1. Student marks:

```
package com.torryharris.mainpath;
import java.util.Scanner;
public class Main
{
        public static void main(String[] args)
        {
                Scanner sc = new Scanner(System.in);
                System.out.println("Enter the mark : ");
                int mark = sc.nextInt();
                char opt;
                if(mark>=90)
                {
                        opt ='A';
                }
                else if (80<=mark && mark<=89)
                {
                        opt ='B';
                }
                else if (70<=mark && mark<=79)
                {
                        opt ='C';
                }
                else if (60<=mark && mark<=69)
                {
                        opt ='D';
                }
                else if (50<=mark && mark<=59)
                {
                        opt ='E';
                }
                else
                {
                        opt = 'F';
                }
                switch(opt)
                {
                        case 'A' :
                        {
                                System.out.println("Grade is : A")
                        }
                        case 'B' :
                        {
                                System.out.println("Grade is : B")
                        }
```

```java
                        case 'C' :
                        {
                                System.out.println("Grade is : C")
                        }
                        case 'D' :
                        {
                                System.out.println("Grade is : D")
                        }
                        case 'E' :
                        {
                                System.out.println("Grade is : E")
                        }
                        default:
                        {
                                System.out.println("Grade is : F")
                        }
                }
        }
}
```

Output 1:

```
Enter the mark :
89
Grade is : B


Process finished with exit code 0
```

Output 2:

```
Enter the mark :
45
Grade is : F


Process finished with exit code 0
```

2. PASCAL'S TRIANGLE :

Main.java
```java
package com.torryharris;

public class Main
{
        public static void main(String[] args)
        {
                int n=4, I, j;
                Pascal p = new Pascal();
                for(int i=0;i<=n;i++)
                {
                        for(j=0;j<=n;j++)
                        {
                                System.out.println(" ");
                        }
                        for(j=0;j<=i;j++)
                        {
                                System.out.print(" "+p.factorial(i)/(p.factorial(i-j)  * p.factorial(j)));
                        }
                        System.out.println();
                }

        }
}
```

Pascal.java

```java
package com.torryharris;
public class Pascal
{
        public int factorial(int I)
        {
                if(i==0)
                {
                        return 1;
                }
                return i*factorial(i-1);
        }
}
```

Output :

```
"C:\Program Files\OpenJDK\jdk-8.0.262.10-hotspot\bin\java.exe" ...
      1
     1 1
    1 2 1
   1 3 3 1
  1 4 6 4 1

Process finished with exit code 0
```

3. MAGIC NUMBER :

```java
package com.torryharris.mainpath;
import java.util.Scanner;
public class Main
{
        public static void main (String[] args)
        {
                int n;
                Scanner sc = new Scanner(System.in);
                System.out.println("Enter the number : ");
                n= sc.nextInt();

                if(isMagic(n));
                {
                        System.out.println(n+" is a Magic Number.");
                }
                else
                {
                        System.out.println(n+" is not a Magic Number.");
                }
        }

        public static boolean isMagic(int n)
        {
                int sum = 0;
                while (n > 0 || sum > 9)
                {
                        if(n==0)
```

```
                {
                        n = sum;
                        sum = 0;
                }
                sum += n%10;
                n/=10;
        }
        return (sum == 1);
    }
}
```

Output 1 :

```
"C:\Program Files\OpenJDK\jdk-8.0.262.10-hotspot\bin\java.exe" ...
Enter the number to check wheather it is a magic number :
1234
1234 is a Magic Number

Process finished with exit code 0
```

Output 2 :

```
"C:\Program Files\OpenJDK\jdk-8.0.262.10-hotspot\bin\java.exe" ...
Enter the number to check wheather it is a magic number :
12345
12345 is Not a Magic Number

Process finished with exit code 0
```

3. GCD and LCM :

```java
package com.torryharris;

import java.util.Scanner;

public class Main
{
        public static void main (String[] args)
        {
                int temp1, temp2, num1, num2, temp, hcf, lcm;

                Scanner sc = new Scanner(System.in);
                System.out.println("Enter first number : ");
                num1 = sc.nextInt();
                System.out.println("Enter second number : ");
                num2 = sc.nextInt();
                sc.close();

                temp1 =num1;
                temp2 =num2;
                while(temp2 != 0)
                {
                        temp = temp2;
                        temp2 = temp1 % temp2;
                        temp1 = temp;
                }

                hcf = temp1;
                lcm = (num1*num2)/hcf;

                System.out.println("HCF of input numbers: "+hcf);
                System.out.println("LCM of input numberes: "+lcm);

        }
}
```

