1. Write a program to input a 2-digit integer, call it x, where the rightmost digit is non-zero. Compute the integer y which has the same digits as x, but in reverse order. Print out x, y and x+y.

CODE:

```
package test2days;
import java.util.Scanner;

public class Tests {

    public static void main(String[] args) {
         Scanner scanners = new Scanner(System.in);
         System.out.print("Enter a 2-digit integer: ");
         int x = scanners.nextInt();
         int tens = x / 10;
         int units = x % 10;
         int y = units * 10 + tens;
         System.out.println("Original number (x): " + x);
         System.out.println("Reversed number (y): " + y);
         System.out.println("Sum of x and y: " + (x + y));
        }

    }
```

Answer:

```
Enter a 2-digit integer: 23
Original number (x): 23
Reversed number (y): 32
Sum of x and y: 55
```

2. Write a program that plays a word game with the user. The program should ask the user to enter the following: His or her name, His or her age, the name of a city, the name of a college, A profession, A type of animal, A pet's name After the user has entered these items, the program should display the following story, inserting the user's input into the appropriate locations There once was a person named NAME who lived in CITY. At the age of AGE, NAME went to college at COLLEGE. NAME graduated and went to work as a PROFESSION. Then, NAME adopted a(n) ANIMAL named PETNAME. They both lived happily ever after!

CODE:

```java
import java .util.Scanner;

public class Test {

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

        System.out.print("Enter the name: ");
        String name=x.nextLine();

        System.out.print("Enter the age: ");
        int age=x.nextInt();
        x.nextLine();

        System.out.print("Enter name of the city: ");
        String city=x.nextLine();

        System.out.print("Enter name of college: ");
        String college=x.nextLine();

        System.out.print("Enter your profession: ");
        String profession=x.nextLine();

        System.out.print("Enter type of animal: ");
        String animal=x.nextLine();

        System.out.print("Enter pet's name: ");
        String pet=x.nextLine();

        System.out.println("There once was person named "+name+" who lived in "+city +". At age "+ age+ name+" went college at "+
                college +" graduated and went to work as "+ profession+". then"+ name+" adopted 4 "+animal+" named"+pet+". "
                        + "They both lived happily ever after!" );
```

Aswers:

```
Enter the name: MNABELE JOHN
Enter the age: 24
Enter name of the city: MWANZA
Enter name of college: SOKOINE
Enter your profession: DOCTOR OF ANIMALS
Enter type of animal: COWS AND DOGS
Enter pet's name: LIVESTOCK KEEPER

There once was person named MNABELE JOHN who lived in MWANZA. At age 24MNABELE JOHN went college at SOKOINE graduated and went to work as DOCTOR OF ANIMAL
```

3. A particular employee earns $32,500 annually. Write a program that determines and displays what the amount of his gross pay will be for each pay period if he is paid twice a month (24 pay checks per year) and if he is paid bi-weekly (26 check per year).

CODE:

```java
public class Tests {

    public static void main(String[] args) {
        double annualSalary = 32500.00;
        double semiMonthlyPay = annualSalary / 24;
        double biWeeklyPay = annualSalary / 26;
        System.out.printf("Gross pay for each semi-monthly pay period: $%.2f%n", semiMonthlyPay);
        System.out.printf("Gross pay for each bi-weekly pay period: $%.2f%n", biWeeklyPay);
        }

    }
```

Answer:

```
Gross pay for each semi-monthly pay period: $1354.17
Gross pay for each bi-weekly pay period: $1250.00
```

4. A county collects property taxes on the assessed value of property, which is 60 percent of its actual value. For example, if a house is valued at $158,000.00 its assessed value is $94,800. This is the amount the homeowner pays tax on. If the tax rate is $2.64 for each $100.00 of assessed value, the annual property tax for this house would be $2502.72. Write a program that asks the user for the actual value of a piece of property and the current tax rate for each $100.00 of assessed value. The program should then calculate and display how much annual property tax the homeowner will be charged for his property.

