t3.To Withdraw
amount\n\t4.To Check balance\n\t5.To display all details\n\t6.To Exit");
            System.out.println("Enter Your Choice:");
            int ch = in.nextInt();
            do
            {
                if(ch == 1)
                {
                    System.out.println("Enter the Account Number");
                    int ac = in.nextInt();
                    in.nextLine();
                    System.out.println("Enter the Name of Account Holder");
                    String s = in.nextLine();
                    System.out.println("Enter the Amount");
                    int u = in.nextInt();
                st.insert(ac,s,u);
                }
                else if(ch == 2)
                {
                     System.out.println("Enter the Deposit Amount");
                    int d = in.nextInt();
                    st.deposit(d);
                }

                else if(ch == 3)
                {
                    System.out.println("Name of Withdraw Amount");
                    int w=in.nextInt();
                    st.withdraw(w);
                }
                else if(ch == 4)
                {
                    st.checkbalance();
                }
                else if(ch == 5)
                {
                    st.display();
                }
                else
                {
                    System.out.println("Enter a Valid Choice…!!!!!!!");

                }
                System.out.println("Enter Your Choice:");
                ch = in.nextInt();
            }while(ch != 6);  }  }
```

Output

```
C:\Users\ASUS\Desktop\java>javac p2.java

C:\Users\ASUS\Desktop\java>java Account
Enter 1. To Enter details
         2.To deposit Amount
         3.To Withdraw amount
         4.To Check balance
         5.To display all details
         6.To Exit
Enter Your Choice:
1
Enter the Account Number
100200
Enter the Name of Account Holder
Aman
Enter the Amount
1000
Enter Your Choice:
2
Enter the Deposit Amount
1000
Enter Your Choice:
3
Name of Withdraw Amount
500
Enter Your Choice:
4
Balance:1500
Enter Your Choice:
5
Name of Account Holder:Aman
Account Number:100200
Amount left:1500
Enter Your Choice:
6
```

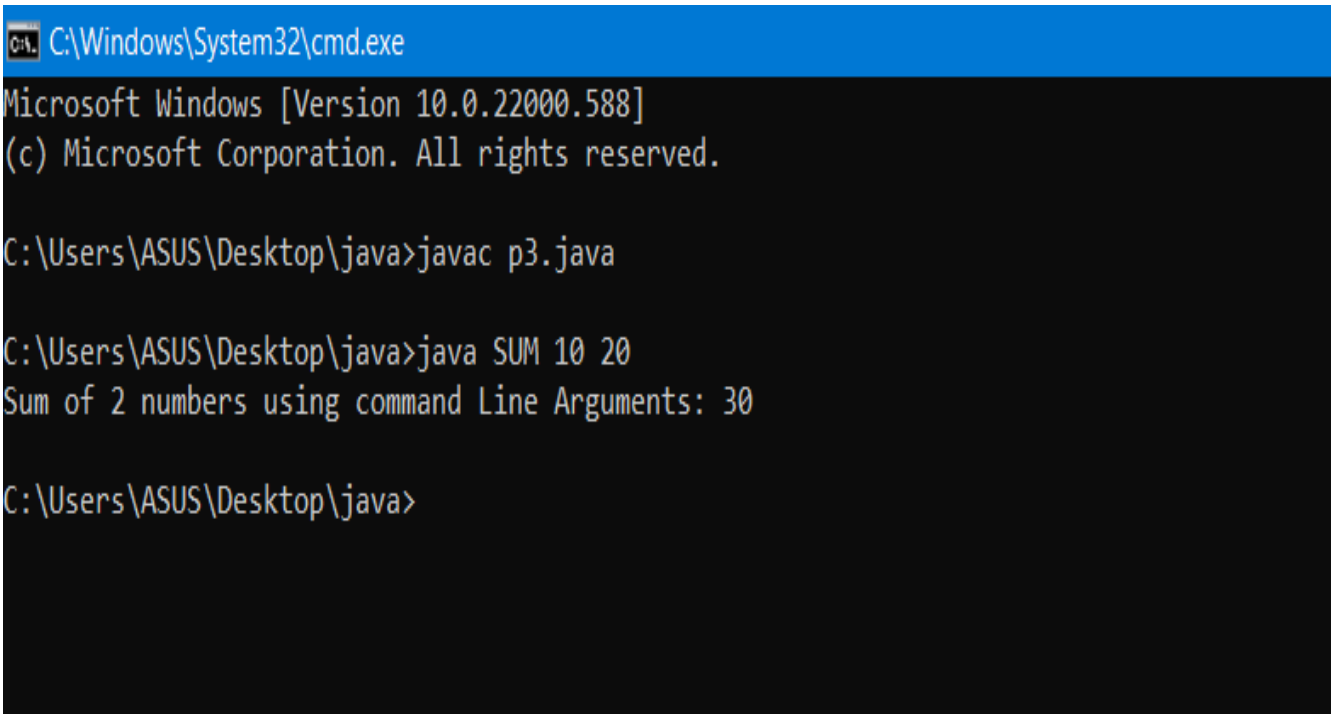
Practical No. 03

3. Write a program to sum two numbers. Here inputs are provided through command line argument.

Source Code:

```
package com.company;

public class Sum_of_Two_Numbers
{
   public static void main(String[] args)
   {
      int num1 = Integer.parseInt(args[0]);
      int num2 = Integer.parseInt(args[1]);

      int sum = num1 + num2;