Output :

```
Enter First Number: 10
Enter Second Number: 35
HCF of input numbers: 5
LCM of input numbers: 70


Process finished with exit code 0
```

4. PALINDROME OF A NUMBER :
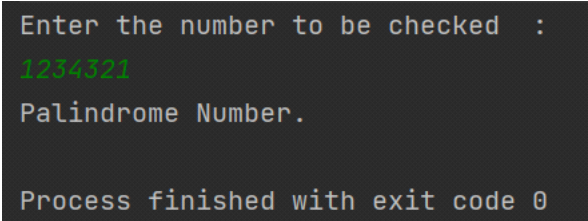
```java
package com.th;
import java.util.Scanner;
public class Main
{
        public static void main (String[] args)
        {
                int rem, sum =0, temp, n;
                Scanner sc = new Scanner(System.in);
                n = sc.nextInt();

                temp = n;

                while(n >0)
                {
                        rem = n % 10;
                        sum = (sum * 10) + rem;
                        n = n/10;
                }
                if (temp == sum)
                {
                        System.out.println("Palindrome Number");
                }

                else
                {
                        System.out.println("Not a Palindrome Number");
                }
        }
}
```

Output :

```
Enter the number to be checked  :
1234321
Palindrome Number.

Process finished with exit code 0
```

5. KRISHNAMURTHY'S NUMBER :

```java
package com.th;
public class Main
{
        public static void Main(String[] args)
        {
                int n = 145;
                if(isKrishnaMurthy(n))
                {
                        System.out.println(n+" is Krishnamurthy's Number");
                }
                else
                {
                        System.out.println(n+" is not a Krishnamurthy's Number");
                }
        }

        static int factorial(int n)
        {
        int fact = 1;
        while(n != 0)
        {
                fact = fact * n;
                n--;
        }
        return fact;
        }

        static boolean isKrishnaMurthy()
        {
                int sum = 0;
                int temp = n;
                while (temp != 0)
                {
                        sum += factorial(temp%10);
                        temp = temp / 10;
                }
                return (sum == n);
        }
}
```

Output :

```
"C:\Program Files\OpenJDK\jdk-8.0.262.10-hotspot\bin\java.exe" ...
145 is Krishnamurthy Number

Process finished with exit code 0
```

6. Sum of Even digits in a given number :

```java
package com.th;
public class Main
{
        public static void main(String[] args)
        {
                int n = 1234;
        }
        static int reverse(int n)
        {
                int rev = 0;
                while (n!=0)
                {
                        rev = (rev*10) + (n%10);
                        n/=10;
                }
                return rev;
        }
        static void getSum(int n)
        {
                n = reverse(n);
                int sumOdd = 0, sumEven = 0,c=1;
                while (n!=0)
                {
                        if(c%2 == 0)
                        {
                                sumEven += n % 10;
                        }
                        else
                        {
                                sumOdd += n % 10;
                        }
                        n/=10;
                        c++;
                }
                System.out.println("Sum Odd : "+sumOdd);
                System.out.println("Sum Even : "+sumEven);
        }
}
```

Output :

7. FIBONACCI SERIES :

```
package com.thbs;
import java.util.*;
public class Main
{
        public static void main(String[] args)
        {
                // write your code here
                Scanner s =new Scanner (System.in);
                int fib1=0,fib2=1,fib3,n,count=0;
                System.out.println("Enter n");
                n= s.nextInt();
                System.out.println(fib1+"\n"+fib2);count=2;
                while(count<n)
                {
                        fib3=fib1+fib2;
                        count++;
                        System.out.println(fib3);
                        fib1=fib2;fib2=fib3;
                }
        }
}
```

Output :

```
Enter n
10
0
1
1
2
3
5
8
13
21
34

Process finished with exit code 0
```

8. Celcius to Faranheit :

```java
package com.thbs;
import java.util.*;
public class Main
{
      public static void main(String[] args)
      {
            // write your code here
            Scanner s=new Scanner(System.in);
            System.out.println("enter the value in Celsius");
            float c=s.nextFloat();
            float F;
            F=(c*9/5)+32;
            System.out.println("Value in Fahrenheit is "+F);
      }
}
```

Output:

```
enter the value in Celsius
96
Value in Fahrenheit is 204.8

Process finished with exit code 0
```