   CODE:

```java
import java.util.Scanner;

public class Taxes {

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the actual value of the property: $");
        double actualValue = scanner.nextDouble();
        System.out.print("Enter the tax rate per $100 of assessed value: $");
        double taxRate = scanner.nextDouble();
        double assessedValue = actualValue * 0.60;
        double annualTax = (assessedValue / 100) * taxRate;
        System.out.printf("The assessed value of the property is: $%.2f%n", assessedValue);
        System.out.printf("The annual property tax is: $%.2f%n", annualTax);

    }

}
```

   Answer:

```
Enter the actual value of the property: $34588
Enter the tax rate per $100 of assessed value: $200
The assessed value of the property is: $20752.80
The annual property tax is: $41505.60
```

5. A person is eligible to be a US senator if they are at least 30 years old and have been a US citizen for at least 9 years. To be a US representative these numbers are 25 and 7, respectively. Write a program that accepts a person's age and years of citizenship as input and outputs their e ligibility for the Senate and House

   CODE:

```java
import java.util.Scanner;

public class US_Senator {

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

         System.out.print("Enter your age: ");
        int age = scanner.nextInt();

       System.out.print("Enter your years of US citizenship: ");
        int yearsOfCitizenship = scanner.nextInt();

        boolean eligibleForSenate = age >= 30 && yearsOfCitizenship >= 9;

       boolean eligibleForHouse = age >= 25 && yearsOfCitizenship >= 7;

        if (eligibleForSenate) {
            System.out.println("You are eligible to be a US Senator.");
        } else {
            System.out.println("You are not eligible to be a US Senator.");
        }

        if (eligibleForHouse) {
            System.out.println("You are eligible to be a US Representative.");
        } else {
            System.out.println("You are not eligible to be a US Representative.");
        }

       }
    }
```

Answer:

```
Enter your age: 34
Enter your years of US citizenship: 2012
You are eligible to be a US Senator.
You are eligible to be a US Representative.
```

6. A palindrome is a number or a text phrase that reads the same backwards as forwards. For example, each of the following five-digit integers is a palindrome: 12321, 55555, 45554 and 11611. Write a program that reads in a five-digit integer and determines whether it is a palindrom

CODE:

```java
import java.util.Scanner;

public class Palindrome {

    public static void main(String[] args) {

        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a five-digit integer: ");
        int number = scanner.nextInt();

        int digit1 = number / 10000;
        int digit2 = (number / 1000) % 10;
        int digit4 = (number / 10) % 10;
        int digit5 = number % 10;

        if (digit1 == digit5 && digit2 == digit4) {
            System.out.println(number + " is a palindrome.");
            } else
            { System.out.println(number + " is not a palindrome.");
            }
    }

}
```

Answer:

```
Enter a five-digit integer: 54324
54324 is not a palindrome.
```

7. The owners of the Kwality Supermarket would like to have a program that computes the weekly gross pay of their employees. The user will enter an employee's ID number, the hourly rate of pay, and the number of hours worked for the week. In addition, Kwality Supermarkets would like the program to compute the employee's net pay and overtime pay. Overtime hours, any hours over 40, are paid at 1.5 the regular hourly rate. Net pay is Gross minus deductions. Assume that deductions are made up of income tax (at 15% of gross if the gross exceeds 500.00) and a 20 parking charge.

   CODE:

```java
import java.util.Scanner;

public class Supermarket {

    public static void main(String[] args) {

            Scanner scanner = new Scanner(System.in);

            System.out.print("Enter employee ID: ");
            String employeeID = scanner.nextLine();

            System.out.print("Enter hourly rate of pay: ");
            double hourlyRate = scanner.nextDouble();

            System.out.print("Enter number of hours worked for the week: ");
            double hoursWorked = scanner.nextDouble();

            double regularHours = Math.min(hoursWorked, 40);
            double overtimeHours = Math.max(0, hoursWorked - 40);
            double overtimePay = overtimeHours * hourlyRate * 1.5;
            double grossPay = (regularHours * hourlyRate) + overtimePay;

            double incomeTax = (grossPay > 500.00) ? grossPay * 0.15 : 0;
            double parkingCharge = 20.00;
            double totalDeductions = incomeTax + parkingCharge;

            double netPay = grossPay - totalDeductions;

            System.out.println("\nEmployee ID: " + employeeID);
            System.out.printf("Gross Pay: $%.2f%n", grossPay);
            System.out.printf("Overtime Pay: $%.2f%n", overtimePay);
            System.out.printf("Net Pay: $%.2f%n", netPay);

    }
```

Answer:

```
Enter employee ID: 12
Enter hourly rate of pay: 10000
Enter number of hours worked for the week: 17

Employee ID: 12
Gross Pay: $170000.00
Overtime Pay: $0.00
Net Pay: $144480.00
```

8. Write a program that asks for the names of three runners and the time, in minutes, it took each of them to finish a race. The program should display the names of the runners in the order that they finished