      System.out.println("Sum of two number through Command Line Argument is : " + sum);
   }
}
```

Output


C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.22000.588]
(c) Microsoft Corporation. All rights reserved.
C:\Users\ASUS\Desktop\java>javac p3.java
C:\Users\ASUS\Desktop\java>java SUM 10 20
Sum of 2 numbers using command Line Arguments: 30
C:\Users\ASUS\Desktop\java>

Practical No. 04

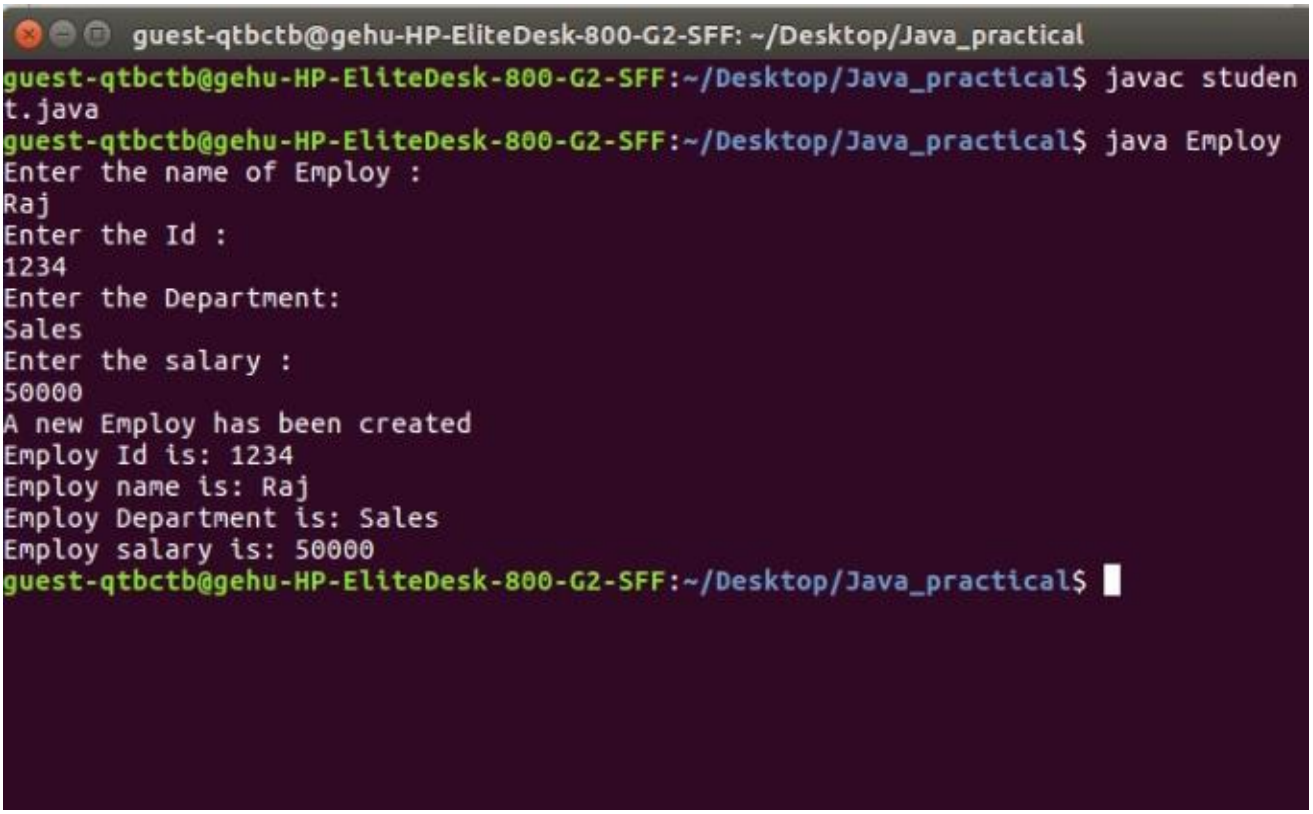
4. Create class Employee with following attributes and methods
   ID, name, department and salary.
   The setDetails() method sets the values of ID, name, department and salary.
   And showDetails() method shows the value of each field.
   Note: (i) Values must be entered through Scanner class.
   (ii) Use proper constructor
   (iii) Use “this” reference variable to avoid ambiguity.

Source Code:

```
package com.company;
import java.util.Scanner;

public class Employee {
    int id;
    String name;
    String department;
    int salary;

    // USING CONSTRUCTOR
    Employee() {

    }

    Employee(int id, String name, String department, int salary)
    {
        this.id = id;
        this.name = name;
        this.department = department;
        this.salary = salary;
    }

    // USING SCANNER CLASS
    void setDetails(int id, String name, String department, int salary)
    {
        this.id = id;
        this.name = name;
        this.department = department;
        this.salary = salary;
    }
```

```
    void showDetails()
    {
        System.out.println("Employee Name : " + name);


        System.out.println("Employee ID : " + id);
        System.out.println("Employee Department : " + department);
        System.out.println("Employee Salary : " + salary);
    }

    public static void main(String[] args)
    {
        Scanner sc = new Scanner(System.in);

        System.out.print("Enter Employee Name : ");
        String name = sc.nextLine();

        System.out.print("Enter Employee ID : ");
        int id = sc.nextInt();

        System.out.print("Enter Employee Department : ");
        String department = sc.next();

        System.out.print("Enter Employee Salary : ");
        int salary = sc.nextInt();

        Employee e1 = new Employee();
        e1.setDetails(id, name, department, salary);
        System.out.println("\nDetails through Scanner Class :-");
        e1.showDetails();

        Employee e2 = new Employee(234567, "Ayush Maheshwari", "Google", 2000000);
        System.out.println("\nDetails using Constructor :-");
        e2.showDetails();
    }
}
```

Output


guest-qtbctb@gehu-HP-EliteDesk-800-G2-SFF: ~/Desktop/Java_practical
guest-qtbctb@gehu-HP-EliteDesk-800-G2-SFF:~/Desktop/Java_practical$ javac studen
t.java
guest-qtbctb@gehu-HP-EliteDesk-800-G2-SFF:~/Desktop/Java_practical$ java Employ
Enter the name of Employ :
Raj
Enter the Id :
1234
Enter the Department:
Sales
Enter the salary :
50000
A new Employ has been created
Employ Id is: 1234
Employ name is: Raj
Employ Department is: Sales
Employ salary is: 50000
guest-qtbctb@gehu-HP-EliteDesk-800-G2-SFF:~/Desktop/Java_practical$

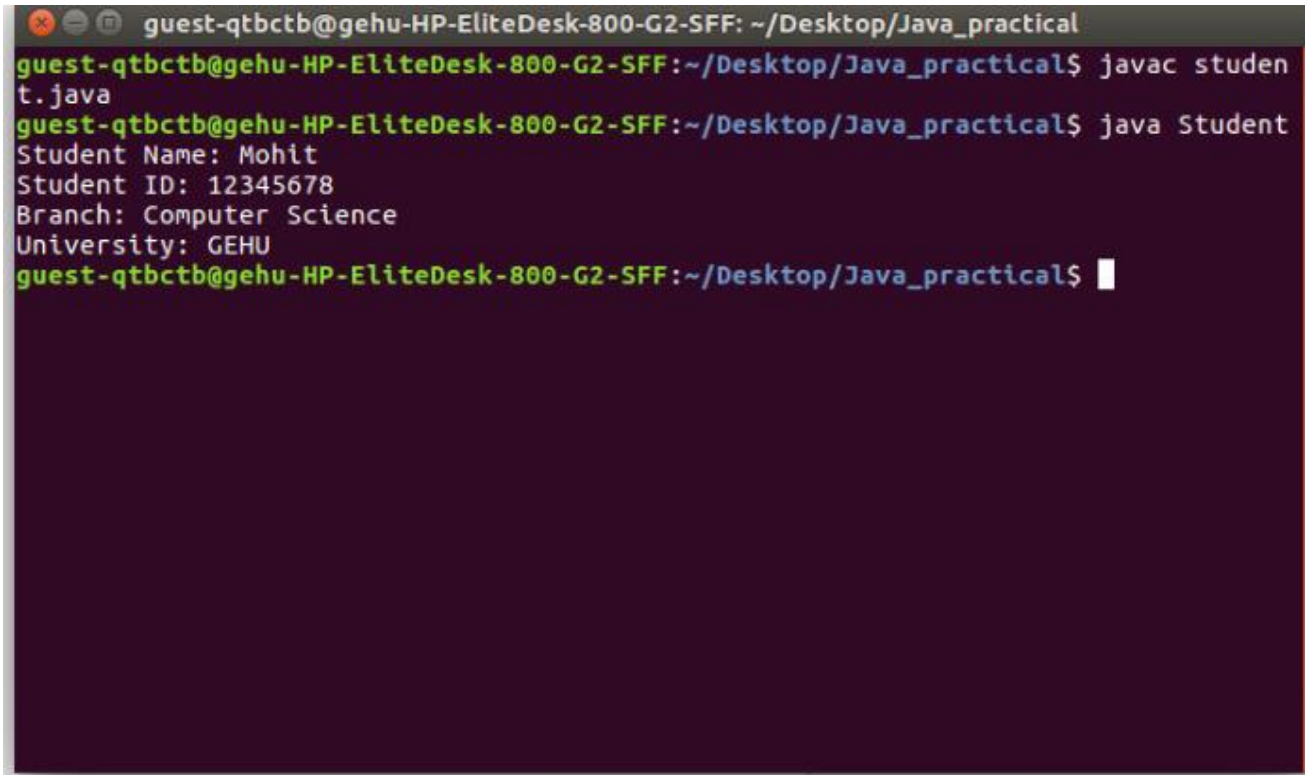
Practical No. 05

5. Re-write program 1 with better memory management approach.
   Note: use of static keyword

Source Code:

```
class Student
{
   long id;
   String Name,Branch;
   static String university = "GEHU";
   void setDetails(String a , String b , long x)
   {
            Name = a;
            Branch = b;
            id = x;
   }
   void showDetails()
   {
            System.out.println("Student Name: " + Name);
            System.out.println("Student ID: " + id);
            System.out.println("Branch: " + Branch);
            System.out.println("University: " + university);
   }
   public static void main(String args[])
   {
            String a = "Mohit";
            String b = "Computer Science";
            long x =  12345678;
            Student s = new Student();
            s.setDetails(a, b, x);
            s.showDetails();
   }

}
```

Output


guest-qtbctb@gehu-HP-EliteDesk-800-G2-SFF: ~/Desktop/Java_practical
guest-qtbctb@gehu-HP-EliteDesk-800-G2-SFF:~/Desktop/Java_practical$ javac studen
t.java
guest-qtbctb@gehu-HP-EliteDesk-800-G2-SFF:~/Desktop/Java_practical$ java Student
Student Name: Mohit
Student ID: 12345678
Branch: Computer Science
University: GEHU
guest-qtbctb@gehu-HP-EliteDesk-800-G2-SFF:~/Desktop/Java_practical$

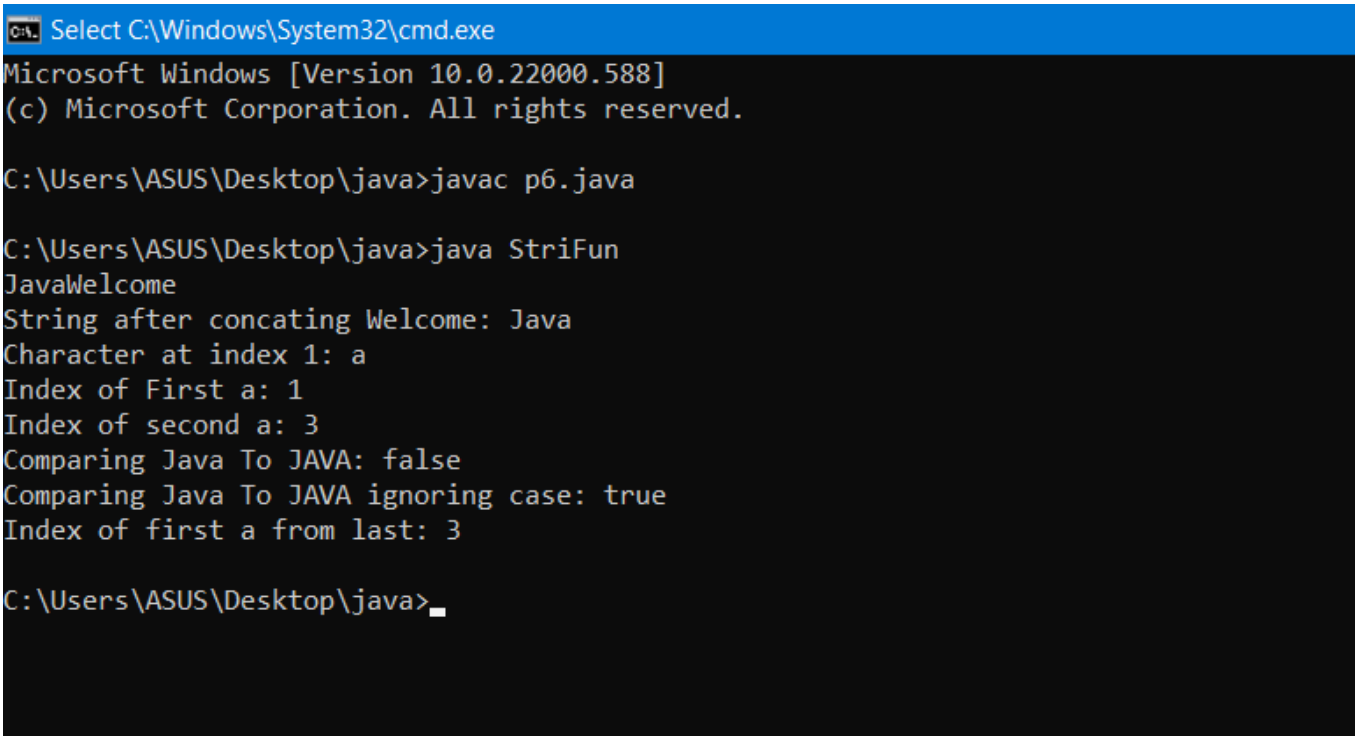
Practical No. 06

6. Apply following functions on the String "Java".
(i) Try to concat "Welcome" and write down your observation.
(ii) Find character at index 1
(iii) Find index of first 'a'.
(iv) Find index of second 'a'
(v) Compare "Java" to "JAVA"
(vi) Compare "Java" to "JAVA" ignoring the case
(vii) Find the index of first 'a' from last

Source Code:

```
class StringFunction
{
   public static void main(String args[])
   {
            String s = "Java";
            System.out.println(s.concat("Welcome"));
            System.out.println("String after concating Welcome: " + s);
            System.out.println("Character at index 1: " + s.charAt(1));
            System.out.println("Index of First a: " + s.indexOf('a'));
            System.out.println("Index of second a: " + s.lastIndexOf('a'));

            String s2 = new String("JAVA");
            System.out.println("Comparing Java To JAVA: " + s.equals(s2));
            System.out.println("Comparing Java To JAVA ignoring case: " + s.equalsIgnoreCase(s2));
            System.out.println("Index of first a from last: " + s.lastIndexOf('a'));
   }
}
```

Output


Select C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.22000.588]
(c) Microsoft Corporation. All rights reserved.
C:\Users\ASUS\Desktop\java>javac p6.java
C:\Users\ASUS\Desktop\java>java StriFun
JavaWelcome
String after concating Welcome: Java
Character at index 1: a
Index of First a: 1
Index of second a: 3
Comparing Java To JAVA: false
Comparing Java To JAVA ignoring case: true
Index of first a from last: 3
C:\Users\ASUS\Desktop\java>

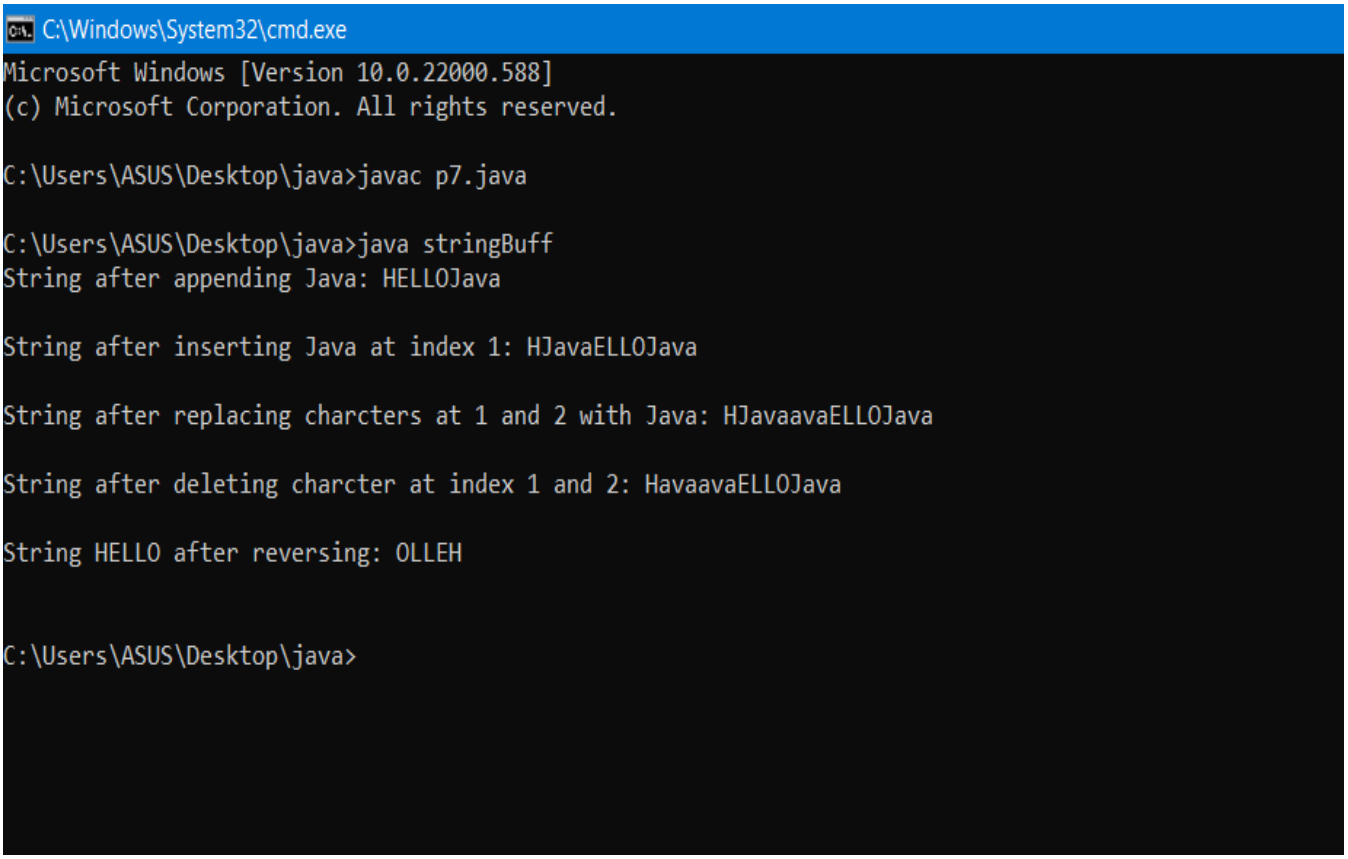
Practical No. 07

7. Apply following functions on StringBuffer object "HELLO"
(i) Append "Java"
(ii) Insert "Java" at index 1
(iii) Replace with "Java" with characters between index 1 to 2
(iv) Delete characters between index 1 and 2
(v) Reverse the string "HELLO"

Source Code:

```
class stringBuffer
{
   public static void main(String args[])
   {
            StringBuffer s = new StringBuffer("HELLO");
            s.append("Java");
            System.out.println("String after appending Java: " + s + "\n");

            s.insert(1,"Java");
            System.out.println("String after inserting Java at index 1: " + s + "\n");

            s.replace(1,2,"Java");
            System.out.println("String after replacing charcters at 1 and 2 with Java: " + s + "\n");

            s.delete(1,2);
            System.out.println("String after deleting charcter at index 1 and 2: " + s + "\n");

            s = new StringBuffer("HELLO");
            s.reverse();
            System.out.println("String HELLO after reversing: " + s + "\n");