9. TO FIND THE MAXIMUM NUMBER IN THE ARRAY:

```java
package com.th;
import java.util.*;
public class test2
{
    public static void main(String[] args)
    {
        // write your code here
        Scanner s=new Scanner(System.in);
        int n;
        System.out.println("Enter n : ");
        n=s.nextInt();
        int[] a = new int[n];
        System.out.println("Enter the elements : ");
        for(int i=0;i<n;i++)
        {
            a[i]=s.nextInt();
        }
        int max=a[0];
        for(int i=1;i<n;i++)
        {
            if(a[i]>max)max=a[i];
        }
        System.out.println("max num in array is "+max);
    }
}
```

Output:

```
Enter n :
5
Enter the elements :
12
34
45
6
23
max num in array is 45


Process finished with exit code 0
```

10. TO MERGE TWO SORTED ARRAY :

```java
package com.th;
import java.util.*;
public class test2
{
    public static void main(String[] args)
    {
        // write your code here
        Scanner s=new Scanner(System.in);
        System.out.println("enter n of array 1");
        int n=s.nextInt();
        int[] a = new int[n];
        System.out.println("Enter 2 sorted array");
        System.out.println("Enter the elements of array 1 in sorted order");
        for(int i=0;i<n;i++)
        {
            a[i]=s.nextInt();
        }
        System.out.println("enter n of array 2");
        int m=s.nextInt();
        int[] b = new int[m];
        System.out.println("Enter the elements of array 2 in sorted order");
        for(int i=0;i<m;i++)
        {
            b[i]=s.nextInt();
        }
        int i=0,j=0,k=0;
        int[] c = new int[m+n];
        while(i<m && j<n )
        {
            if(a[i]<b[j])
                c[k++]=a[i++];
            else
```

```
            c[k++]=b[j++];
        }
        System.out.println("Elements in sorted order");
        for(i=0;i<(m+n);i++)
        {
            System.out.println(c[i]);
        }
    }
}
```

Output:

enter n of array 1
4
Enter 2 sorted array
Enter the elements of array 1 in sorted order
2
4
6
8
enter n of array 2
4
Enter the elements of array 2 in sorted order
3
5
7
9
Elements in sorted order
2
3
4
5
6
7
8
9

11. REPEATED ELEMENTS IN THE ARRAY :

```
package com.th;
public class test2 {

    public static void main(String[] args) {
        // write your code here
        int arr[]={50,20,10,40,20,20,10,10,60,30,70};
        int temp[]=new int[arr.length];
        int count = 0;
```

```java
    for(int i=0;i<arr.length;i++){
        int element = arr[i];
        boolean flag = false;
        for(int j=0;j<count;j++){
            if(temp[j]==element){
                flag = true;
                break;
            }
        }
        if(flag){
            continue;
        }
        for(int j=i+1;j<arr.length;j++){
            if(arr[j] == element){
                temp[count++]=element;
                break;
            }
        }
    }
    System.out.println("total repeted elements: "+count);
    System.out.println("repeted elements are: ");
    for(int i=0;i<count;i++){
        System.out.println(temp[i]+" ");
    }
  }
}
```

Output :

```
"C:\Program Files\OpenJDK\jdk-8.0.262.10-hotspot\bin\java.exe" ...
total repeted elements: 2
repeted elements are:
20
10


Process finished with exit code 0
```

12. REMOVE REPEATED ELEMENTS IN THE ARRAY :

```java
package com.th;

import java.util.Arrays;

public class test2 {
```

```java
    public static void main(String[] args) {
        // write your code here
        int arr[] = {30, 50, 20, 50, 10, 20, 30, 10, 10, 40};
        int newArr[] = removeDuplicates(arr);
        System.out.println("Original array: " + Arrays.toString(arr));
        System.out.println("After removing duplicates: " + Arrays.toString(newArr));
    }
    public static int[] removeDuplicates(int[] arr) {
        int index = 1;
        for (int i = 1; i < arr.length; i++) {
            int element = arr[i];
            for(int j=0; j<index; j++) {
                if(arr[j] == element){
                    break;
                }
                if(j == index-1) {
                    arr[index++] = element;
                    break;
                }
            }

        }
        return Arrays.copyOf(arr, index);
    }
}
```

Output :

```
"C:\Program Files\OpenJDK\jdk-8.0.262.10-hotspot\bin\java.exe" ...
Original array: [30, 50, 20, 10, 40, 20, 30, 10, 10, 40]
After removing duplicates: [30, 50, 20, 10, 40]

Process finished with exit code 0
```

