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Experiment No.	**1**

AIM:	Programs on Encapsulation. Write a program to demonstrate classes and objects
Program 1	
PROBLEM STATEMENT:	Write a program to find all prime numbers in the given range and print them. Also, print the told no. of prime numbers. Use concept of class & Objects.

PROGRAM:	import *java.util. *;*
	import *java.lang.Math;*
	public class Prime {
	  public int CheckPrime(int n) {
	  if (n==0 || n==1) {
	  return 0;
	  }
	  for (int i=2;i<=Math.sqrt(n);i++) {
	  if (n%i==0) {
	  return 0;
	  }
	  }
	  return 1;
	  }
	  public static void main(String[] args) {
	  Scanner input = new Scanner(System.*in*);
	  Prime obj = new Prime();
	  System.*out*.println("Enter the lower range: ");
	  int lower = input.nextInt();
	  System.*out*.println("Enter the upper range: ");
	  int upper = input.nextInt();

```
        int count = 0;
        for (int i=lower;i<=upper;i++) {
            if (obj.CheckPrime(i)==1) {
                System.out.print(i+" ");
                count++;
            }
        }
        System.out.println("\nTotal prime numbers are: " + count);
    }
}
```

RESULT:

```
PS D:\Java Practicals\Experiment_1> cd "d:\Java Practicals\Exper
Enter the lower range:
10
Enter the upper range:
100
11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71 73 79 83 89 97
Total prime numbers are: 21
PS D:\Java Practicals\Experiment_1>
```

Program 2

PROBLEM STATEMENT:

A Mersenne prime is a prime number that has the form 2^p-1 where p is a positive number greater than 1. Write a program that calculates candidate Mersenne primes $2^p - 1$ for $2 \leq p \leq 31$. Then test the number to see if it is prime. If you detect that the number is prime, print out the number and the value of p.

PROGRAM:

```
import java.util. *;
import java.lang.Math;
public class MerPrime {
    public int CheckPrime(double n) {
        if (n==0 || n==1) {
            return 0;
        }
        for (int i=2;i<=Math.sqrt(n);i++) {
            if (n%i==0) {
```

```
            return 0;
        }
    }
    System.out.print((int)n+" ");
    return 1;
  }
  public static void main(String[] args) {
    MerPrime obj = new MerPrime();
    double a;
    for(int i=2;i<=31;i++) {
      a = Math.pow(2.0,(double)i)-1.0;
      obj.CheckPrime(a);
    }
  }
}
```

RESULT:

```
PS D:\Java Practicals\Experiment_3> cd "c
}
3 7 31 127 8191 131071 524287 2147483647
PS D:\Java Practicals\Experiment_1>
```

Program 3

PROBLEM STATEMENT:

To write a java program to print grade of the student
1. 75% and above - Distinction
2. 60% to 74% - first class
3. 45% to 59% - second class
4. below 44% - fail class

PROGRAM:

```
import java.util. *;
public class Grade {
  public static void main(String[] args) {
    Scanner input = new Scanner(System.in);
    do{
      System.out.println("Enter the percentage of the student: ");
      int perc = input.nextInt();
      if(perc>=75) {
```

```
            System.out.println("Grade: Distinction");
        } else if(perc>=60) {
            System.out.println("Grade: First Class");
        } else if(perc>=45) {
            System.out.println("Grade: Second Class");
        } else {
            System.out.println("Grade: Fail");
        }
        System.out.println("Do you want to continue? (y=1/n=0)");
      }while(input.nextInt()!=0);
   }
}
```

RESULT:

```
PS D:\Java Practicals\Experiment_1> cd
Enter the percentage of the student:
53
Grade: Second Class
Do you want to continue? (y=1/n=0)
1
Enter the percentage of the student:
89
Grade: Distinction
Do you want to continue? (y=1/n=0)
1
Enter the percentage of the student:
42
Grade: Fail
Do you want to continue? (y=1/n=0)
1
Enter the percentage of the student:
69
Grade: First Class
Do you want to continue? (y=1/n=0)
0
PS D:\Java Practicals\Experiment_1>
```

Program 4	
PROBLEM STATEMENT:	4. Find GCD of Two Numbers Using for Loop

PROGRAM:	import *java.util. *;*
	import *java.lang.Math;*
	public class Gcd {
	  public static int gcd(int a, int b) {
	  if(b==0)
	  return a;
	  else if(a==0)
	  return b;
	  if(a>b)
	  return gcd(a-b, b);
	  else
	  return gcd(b-a, a);
	  }
	  public static void main(String[] args) {
	  Scanner input = new Scanner(System.*in*);
	  int a,b;
	  do{
	  System.*out*.println("Enter the first number: ");
	  a = input.nextInt();
	  System.*out*.println("Enter the second number: ");
	  b = input.nextInt();
	  System.*out*.println("GCD of "+a+" and "+b+" is "+gcd(a,b));
	  System.*out*.println("Do you want to continue? (y=1/n=0)");
	  }while(input.nextInt()!=0);
	  }
	}

RESULT:

```
PS D:\Java Practicals\Experiment_1> cd '
Enter the first number:
10
Enter the second number:
12
GCD of 10 and 12 is 2
Do you want to continue? (y=1/n=0)
0
PS D:\Java Practicals\Experiment_1>
```

CONCLUSION:	In this experiment, we learned how to write basic programs in java by using control flow statements and loops.