BHARTIYA INSTITUTE OF ENGINEERING & TECHNOLOGY, SIKAR

LAB MANUAL

IV SEMESTER

JAVA LAB

Subject Code: 4CS4-25

Prepared By:

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List of Experiment:

1. Develop an in depth understanding of programming in Java: data types, variables, operators, operator precedence, Decision and control statements, arrays, switch statement, Iteration Statements, Jump Statements, Using break, Using continue, return.

2. Write Object Oriented programs in Java: Objects, Classes constructors, returning and passing objects as parameter, Inheritance, Access Control, Using super, final with inheritance Overloading and overriding methods, Abstract classes, Extended classes.

3. Develop understanding to developing packages & Interfaces in Java: Package, concept of CLASSPATH, access modifiers, importing package, Defining and implementing interfaces.

4. Develop understanding to developing Strings and exception handling: String constructors, special string operations, character extraction, searching and comparing strings, string Buffer class. Exception handling fundamentals, Exception types, uncaught exceptions, try, catch and multiple catch statements. Usage of throw, throws and finally.

5. Develop applications involving file handling: I/O streams, File I/O.

6. Develop applications involving concurrency: Processes and Threads, Thread Objects, Defining and Starting a Thread, Pausing Execution with Sleep, Interrupts, Joins, and Synchronization. Indicative List of exercises:

7. Programs to demonstrate basic concepts e.g. operators, classes, constructors, control & iteration statements, recursion etc. such as complex arithmetic, matrix arithmetic, tower of Hanoi problem etc.

8. Development of programs/projects to demonstrate concepts like inheritance, exception handling, packages, interfaces etc. such as application for electricity department, library management, ticket reservation system, payroll system etc.

9. Development of a project to demonstrate various file handling concepts.

10. Develop applications involving Applet: Applet Fundamentals, using paint method and drawing polygons. It is expected that each laboratory assignments to given to the students with an aim to In order to achieve the above objectives.

PROGRAM 1

Q. Write a program that displays the text “Hello”.

```
class First{
public static void main(String args[])
{
System.out.println("Hello");
}
}
```

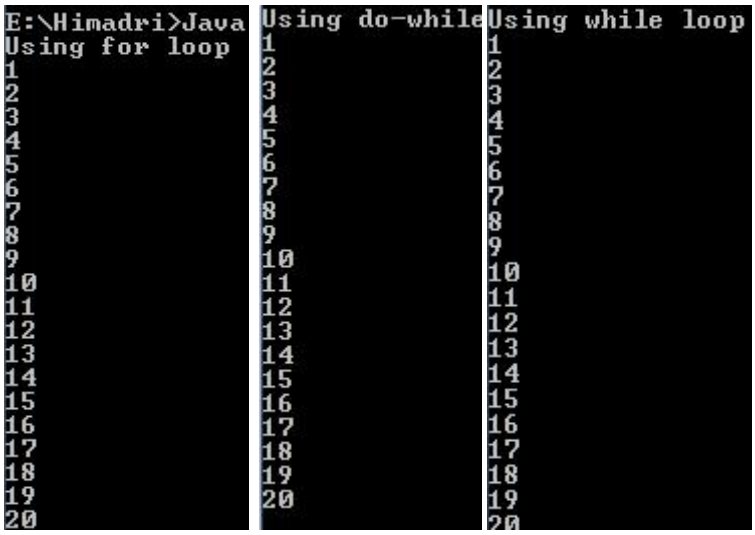
OUTPUT:

PROGRAM 2

Q. Write a program to display numbers from 1 to 20 using for, while and do-while loop.

```
// Display 1 to 20 using for,while,do-while
class Numbers
{
public static void main(String args[])
{ int i,j=1,k=1;
System.out.println("Using for loop");
//Using for loop
for(i=1;i<=20;i++)
{
System.out.println(i);
}
System.out.println("Using while loop");
//Using while loop
while(j<=20)
{
System.out.println(j);
j++;
System.out.println("Using do-while loop");
//Using do while loop
do {
  System.out.println(k);
k++;
   }while( k <= 20 );}}
```

OUTPUT:


E:\Himadri>Java
Using for loop
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Using do-while
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Using while loop
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