13. AUTOMORPHIC NUMBER :

package com.torryharris.mainpack;

import java.util.Scanner;

public class Main

{

        public static void main(String[] args) {

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

        System.out.println("Enter the number");

        int n=sc.nextInt();


        if(isAutomorphic(n)){

                System.out.println(n+" is automorphic");

        }else

                System.out.println(n+" is not automorphic");

    }
    static boolean isAutomorphic(int num)

    {

        int square = num * num;

        while (num > 0)

        {

          if (num % 10 != square % 10)

              return false;


          num = num/10;

          square = square/10;

        }

        return true;

    }

}
```
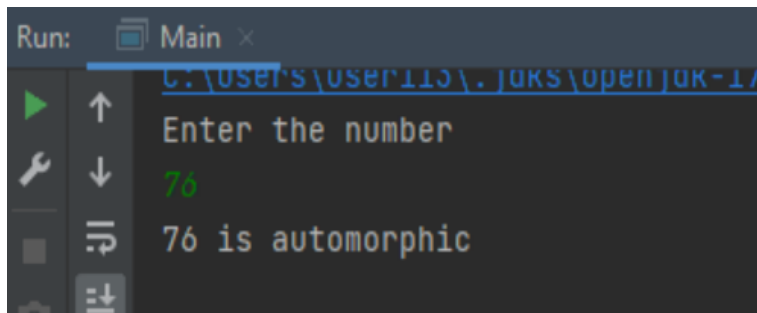
14. BODY MASS INDEX (BMI) :

package com.torryharris.mainpack;

import java.util.Scanner;

public class Main {

  public static void main(String[] args) {

        System.out.print("Please enter your weight in kg: ");

        Scanner s = new Scanner(System.in);

        float weight = s.nextFloat();

        System.out.print("Please enter your height in m: ");

        float height = s.nextFloat();

        calculateBMI(weight,height);

    }

    private static void calculateBMI(float weight,float height){

     float bmi = (weight)/(height*height);

     System.out.println("Your BMI is: "+bmi);

       printBMICategory(bmi);

    }

```java
    private static void printBMICategory(float bmi) {

        if(bmi < 18.5) {

            System.out.println("You are thinness");

        }else if (bmi < 25) {

            System.out.println("You are normal");

        }else if (bmi < 30) {

            System.out.println("You are overweight");

        }else {

            System.out.println("You are obese");

        }

    }

}
```
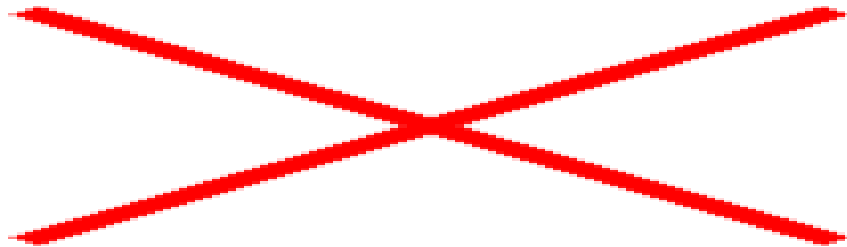
15. PERFECT NUMBER :

```java
package com.torryharris.mainpack;

import java.util.Scanner;

public class Main {

  public static void main(String args[])

    {

        long n, sum=0;

        Scanner sc=new Scanner(System.in);

        System.out.print("Enter the number: ");
```

```
n=sc.nextLong();

int i=1;


while(i <= n/2)

{

   if(n % i == 0)

   {

      sum = sum + i;

   }

   i++;

}

if(sum==n)

{

   System.out.println(n+" is a perfect number.");

}

else

   System.out.println(n+" is not a perfect number.");

  }

 }
```
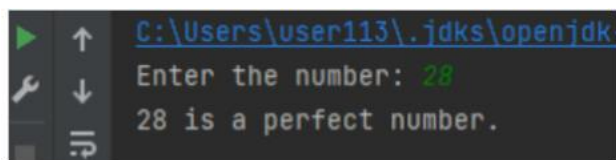
Output :


```
C:\Users\user113\.jdks\openjdk
Enter the number: 28
28 is a perfect number.
```

16. SECOND LARGEST NUMBER IN THE ARRAY :

package com.torryharris.mainpack;