CODE:

```java
import java.util.Scanner;

public class ThreeRunners {

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

            System.out.print("Enter the name of the first runner: ");
            String runner1 = scanner.nextLine();
            System.out.print("Enter the time (in minutes) for " + runner1 + ": ");
            int time1 = scanner.nextInt();

            scanner.nextLine();
            System.out.print("Enter the name of the second runner: ");
            String runner2 = scanner.nextLine();
            System.out.print("Enter the time (in minutes) for " + runner2 + ": ");
            int time2 = scanner.nextInt();

            scanner.nextLine();
            System.out.print("Enter the name of the third runner: ");
            String runner3 = scanner.nextLine();
            System.out.print("Enter the time (in minutes) for " + runner3 + ": ");
            int time3 = scanner.nextInt();

            if (time1 <= time2 && time1 <= time3) {
                System.out.println("1st: " + runner1);
                if (time2 <= time3) {
                    System.out.println("2nd: " + runner2);
                    System.out.println("3rd: " + runner3);
                } else {
                    System.out.println("2nd: " + runner3);
                    System.out.println("3rd: " + runner2);
                }
            } else if (time2 <= time1 && time2 <= time3) {
                System.out.println("1st: " + runner2);
                if (time1 <= time3) {
                    System.out.println("2nd: " + runner1);
                    System.out.println("3rd: " + runner3);
                } else {
                    System.out.println("2nd: " + runner3);
                    System.out.println("3rd: " + runner1);
                }
            } else {
                System.out.println("1st: " + runner3);
                if (time1 <= time2) {
                    System.out.println("2nd: " + runner1);
                    System.out.println("3rd: " + runner2);
                } else {
                    System.out.println("2nd: " + runner2);
                    System.out.println("3rd: " + runner1);
                }
            }
    }

}
```

Answer:

```
Enter the name of the first runner: ATHUMAN SUDY
Enter the time (in minutes) for ATHUMAN SUDY: 10
Enter the name of the second runner: RASH HAMIS
Enter the time (in minutes) for RASH HAMIS: 6
Enter the name of the third runner: MABELE JOHN
Enter the time (in minutes) for MABELE JOHN: 4
1st: MABELE JOHN
2nd: RASH HAMIS
3rd: ATHUMAN SUDY
```

9. A certain CS professor gives 5-point quizzes that are graded on the scale 5-A, 4-B, 3-C, 2-D, 1-F, 0-F. Write a program that accepts a quiz score as an input and uses a decision structure to calculate the corresponding grade.

CODE:

```
package test2days;
import java.util.Scanner;

public class GradeQuiz {

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

            System.out.print("Enter the quiz score (0-5): ");
            int score = scanner.nextInt();

            String grade;
            switch (score) {
                case 5:
                    grade = "A";
                    break;
                case 4:
                    grade = "B";
                    break;
                case 3:
                    grade = "C";
                    break;
                case 2:
                    grade = "D";
                    break;
                case 1:
                case 0:
                    grade = "F";
                    break;
                default:
                    grade = "Invalid score";
            }
            if (score >= 0 && score <= 5) {
                System.out.println("The grade is: " + grade);
            } else {
                System.out.println("Error: " + grade);
            }



    }

}
```

Answer:

```
Enter the quiz score (0-5): 5
The grade is: A
```

10. Write a Java program that uses a while statement and the tab escape sequence \t to print the following table of values

CODE:

```
import java.util.Scanner;
public class While10test {

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int number = scanner.nextInt();
        for (int i = 1; i <= 10; i++) {
            System.out.println(number + " * " + i + " = " + (number * i));
            }

    }

}
```

Answer:

```
Enter a number: 10
10 * 1 = 10
10 * 2 = 20
10 * 3 = 30
10 * 4 = 40
10 * 5 = 50
10 * 6 = 60
10 * 7 = 70
10 * 8 = 80
10 * 9 = 90
10 * 10 = 100
```

11. The distance a vehicle travels can be calculated as follows: distance = speed * time for example, if a train travels 40 miles per hour for three hours, the distance traveled is 120 miles. Write a program that asks the user for the speed of a vehicle (in miles per hour) and the number of hours it has traveled. It should then use a loop to display the distance the vehicle has traveled for each hour of that time period. Here is an example of the desired output:
    What is the speed of the vehicle in mph? 40e
    How many hours has it traveled? 3e

Hour	Distance Traveled
1	40
2	80

3 120

CODE:

```
import java.util.Scanner;
public class DistanceTravell {

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

            System.out.print("Enter the speed of the vehicle in mph: ");
            int speed = scanner.nextInt();
            System.out.print("Enter the number of hours traveled: ");
            int hours = scanner.nextInt();

            System.out.println("Hour\tDistance Traveled");

            for (int hour = 1; hour <= hours; hour++) {
                int distance = speed * hour;
                System.out.println(hour + "\t" + distance);
            }


    }

}
```

Answer:

```
Enter the speed of the vehicle in mph: 60
Enter the number of hours traveled: 3
Hour    Distance Traveled
1       60
2       120
3       180
```

12. Write a program that uses nested loops to collect data and calculate the average rainfall over a period of years. The program should first ask for the number of years. The outer loop will iterate once for each year. The inner loop will iterate twelve times, once for each month. Each iteration of the inner loop will ask the user for the inches of rainfall for that month. After all iterations, the program should display the number of months, the total inches of rainfall, and the average rainfall per month for the entire period.