PROGRAM 3

Q. Take two integer variables x and y, where x=10 and y=20. Write a program to display the sum of these two variables.

```
class Sum

{

public static void main(String args[])

{ int x=10,y=20,sum=0;

sum=x+y;

System.out.println(sum);

}

}
```

OUTPUT:

PROGRAM 4

Q. Write a program to swap the values of x and y in Q3.

```
class Swap
{
public static void main(String args[])
{
int x=10,y=20,temp=0;
System.out.println("The initial value of x: "+x);
System.out.println("The initial value of y : "+y);
temp=x;
x=y;
y=temp;
System.out.println("The swapped value of x:"+x);
System.out.println("The swapped value of y:"+y);
}
}
```

OUTPUT:

```
E:\Himadri>javac Swap.java

E:\Himadri>Java Swap
The initial value of x: 10
The initial value of y : 20
The swapped value of x:20
The swapped value of y:10
```

PROGRAM 5

Q. Write a program to display the following figure:

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

```
class Star
{
public static void main(String args[])
{
int i,j,n;
for (i=1;i<=5;i++)
{
for(j=1;j<=i;j++)
{System.out.print("*");
}System.out.println(" ");}}}
```

OUTPUT:

```
E:\Himadri>javac Star.java

E:\Himadri>Java Star
*
**
***
****
*****
```

PROGRAM 6

Q. Write a program to display first 20 prime numbers.

```
class Prime{
public static void main(String args[]){
int i=2,j,flag,k=0;
do{
flag=0;
for(j=2;j<i;j++)  {
   if(i%j==0)
    flag=1;}
if(flag==0){
System.out.println(i);
k++;}
i++;}while(k!=20);}}
```

OUTPUT:

```
E:\Himadri>javac Prime.java

E:\Himadri>Java Prime
2
3
5
7
11
13
17
19
23
29
31
37
41
43
47
53
59
61
67
71
```

PROGRAM 7

Q. Take a word (say “BRAINVITA”) as a command line argument and display it as “Hello BRAINVITA”.

```
class Brainvita

{

public static void main( String args[])

{

System.out.println("Hello "+args[0]);

}}
```

OUTPUT:

PROGRAM 8

Q. Write a program to check a given number whether it is odd or even and find its factorial.

```
class Oddeven
{
public static void main(String args[])
{
int x=Integer.parseInt(args[0]);
int i;
int fact=1;
if(x%2==0)
System.out.println("The number " +x+" is even");
else
System.out.println("The number " +x+"is odd");
for(i=1;i<=x;i++)
fact=fact*i;
System.out.println("The factorial is "+fact);}}
```

OUTPUT:

```
D:\Himadri Panwar A1>javac Oddeven.java

D:\Himadri Panwar A1>java Oddeven 4
The number 4 is even
The factorial is 24
```

PROGRAM 9

Q. Write a program to add two 3D arrays and display the result

```
class Threed
{
public static void main(String args[])
{
int i,j,k,h=1;
int[][][] a= new int [3][2][2];
int[][][] b= new int  [3][2][2];
int[][][]  c= new int  [3][2][2];
for(i=0;i<3;i++)
{for (j=0;j<2;j++)
{for(k=0;k<2;k++)
{ a[i][j][k]=h;
h++;}}}
h=1;
for(i=0;i<3;i++)
{for (j=0;j<2;j++)
{for(k=0;k<2;k++)
{ b[i][j][k]=h;
h++;}}}
for(i=0;i<3;i++)
{for (j=0;j<2;j++)
{for(k=0;k<2;k++)
{c[i][j][k]= a[i][j][k]+b[i][j][k];}}}
for(i=0;i<3;i++){
for (j=0;j<2;j++){
for(k=0;k<2;k++)
System.out.print(c[i][j][k]+" ");
System.out.println();}
System.out.println();}} }
```

OUTPUT:

```
D:\Himadri Panwar A1>javac Threed.java

D:\Himadri Panwar A1>Java Threed
2 4
6 8

10 12
14 16

18 20
22 24
```

