**(Done by R.Priyadharshini)**

17.**In mathematics, a number is called an Automorphic number if the square of the number ends with the same number.** Example of [Automorphic numbers](https://en.wikipedia.org/wiki/Automorphic_number) are:- **5, 6, 25, 76, e.t.c..**

**Program:**

**package** com.torryharris;  
import java.util.Scanner;  
public class Main {  
 public static void main(String[] args) {  
 Scanner sc = new Scanner(System.*in*);  
 System.*out*.println("Enter a number");  
 int num= sc.nextInt();  
 int temp=num;  
 int square=num\*num,c=0;  
 while(temp>0)  
 {  
 c++;  
 temp=temp/10;  
 //System.out.println(square);  
 }  
 int last=(int)(square%(Math.*pow*(10,c)));  
 if (num==last)  
 System.*out*.println(num+" is a Automorphic number");  
 else  
 System.*out*.println(num+" is not a Automorphic number");  
 }  
}

**Output:**

**Enter a number**

**5**

**5 is a Automorphic number**

**18.we will develop a Java program for a BMI calculator.**

**The BMI stands for Body Mass Index. It is a measure of health based on height and weight. It can be calculated by taking the weight in kilograms and dividing it by the square of your height in meters.**

**Formula for Calculating BMI in Metric Units,**

**BMI = (Weight in Kg) / (Height in Meters \* Height in Meters)**

**For example,  
weight = 75 kg, height = 1.5 m  
BMI = 75 / (1.5\*1.5) = 33.33**

**Using the range of BMI, individuals are classified as underweight, normal or overweight. Its value is in a specific range for a healthy individual. The following table shows the main BMI categories,**

|  |  |
| --- | --- |
| ***BMI Range*** | ***Category*** |
| **< 18.5** | **Thinness** |
| **18.5 – 25** | **Normal** |
| **25 – 30** | **Overweight** |
| **> 30** | **Obese** |

[**BMI calculator**](https://calculator-online.net/bmi-calculator/)**finds whether the person is underweight, normal, overweight, or obese. The person who wants to lose their want can use a**[**weight loss calculator**](https://www.calculators.org/health/weight-loss.php)**which can tell the daily caloric requirements, and many easy tips to lose weight.**

**Program:**

package com.torryharris;  
import java.util.Scanner;  
public class Main {  
 public static void main(String[] args) {  
 Scanner sc =new Scanner(System.*in*);  
 System.*out*.println("Enter your weight in kg");  
 double weight\_kg = sc.nextDouble();  
 System.*out*.println("Enter your height in kg");  
 double height\_m = sc.nextDouble();  
 double BMI= (weight\_kg/(height\_m\*height\_m));  
 if (BMI<18.5)  
 {  
 System.*out*.println("Under weight");  
 }  
 else if (BMI<25)  
 {  
 System.*out*.println("Normal");  
 }  
 else if (BMI<30)  
 {  
 System.*out*.println("Overwight");  
 }  
 else  
 {  
 System.*out*.println("obese");  
 }  
 }  
}

**output:**

Enter your weight in kg

55

Enter your height in kg

1.5

Normal

**19.Perfect number**:- **A number whose factors sum except itself, is equal to the same number is called a**[**perfect number**](https://en.wikipedia.org/wiki/Perfect_number)**.**

**Program:**

**package** com.torryharris;  
import java.util.Scanner;  
public class Main {  
 public static void main(String[] args) {  
 Scanner sc =new Scanner(System.*in*);  
 System.*out*.print("Enter the number:");  
 int n=sc.nextInt();  
 int sum=0;  
 for (int i=1;i<=(n/2);i++)  
 {  
 if(n%i==0)  
 {  
 sum= sum+i;  
 System.*out*.println(sum);  
 }  
 }  
 if (sum== n)  
 {  
 System.*out*.println(n+" is a perfect number");  
 }  
 else  
 {  
 System.*out*.println(n+" is not a perfect number");  
 }  
 }  
}

**Output:**

**Enter the number:496**

**1**

**3**

**7**

**15**

**31**

**62**

**124**

**248**

**496**

**496 is a perfect number**

**20.Write a Java program to find the second largest number in Java.**

**Program:**

package com.torryharris;  
public class Main {  
 public static void main(String[] args) {  
 int[] arr ={70,100,150,99,50,98};  
 for (int i=0;i<arr.length;i++)  
 {  
 for (int j=i+1;j<arr.length;j++){  
 if (arr[i] < arr[j]){  
 int temp = arr[i];  
 arr[i] = arr[j];  
 arr[j]=temp;  
 }  
 }  
 }  
 System.*out*.println((arr[1])+" is the second largest number.");  
 }  
}

**Output:**

100 is the second largest number.