   }
}
```

Output


C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.22000.588]
(c) Microsoft Corporation. All rights reserved.
C:\Users\ASUS\Desktop\java>javac p7.java
C:\Users\ASUS\Desktop\java>java stringBuff
String after appending Java: HELLOJava
String after inserting Java at index 1: HJavaELLOJava
String after replacing charcters at 1 and 2 with Java: HJavaavaELLOJava
String after deleting charcter at index 1 and 2: HavaavaELLOJava
String HELLO after reversing: OLLEH
C:\Users\ASUS\Desktop\java>

Practical No. 08

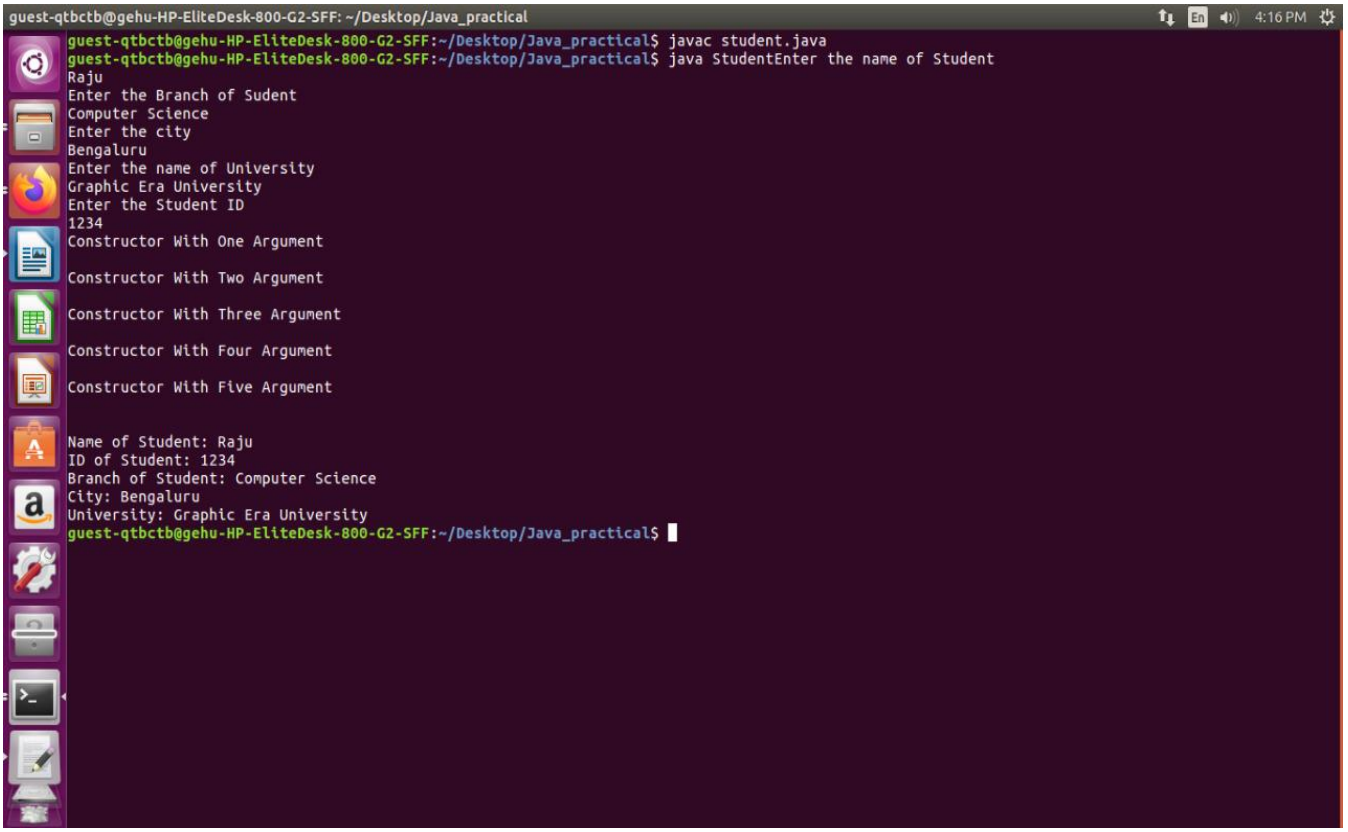
8. Create a class “Student” having following instance variables and methods.
Instance variables: ID, Name, Branch, city and university
While creating constructors with one, two, three, four and five arguments reuse the constructors by **construction chaining.**

Source Code:

```
import java.util.*;
class Student
{
   long id;
   String Name,Branch,city,university;
   Student(String a)
   {
            Name = a;
            System.out.println("Constructor With One Argument\n");
   }
   Student(String a,String b)
   {
            this(a);
            Branch = b;
            System.out.println("Constructor With Two Argument\n");
   }
   Student(String a,String b,String c)
   {
            this(a,b);
            city = c;
            System.out.println("Constructor With Three Argument\n");
   }
   Student(String a,String b,String c,String d)
   {
            this(a,b,c);
            university = d;
            System.out.println("Constructor With Four Argument\n");
   }
   Student(String a,String b,String c,String d,long e)
   {
            this(a,b,c,d);
            id = e;
            System.out.println("Constructor With Five Argument\n");
```

```
    }
    void display()
    {
            System.out.println("Name of Student: " + Name);
            System.out.println("ID of Student: " + id);
            System.out.println("Branch of Student: " + Branch);
            System.out.println("City: " + city);
            System.out.println("University: " + university);
    }

    public static void main(String args[])
    {
            Scanner in = new Scanner(System.in);
            System.out.println("Enter the name of Student");
            String a = in.nextLine();

            System.out.println("Enter the Branch of Sudent");
            String b = in.nextLine();
            System.out.println("Enter the city");
            String c = in.nextLine();

            System.out.println("Enter the name of University");
            String d = in.nextLine();
            System.out.println("Enter the Student ID");
            long e = in.nextLong();