```java
import java.util.Scanner;

public class Main {

    public static void main(String[] args) {
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter the array size");
        int n=sc.nextInt();
        int ar[]=new int[n];
        System.out.println("Enter the "+n+"array elements");
        for(int i=0;i<n;i++)
            ar[i]=sc.nextInt();
        System.out.println("Second largest num: "+getSecondLargest(ar,n));
    }
    public static int getSecondLargest(int[] a, int total){
        int temp;
        for (int i = 0; i < total; i++)
        {
            for (int j = i + 1; j < total; j++)
            {
                if (a[i] > a[j])
                {
                    temp = a[i];
                    a[i] = a[j];
                    a[j] = temp;
                }
            }
        }
```
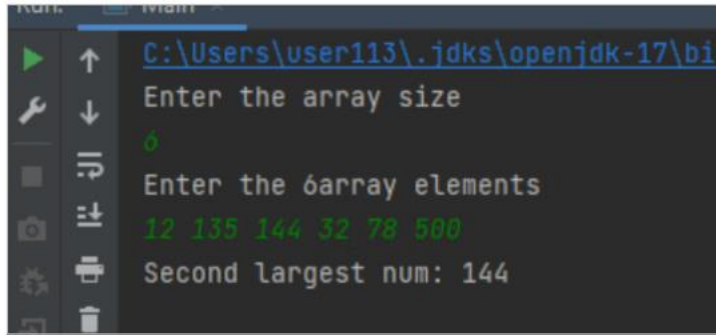
```
        return a[total-2];
    }
}
```

Output :

DISARIUM NUMBER :

A number whose sum of its digits powered with their respective position is

equal to the original number is called disarium number.

Examples of disarium numbers are- 135, 175, 518 and e.tc.

Number = 89 => 81 + 92 = 8 + 81 = 89 So, 89 is a disarium number.

Number = 135 => 11 + 32 + 53 = 1 + 9 + 125 = 135 Hence 135 is a disarium number.

Number = 518 => 51 + 12 + 83 = 5 + 1+ 512 = 518 So, 518 is a disarium number.

DisariumNumber

package com.thbs;

public class Main

{

        public static void main(String[] args) {

        int num = 175, sum = 0, rem = 0, n;//1^1+7^2+5^3=175

        int len = calculateLength(num);

        n = num;

```java
        while(num > 0)

        {

                rem = num%10;

                sum = sum + (int)Math.pow(rem,len);

                num = num/10;

                len--;

        }


        //Checks whether the sum is equal to the number itself

        if(sum == n)

                System.out.println(n + " is a disarium number");

        else

                System.out.println(n + " is not a disarium number");

    }

    public static int calculateLength(int n)

    {

        int length = 0;

        while(n != 0)

        {

                length = length + 1;

                n = n/10;

        }

        return length;

    }

}
```

Output:

175 is a disarium number

15)
```java
package com.torryharris;
import java.util.Arrays;
public class Main {
    public static int[] addElement(int[] arr, int element) {
        int temp[] = new int[arr.length+1];
        for (int i = 0; i < arr.length; i++) {
            temp[i] = arr[i];
        }
        temp[arr.length] = element;
        return temp;
    }

    public static void main(String[] args) {
        int arr[] = { 30, 50, 20, 40, 10};
        int element = 99;
        System.out.println("Original array: " + Arrays.toString(arr));
        arr = addElement(arr, element);
        System.out.println("New array: " + Arrays.toString(arr));
    }
}
```

Output:
Original array: [30, 50, 20, 40, 10]
New array: [30, 50, 20, 40, 10, 99]

16)
```java
package com.torryharris;
import java.util.Scanner;
import java.lang.Math;
public class Main {
    static boolean isArmstrong(int n)
    {
        int temp, digits=0, last=0, sum=0;
        temp=n;
        while(temp>0)
        {
            temp = temp/10;
            digits++;
        }
```

```java
        temp = n;
        while(temp>0)
        {
            last = temp % 10;
            sum +=  (Math.pow(last, digits));
            temp = temp/10;
        }
        if(n==sum)
            return true;
        else return false;
    }
    public static void main(String args[])
    {
        int num;
        Scanner sc= new Scanner(System.in);
        System.out.print("Enter the limit: ");
        num=sc.nextInt();
        System.out.println("Armstrong Number up to "+ num + " are: ");
        for(int i=0; i<=num; i++)
            if(isArmstrong(i))
                System.out.print(i+ ", ");
    }
}
```
Output:
Enter the limit: 1000
Armstrong Number up to 1000 are:
0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 153, 370, 371, 407,