    CODE:

```java
import java.util.Scanner;
public class Rainfall {

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

            System.out.print("Enter the number of years: ");
            int years = scanner.nextInt();

            int totalMonths = 0;
            double totalRainfall = 0;

            for (int year = 1; year <= years; year++) {
                System.out.println("Year " + year + ":");

                for (int month = 1; month <= 12; month++) {
                    System.out.print("Enter the inches of rainfall for month " + month + ": ");
                    double rainfall = scanner.nextDouble();
                    totalRainfall += rainfall;
                    totalMonths++;
                }
            }
            double averageRainfall = totalRainfall / totalMonths;

            System.out.println("\nNumber of months: " + totalMonths);
            System.out.printf("Total inches of rainfall: %.2f%n", totalRainfall);
            System.out.printf("Average rainfall per month: %.2f inches%n", averageRainfall);

    }

}
```

Answer:

```
Enter the number of years: 1
Year 1:
Enter the inches of rainfall for month 1: 10
Enter the inches of rainfall for month 2: 20
Enter the inches of rainfall for month 3: 30
Enter the inches of rainfall for month 4: 40
Enter the inches of rainfall for month 5: 50
Enter the inches of rainfall for month 6: 60
Enter the inches of rainfall for month 7: 70
Enter the inches of rainfall for month 8: 80
Enter the inches of rainfall for month 9: 90
Enter the inches of rainfall for month 10: 100
Enter the inches of rainfall for month 11: 110
Enter the inches of rainfall for month 12: 120

Number of months: 12
Total inches of rainfall: 780.00
Average rainfall per month: 65.00 inches
```

13. Write a program with a loop that asks the user to enter a series of positive numbers. The user should enter a negative number to signal the end of the series. After all the positive numbers have been entered, the program should display their sum.
    CODE:

```java
import java.util.Scanner;
public class Series {

    public static void main(String[] args) {
          Scanner scanner = new Scanner(System.in);
            int sum = 0;

            while (true) {
                System.out.print("Enter a positive number (or a negative number to stop): ");
                int number = scanner.nextInt();

                if (number < 0) {
                    break;
                }
                sum += number;
            }

            System.out.println("The sum of the positive numbers is: " + sum);


    }

}
```

Answer:

```
Enter a positive number (or a negative number to stop): 2
Enter a positive number (or a negative number to stop): 1
Enter a positive number (or a negative number to stop): 2
Enter a positive number (or a negative number to stop): 6
Enter a positive number (or a negative number to stop): 8
Enter a positive number (or a negative number to stop): -1
The sum of the positive numbers is: 19
```

14. Write a program that gets a value from the user and then prints mathematical table as show below. For example, user input 7, it should print like this below

CODE:

```java
import java.util.Scanner;
public class Tables2 {

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int n = scanner.nextInt();
        for (int i = 1; i <= n; i++) {
            for (int j = 1; j <= n; j++) {
                System.out.print(i * j + "\t");
                } System.out.println();
                }
        scanner.close();


    }

}
```

Answer:

```
Enter a number: 5
1       2       3       4       5
2       4       6       8       10
3       6       9       12      15
4       8       12      16      20
5       10      15      20      25
```

15. Write a program with a loop that lets the user enter a series of integers, followed by -99 to signal the end of the series. After all the numbers have been entered, the program should display the largest and smallest numbers entered. Do NOT use any build-in functions.

    CODE:

```java
import java.util.Scanner;
public class SeriesInteger {

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

        int largest = Integer.MIN_VALUE;
        int smallest = Integer.MAX_VALUE;

        while (true) {
            System.out.print("Enter a number (or -99 to stop): ");
            int number = scanner.nextInt();

            if (number == -99) {
                break;
            }
            if (number > largest) {
                largest = number;
            }
            if (number < smallest) {
                smallest = number;
            }
        }
        System.out.println("The largest number is: " + largest);
        System.out.println("The smallest number is: " + smallest);
    }

}
```

Answer:

```
Enter a number (or -99 to stop): 1
Enter a number (or -99 to stop): 2
Enter a number (or -99 to stop): 3
Enter a number (or -99 to stop): 8
Enter a number (or -99 to stop): 10
Enter a number (or -99 to stop): -99
The largest number is: 10
The smallest number is: 1
```