            Student s = new Student(a,b,c,d,e);
            System.out.println();
            s.display();
    }
}
```

Output


guest-qtbctb@gehu-HP-EliteDesk-800-G2-SFF: ~/Desktop/Java_practical
4:16 PM
guest-qtbctb@gehu-HP-EliteDesk-800-G2-SFF:~/Desktop/Java_practical$ javac student.java
guest-qtbctb@gehu-HP-EliteDesk-800-G2-SFF:~/Desktop/Java_practical$ java StudentEnter the name of Student
Raju
Enter the Branch of Sudent
Computer Science
Enter the city
Bengaluru
Enter the name of University
Graphic Era University
Enter the Student ID
1234
Constructor With One Argument
Constructor With Two Argument
Constructor With Three Argument
Constructor With Four Argument
Constructor With Five Argument
Name of Student: Raju
ID of Student: 1234
Branch of Student: Computer Science
City: Bengaluru
University: Graphic Era University
guest-qtbctb@gehu-HP-EliteDesk-800-G2-SFF:~/Desktop/Java_practical$

Program No. 09

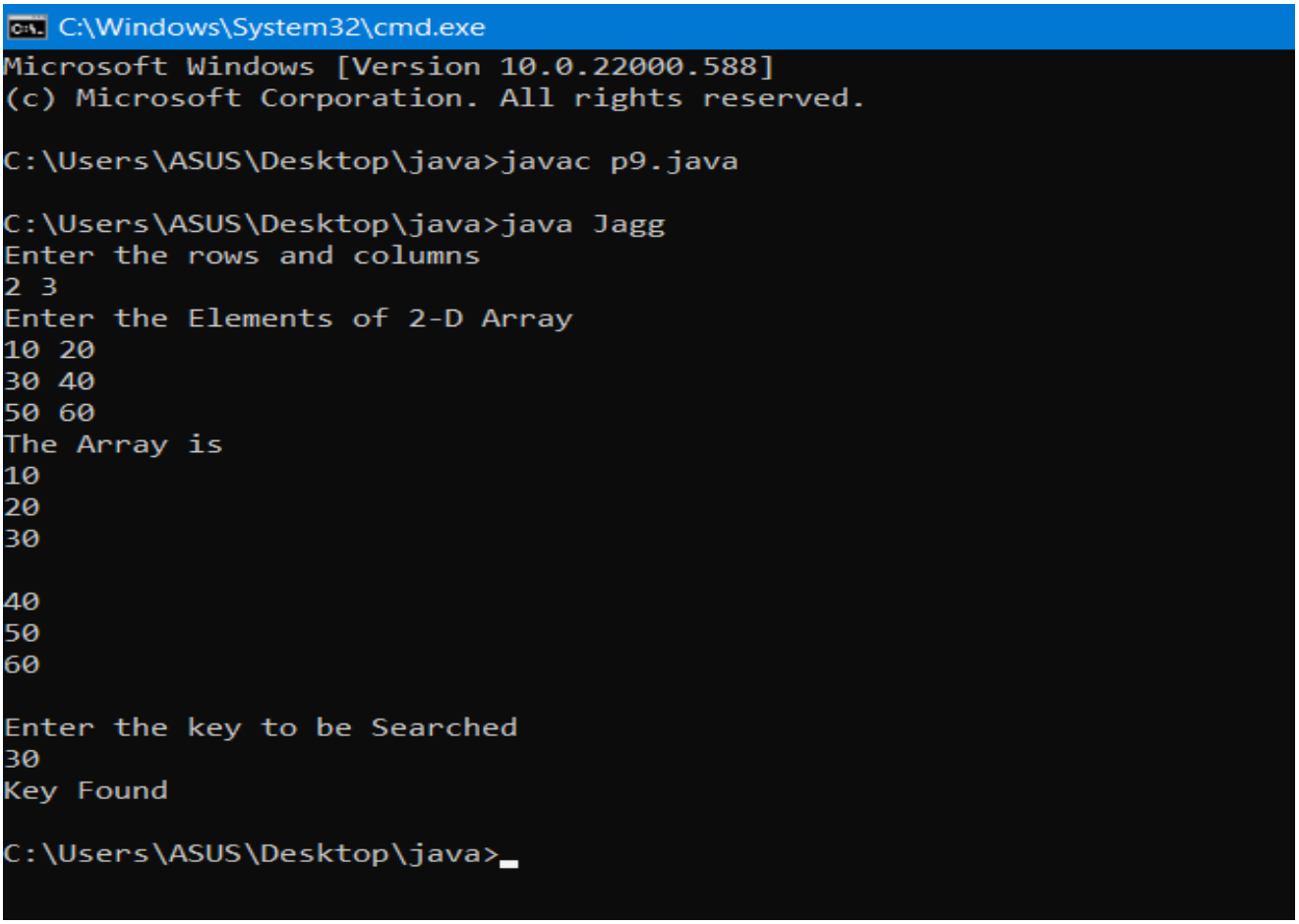
9. Create two dimensional integer array and insert, search and traverse this array.
Note: Use Scanner class to insert data.

Source Code:

```
import java.util.*;
class Jagg
{
   public static void main(String args[])
   {
            Scanner in = new Scanner(System.in);
            System.out.println("Enter the rows and columns ");
            int r = in.nextInt();
            int c = in.nextInt();
            int a[][] = new int[r][c];
            System.out.println("Enter the Elements of 2-D Array");
            for(int i = 0; i <  a.length ;i++)
            {
                     for(int j = 0; j < a[i].length ; j++)
                     {
                              a[i][j] = in.nextInt();
                     }
            }
            System.out.println("The Array is");
            for(int i = 0; i < a.length ;i++)
            {
                     for(int j = 0;j < a[i].length ; j++)
                     {
                              System.out.println(a[i][j];
                     }
                     System.out.println();
            }
            System.out.println("Enter the key to be Searched");
            int k = in.nextInt();
            for(int i = 0; i < a.length ; i++)
            {
                     for(int j = 0;j < a[i].length ; j++)
                     {
                              if(a[i][j ]== k)
                              {
                                       System.out.println("Key Found");
```

```
                                System.exit(0);
                            }
                        }
                    }
                    System.out.println("Key Not Found");
                }
            }
```

Output



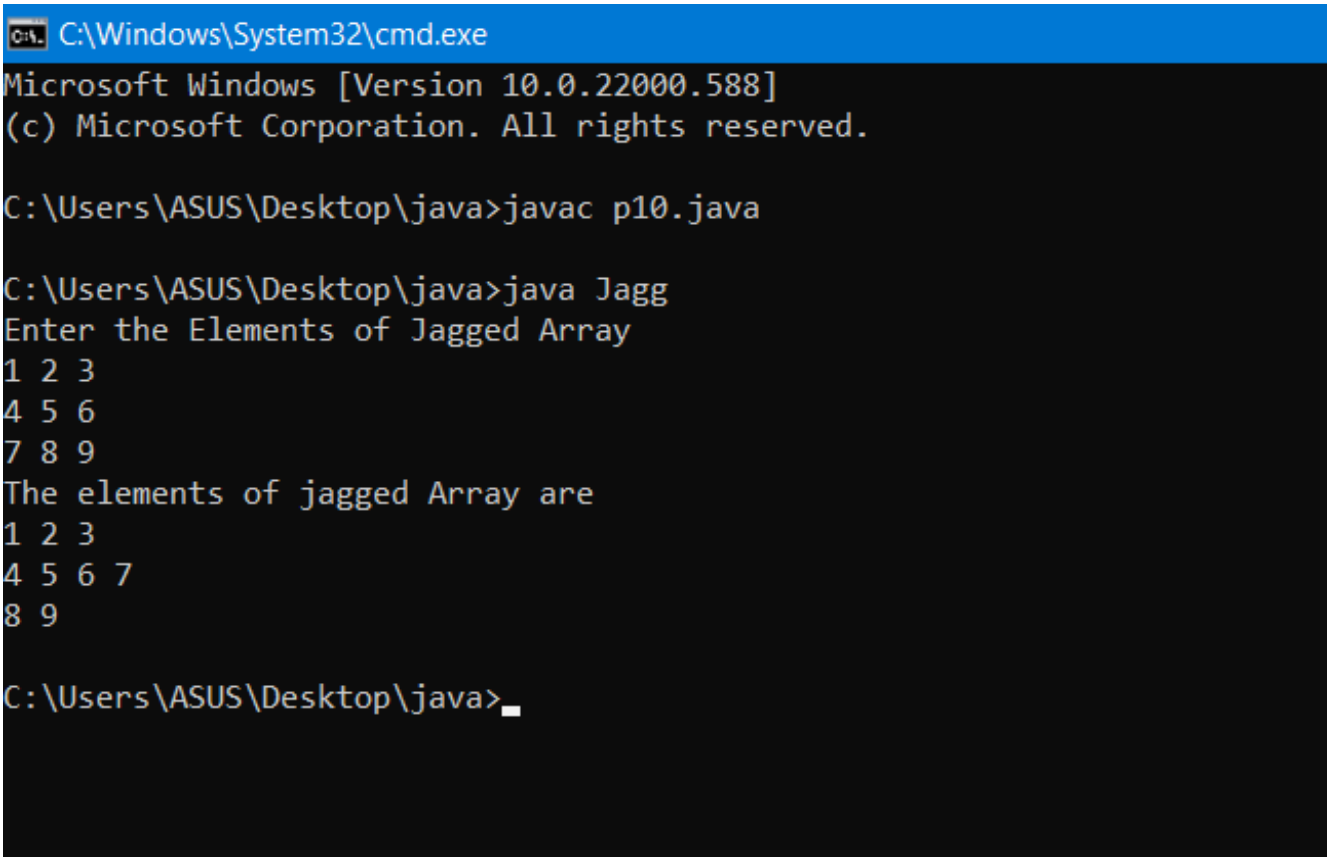
Practical No. 10

10. Create a jagged array having three rows. Where 1st row contains 3 columns, 2nd row contains 4 columns and 3rd row contains 2 columns. Insert and traverse it.

Source Code:

```
import java.util.*;
class Jagg
{

   public static void main(String args[])
   {
            int a[][] = new int[3][];
            a[0] = new int[3];
            a[1] = new int[4];
            a[2] = new int[2];

            Scanner in = new Scanner(System.in);
            System.out.println("Enter the Elements of Jagged Array");
            for(int i = 0;i < a.length ;i++)
            {
                     for(int j = 0;j < a[i].length ; j++)
                     {
                              a[i][j] = in.nextInt();
                     }
            }


            System.out.println("The elements of jagged Array are");
            for(int i = 0;i < a.length ;i++)
            {
                     for(int j = 0;j < a[i].length ;j++)
                     {
                              System.out.print(a[i][j ]+ " ");
                     }
                     System.out.println();
            }
   }
}
```

Output


C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.22000.588]
(c) Microsoft Corporation. All rights reserved.
C:\Users\ASUS\Desktop\java>javac p10.java
C:\Users\ASUS\Desktop\java>java Jagg
Enter the Elements of Jagged Array
1 2 3
4 5 6
7 8 9
The elements of jagged Array are
1 2 3
4 5 6 7
8 9
C:\Users\ASUS\Desktop\java>

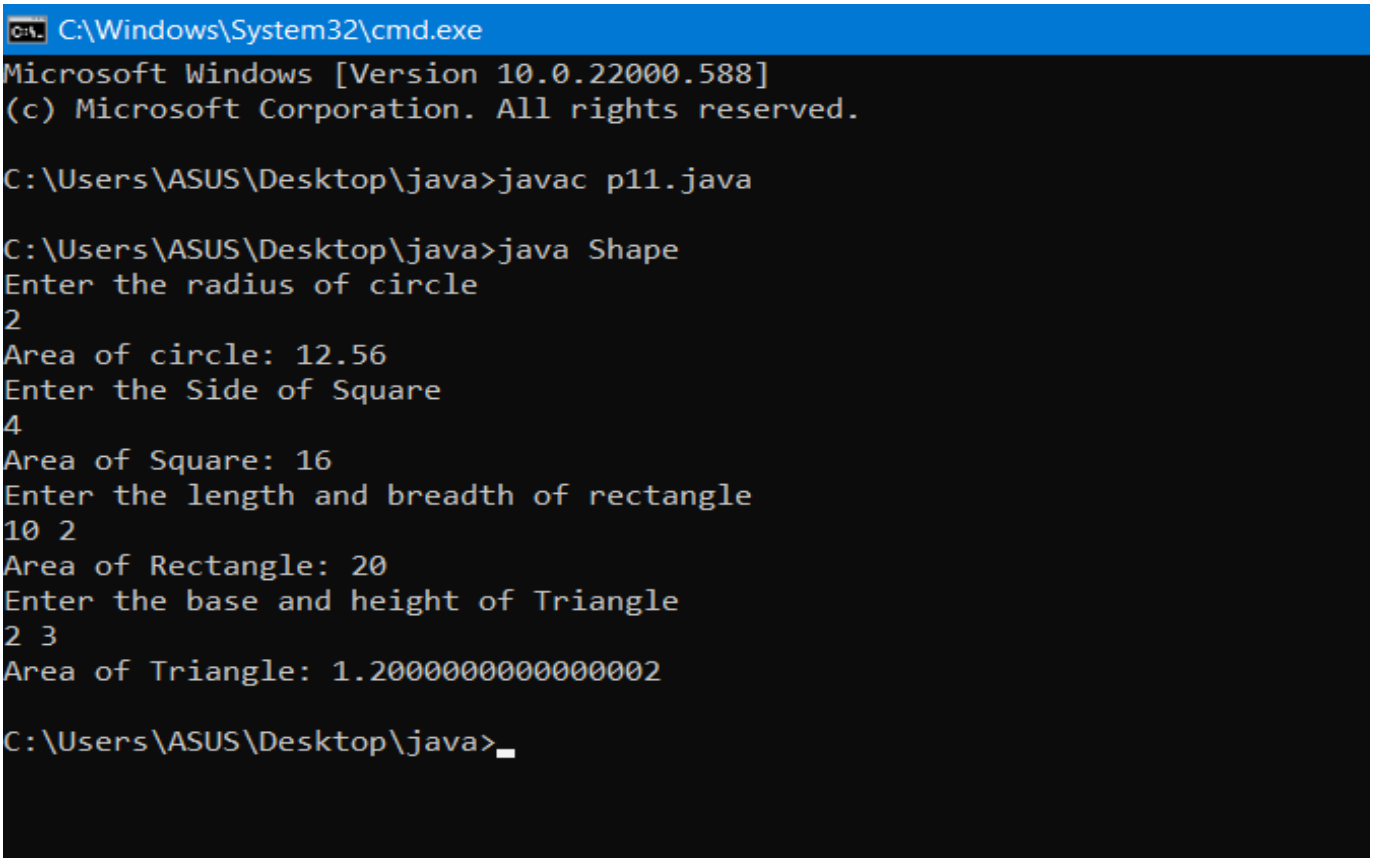
Practical No. 11

11. Create a class “Shape” having area() method to calculate area. Overload the area() method for shapes like triangle, rectangle and circle.

Source Code:

```
import java.util.*;
class Shape
{
   void area(double r) {
            System.out.println("Area of circle: " + (3.14*r*r));
   }
   void area(int s) {
            System.out.println("Area of Square: " + (s*s));
   }
   void area(int l,int b) {
            System.out.println("Area of Rectangle: " + (l*b));
   }
   void area(float b,float h) {
            System.out.println("Area of Triangle: " + (0.2*b*h));
   }
   public static void main(String args[])
   {
            Shape s = new Shape();
            Scanner in = new Scanner(System.in);
            System.out.println("Enter the radius of circle");
            double r = in.nextInt();
            s.area(r);
            System.out.println("Enter the Side of Square");
            int a = in.nextInt();
            s.area(a);

            System.out.println("Enter the length and breadth of rectangle");
            int l = in.nextInt();
            int b = in.nextInt();
            s.area(l,b);

            System.out.println("Enter the base and height of Triangle");
            float x = in.nextFloat();
            float y = in.nextFloat();
            s.area(x,y);
   }
}
```

Output


C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.22000.588]
(c) Microsoft Corporation. All rights reserved.
C:\Users\ASUS\Desktop\java>javac p11.java
C:\Users\ASUS\Desktop\java>java Shape
Enter the radius of circle
2
Area of circle: 12.56
Enter the Side of Square
4
Area of Square: 16
Enter the length and breadth of rectangle
10 2
Area of Rectangle: 20
Enter the base and height of Triangle
2 3
Area of Triangle: 1.2000000000000002
C:\Users\ASUS\Desktop\java>

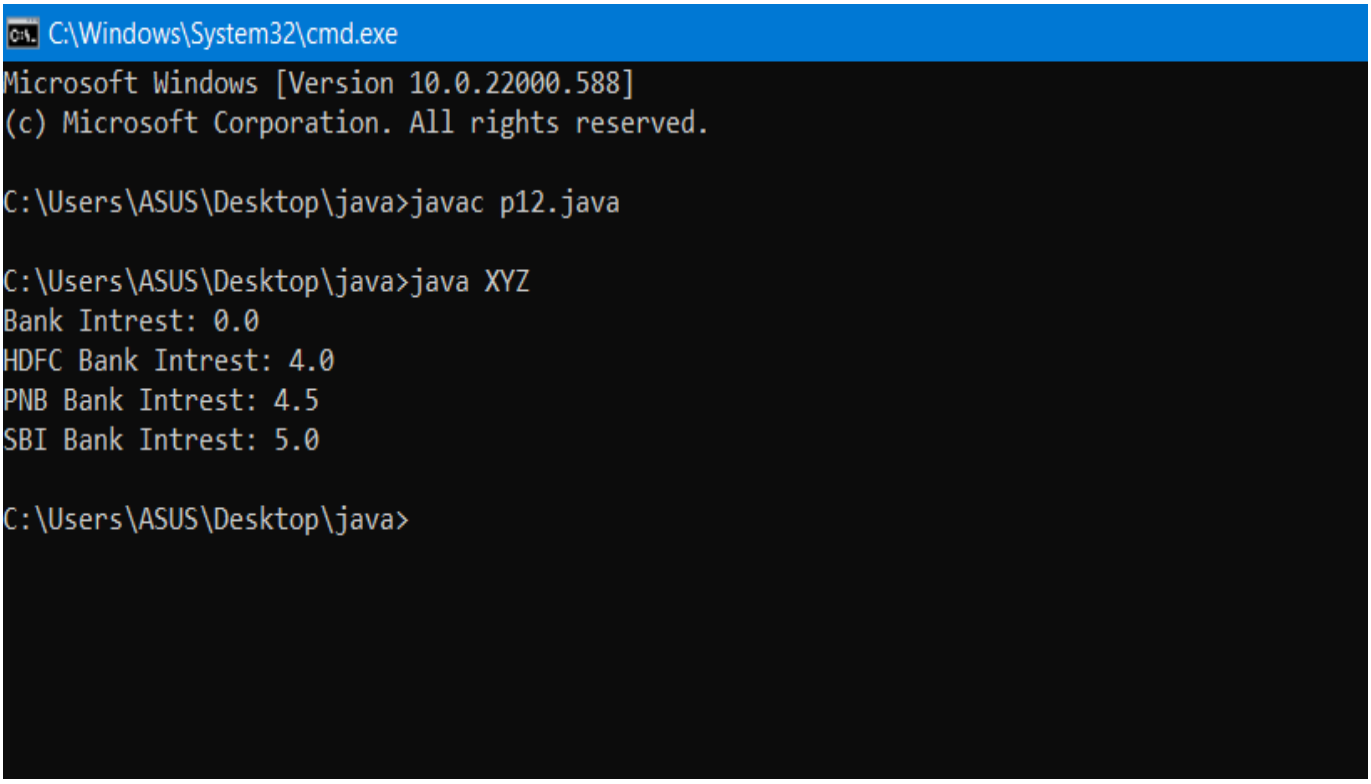
Practical No. 12

12. Create a class “Bank” having method getRateOfInterest(). Create child classes as HDFC, SBI and PNB and override getRateOfInterest() and return interest rates as 4.0, 4.5 and 5% correspondingly.
Use concept of Upcasting to implement this scenario.

Source Code:

```
import java.util.*;
class Bank {
    float getROI() {
      return 0;
    }
}
class HDFC extends Bank {
    float getROI() {
            return(4.0f);
    }
}
class PNB extends Bank {
    float getROI() {
            return(4.5f);
    }
}
class SBI extends Bank {
    float getROI() {
            return(5.0f);
    }
}
class XYZ  {
    public static void main(String args[]) {
            Bank a = new Bank();
            System.out.println("Bank Intrest: " + a.getROI());
            a = new HDFC();
            System.out.println("HDFC Bank Intrest: " +  a.getROI());
            a = new PNB();
            System.out.println("PNB Bank Intrest: " + a.getROI());
            a = new SBI();
            System.out.println("SBI Bank Intrest: " + a.getROI());
    }
}
```

Output


C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.22000.588]
(c) Microsoft Corporation. All rights reserved.
C:\Users\ASUS\Desktop\java>javac p12.java
C:\Users\ASUS\Desktop\java>java XYZ
Bank Intrest: 0.0
HDFC Bank Intrest: 4.0
PNB Bank Intrest: 4.5
SBI Bank Intrest: 5.0
C:\Users\ASUS\Desktop\java>