PROGRAM 10

Q. . Write a program to multiply two matrices and display the result in matrix fashion.

```
class Multmatrix{
public static void main(String args[]){
int i,j,k,p=4,q=0,mult;
int mx1[][]=new int[2][2];
int mx2[][]=new int[2][2];
for(i=0;i<2;i++)
for(j=0;j<2;j++)
{mx1[i][j]=p;
p++;
mx2[i][j]=q;
q++;}
System.out.println("Multiplication of the matrices is:");
for(i=0;i<2;i++){
for(j=0;j<2;j++)
{  mult=0;
  for(k=0;k<2;k++)
{    mult=mult+(mx1[i][k]*mx2[k][j]);}
 System.out.print(mult+" ");}
System.out.println("");}}}
```

OUTPUT:

```
D:\Himadri Panwar>javac Multmatrix.java

D:\Himadri Panwar>java Multmatrix
Multiplication of the matrices is:
10 19
14 27
```

PROGRAM 11

Q. Accept student name and marks from keyboard and display his performance according to
The following conditions:

MARKS	Performance
<50	Fair
>=50 and <75	Good
>=75 and <85	V.Good
>=85	Excellent

```
class Smarks{

public static void main(String args[]){

System.out.println("Name of the student :"+args[0]);

System.out.println("Marks of the student :"+args[1]);

int a=Integer.parseInt(args[1]);

System.out.print("Performance:");

if(a<50)

System.out.println("Fair");

else if(a>=50&&a<75)

System.out.println("Good");

else if(a>=75&&a<85)

System.out.println("Very Good");

else if(a>=85)

System.out.println("Excellent");

}

}
```

OUTPUT:

```
D:\Himadri Panwar>javac Smarks.java

D:\Himadri Panwar>java Smarks Andrew 78
Name of the student :Andrew
Marks of the student :78
Performance:Very Good
```

PROGRAM 12

Q.Design a class to represent a bank account. Include the following members,
Data Members:

(i) Name of the depositor
(ii) Account number
(iii) Type of Account
(iv) Balance amount in the account

Methods:

(i) To assign initial values- pass these values from main()
(ii) To deposit an amount- pass the deposit amount from main()
(iii) To withdraw an amount after checking balance-pass the amt to be withdrawn from main().
(iv) To display name, acc no., acc type and balance.

Create three objects as customers of the bank account. For each of the three customers Invoke all the methods.

```
public class Account
{String name;
int ac_no;
String a_type;
int bal;
 void getdata(String n,int a,String t,int b)
{name=n;
ac_no=a;
a_type=t;
bal=b;}
void deposit(int  d)
{System.out.println("Deposited amount="+d);
bal=bal+d;
System.out.println("The increased balance amount =" +bal);}


void withdrawl(int  w)
{if (bal<2000)
System.out.println("Low balance");
else
{System.out.println("Withdrawl Amount"+w);
bal=bal-w;
System.out.println("Current Amount"+bal);}}
void display()
{System.out.println("Name "+name);
System.out.println("Account Number"+ac_no);
System.out.println("Account Type "+a_type);
System.out.println("Account Balance"+bal);}
```

```
public static void main(String args[])
{
Account b1=new Account();
b1.getdata("Andrew ",1010101,":Savings",20000);
b1.display();
b1.deposit(4000);
b1.withdrawl(2000);
Account b2=new Account();
b2.getdata("Tori ",1010104,":Current",29000);
b2.display();
b2.deposit(4000);
b2.withdrawl(2000);
Account b3=new Account();
b3.getdata("Tori ",1010242,":Current",233000);
b3.display();
b3.deposit(1000);
b3.withdrawl(20000);   }}
```

OUTPUT:

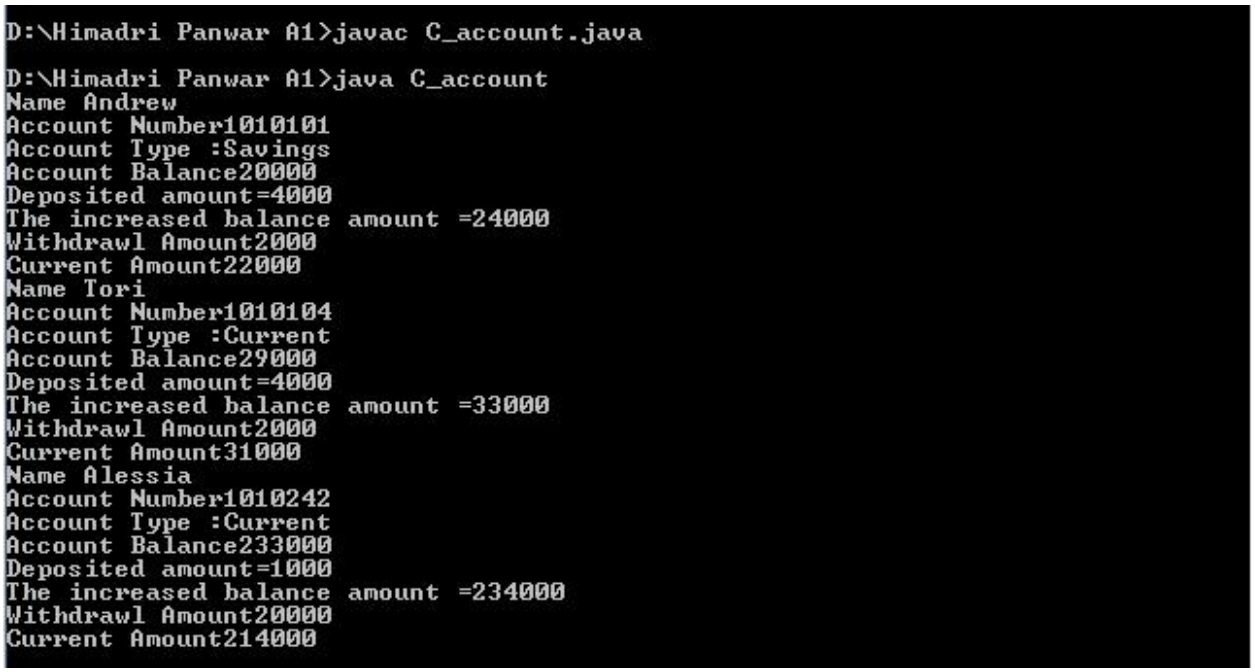
PROGRAM 13

Q. . In Q12 ,replace the first method by a constructor.

```
class C_account
{
String name;
int ac_no;
String a_type;
int bal;
 C_account(String n,int a,String t,int b)
{
name=n;
ac_no=a;
a_type=t;
bal=b;
}
void deposit(int  d)
{
System.out.println("Deposited amount="+d);
bal=bal+d;
System.out.println("The increased balance amount =" +bal);
}
void withdrawl(int  w)
{if (bal<2000)
System.out.println("Low balance");
else
{
System.out.println("Withdrawl Amount"+w);
bal=bal-w;
System.out.println("Current Amount"+bal);}
}
void display()
{System.out.println("Name "+name);
System.out.println("Account Number"+ac_no);
System.out.println("Account Type "+a_type);
System.out.println("Account Balance"+bal);
}

public static void main(String args[])
{
C_account b1=new C_account("Andrew ",1010101,":Savings",20000);

b1.display();
b1.deposit(4000);
b1.withdrawl(2000);
C_account b2=new C_account("Tori ",1010104,":Current",29000);
b2.display();
b2.deposit(4000);
```

```
b2.withdrawl(2000);
C_account b3=new C_account("Alessia ",1010242,":Current",233000);

b3.display();
b3.deposit(1000);
b3.withdrawl(20000);          }}
```

OUTPUT:



PROGRAM 14

Q. Design a class "Shape", which has no data members. It hasonly onemethod "area()", which is overloaded and it computes and displays areas of different shapes namely square,rectangle, circle and triangle. The parameters in different versions of the method area() maybe taken as follows:

(i) For Square- one integer parameter (length)
(ii) For Rectangle- two integer parameters(length& breadth)
(iii) For Circle-one double parameter (radius)
(iv) For Triangle- two double parameters (perpendicular & base)

```
class Shape
{void area(int s)
{System.out.println("SQUARE");
System.out.println("AREA OF THE SQUARE:"+(s*s));}
void area(int l ,int b){
System.out.println("RECTANGLE");
System.out.println("AREA OF THE RECTANGLE:"+(l*b));}
void area(double r){
System.out.println("CIRCLE");
System.out.println("AREA OF THE CIRCLE:"+(3.14*r*r));}
void area(double p,double bs){
System.out.println("TRIANGLE");
System.out.println("AREA OF THE TRIANGLE:"+(0.5*bs*p));}
public static void main(String args[])
{
Shape S=new Shape();
S.area(15);

S.area(5,9);

S.area(3.9);

S.area(15.1,7.1);
}}
```

OUTPUT:

```
D:\Himadri Panwar A1>javac Shape.java

D:\Himadri Panwar A1>java Shape
SQUARE
AREA OF THE SQUARE:225
RECTANGLE
AREA OF THE RECTANGLE:45
CIRCLE
AREA OF THE CIRCLE:47.7594
TRIANGLE
AREA OF THE TRIANGLE:53.605
```

PROGRAM 15

Q. Modify Q14 to illustrate constructor overloading.

```
class Cshape
{
Cshape(int s)
{
System.out.println("SQUARE");
System.out.println("AREA OF THE SQUARE:"+(s*s));
}

Cshape(int l ,int b)
{
System.out.println("RECTANGLE");
System.out.println("AREA OF THE RECTANGLE:"+(l*b));
}
Cshape (double r)
{
System.out.println("CIRCLE");
System.out.println("AREA OF THE CIRCLE:"+(3.14*r*r));
}
Cshape (double p,double bs)
{
System.out.println("TRIANGLE");
System.out.println("AREA OF THE TRIANGLE:"+(0.5*bs*p));
}}

class Cshape1
{public static void main(String args[])
{Cshape s1=new Cshape(15);
Cshape s2=new Cshape(6,7);
Cshape s3=new Cshape(4.7);
Cshape s4=new Cshape(15.4,8.9);

}}
```

OUTPUT:

```
D:\Himadri Panwar A1>javac Cshape1.java

D:\Himadri Panwar A1>java Cshape1
SQUARE
AREA OF THE SQUARE:225
RECTANGLE
AREA OF THE RECTANGLE:42
CIRCLE
AREA OF THE CIRCLE:69.3626
TRIANGLE
AREA OF THE TRIANGLE:68.53
```

PROGRAM 16

Design a class that has two integer variables. It also has a method which adds two objects and returns the resultant object. Another method is there to display the result. Write a program that creates two objects , initialize them automatically, add these two objects and display the result. Take a different class for main() method.
Hint: the method which adds two objects takes one object as the only parameter and the return type of this method is also the object of same type.

```
class Adds
{
int x;
int y;
Adds()
{
};
Adds(int a,int b)
{
x=a;
y=b;
}
Adds sum(Adds o)
{
Adds temp=new Adds();
temp.x=x+o.x;
temp.y=y+o.y;
return temp;
}
void display()
{
System.out.println(x+" "+y);
}
}
class New
{
public static void main(String args[])
{
Adds obj1=new Adds(2,5);
Adds obj2=new Adds(8,7);
Adds obj3=new Adds();
obj3=obj1.sum(obj2);
obj3.display();
}
}
```

OUTPUT:

```
D:\Himadri Panwar A1>javac New.java

D:\Himadri Panwar A1>java New
10 12
```

PROGRAM 17

Write a program which calculates the number of objects created with the help of a static variable. Display the result three times such that each time number of objects created are different. Use a static method to increase the static variable by one upon every creation of objects and display the result using another method. Use different class for main() method.

```
class staticc
{static int x=0;
static void inc()
{
x++;
}
static void display()
{
inc();
System.out.println("no.of static variables are"+x);
}
}
class Staticr
{
public static void main(String args[])
{
staticc oj1=new staticc();
oj1.display();
staticc oj2=new staticc();
oj2.display();
staticc oj3=new staticc();
oj3.display();
}
}
```

OUTPUT:

```
D:\Himadri Panwar A1>javac Staticr.java

D:\Himadri Panwar A1>java Staticr
no.of static variables are1
no.of static variables are2
no.of static variables are3
```