CE251 : JAVA Programming

Assignment - 1

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20DCS103 DEPSTAR CSE : 2 - Batch : B

Assignment :- 1

Descriptive Questions :

1. Why is Java platform-independent?
2. What is java virtual machine?
3. Define following terms: Class, object, encapsulation, inheritance, polymorphism.
4. What are eight basic types in java?
5. What are two steps to create an array?
6. What are three types of java comments?
7. What is significance of main method in java?
8. What is the scope of variable?
9. What is a constructor?
10. What is method overloading?
11. Contrasts method overloading and method overriding.
12. What are the various access specifiers for Java classes?
13. What are Loops in Java? What are three types of loops?
14. What's the purpose of Static methods and static variables?

JAVA Assignment : 1

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1) Why is JAVA platform independent ?

→ Using JAVA virtual machine we can make the byte code understandable to any platform.

→ That is why byte code is known as platform independent. In java, programs are compiled into byte code. So, the java is also platform independent.

2) What is JVM ?

→ JVM is called Java Virtual Machine.

→ A JVM is a virtual machine that enables a computer to run JAVA programs as well as programs written in other languages that are also compiled to JAVA bytecode.

→ The JVM is detailed by a specification that formally describes what is required in JVM implementation.

→ Having a specification ensures interpperability of java programs across different implementations so that program's authors using the JDK [java development kit] need not to worry about idiosyncrasis of the underlying hardware platform.

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3) Class :

A class is a group of objects which have common properties. It is a template or a blueprint from which objects are created.

→ Object :

An entity that has state and behaviour is known as an object. Basically, it is an instance of a class.

→ Encapsulation :

An encapsulation is a mechanism of wrapping data (variables) and code acting the data (methods) together as a single unit. In encapsulation, the variables of a class will be hidden from other classes and can be accessed only through the methods of their current class.

→ Inheritance :

Inheritance in java is a mechanism in which one object acquires all the properties and behaviours of a parent class object.

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→ Polymorphism :

Polymorphism is the ability of an object to take many forms. To make it clear, polymorphism in java allows us to perform the same action in many different ways.

4) What are eight basic data types in java ?

→ There are 8 primitive types of data built into the java language

		Bytes
1) int	: for integer number	4
2) long	: for long integer	8
3) float	: for decimal number	4
4) double	: for long decimal	8
5) boolean	: To get 1 or 0.	1
6) char	: character type	2
7) byte	: Byte type	1
8) short	: short integer	2

5) What are two steps to create an array ?

→ 1] :- With new keyword.

Ex :-
```
int[] marks = new int[5];
marks[0] = 99;
marks[1] = 98;
marks[2] = 94;
marks[3] = 95;
marks[4] = 97;
```

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→ 2] :- Without using new keyword.
Ex :- int [] marks = {98, 99, 97, 95, 94};

6) What are three types of JAVA comments ?

1) Single line comment.
→ Ex :- // This is comment.

2) Multi line comments.
→ Ex :- /* This is 1st comment.
This is 2nd comment.
This is 3rd comment. */

3) Documentation comments.
→ This types of comments are used when writing code for a project/ software package, since it helps to generate a documentation page for reference, which can be used for getting information about methods present, its parameters, etc.

7) What is significance of main method in JAVA ?
→ The main method is static so that JVM can invoke it without instantiating the class.

→ In java programs, the point from where the

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programs starts its execution or simply the entry point of java programs is the main() method.

→ Hence, it is one of the most important methods of JAVA and having proper understanding of it is very important.

8) What is the scope of variable in java ?

→ Scope of variable is the part of the program where the variable is accessible.

→ The sope of the variable can be determined at compile time and independent of function call stack.

→ The member variables must be declared inside the class and outside any function. They can be accessed directly by anywhere in the class.

→ The local variables are declared inside a method and they can not be accessed by outside method.

→ When we declare variables inside the brackets/ curly brackets then it will access by the methods and the functions of that class only.

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9) What is constructor ?

→ Constructor is a block of codes similar to the method.
→ It is a method called when an instance of class is created.
→ At the time of calling constructor, memory for the object is allocated in the memory.
→ It is special type of method used to initialize an object.
→ Every time an object is created using the new() keyword, at least one constructor is called.

10) What is method overloading ?

→ Method overloading allows different methods to have same name, but different signatures where the signature can differ by the number of input parameters or type of type of input parameters or both.

→ Method overloading is related to compile-time polymorphism.

→ Example :-

```
public class Sum
{
```

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```
public int sum(int x, int y)
{
    return (x+y);
}
public int sum(int x, int y, int z)
{
    return (x+y+z);
}
public double sum(double x, double y)
{
    return (x+y);
}

public static void main(String args[])
{
    Sum s = new sum();
    System.out.println(s.sum(10,20));
    System.out.println(s.sum(10,20,30));
    System.out.println(s.sum(10.5, 20.5));
}
}
```

→ Output :-

```
30
60
31.0
```

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11) Contrasts method overloading and method overriding.

*	Method overloading	Method overriding
→	Method overloading is used to increase the readability of the program.	→ Method overriding is used to provide the specific implementation of the method that is already provided by its super class.
→	Method overloading is performed within a class.	→ Method overriding occurs in two classes that have inheritance relationship.
→	In method overloading parameters must be different.	→ In method overriding parameters must be same.
→	It is the example of compile time polymorphism	→ It is the example of run time polymorphism

12) What are various access specifiers in java classes ?

→ The access modifiers specifies the accessibility or scope of a field, method or class.

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1] private :

→ The access level of a private modifier is only within the class. It can not be accessed from outside the class.

2] Default :

→ The access level of a default modifier is only within the package.

→ It cannot be accessed from outside the package.

→ When the access level is not specified, the default will be there.

3] Protected :

→ The access level of a protected modifier is within a package and outside the package through child class.

→ If child class is not made, it cannot be accessed from outside the class.

4]. Public :

→ The access level of a public modifier is everywhere.

→ It can be accessed from within the class, outside the class, within the package and outside the package.

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13) What are loops in JAVA ?
What are three types of loops ?

→ Looping is a feature which facilitates the execution of a set of instructions repeatedly while some conditions evaluate true.

→ There are three types of loops in JAVA :

1] while loop

→
```
while (boolean condition)
{
- - - - - -
}
```

→ When condition is true the loop will be executed or else it will not execute the body of the loop.

2] for loop

→
```
for (initialization ; testing condition ;
                    increment/decrement)
{
- - - - - -
}
```

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→ The for loop initializes the variable first then it will check the condition and if it is true then the loop body will be executed or it will terminate the entire loop.

→ When the loop body is executed then the increment / decrement occurs and again the condition will be checked

3]. do while loop

→
```
do
{
  ----
} while (condition);
```

→ In this loop, first the body of the loop is executed and then the conditions will be checked.

→ If the condition is true then it will again execute the loop body and then it will again check the condition. until the condition is not satisfied.

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14) What is the purpose of static method and Static variables ?

→ The static varidble is a class level variable and it is common to all the class objects.

→ A static method manipulates the static variables in class. It belongs to the class instead of the class objects and can be invoked without using a class object.

→ The static initialization blocks can only initialize the static instance variable. These blocks are executed once when the class is loaded.

— X —

Programs :

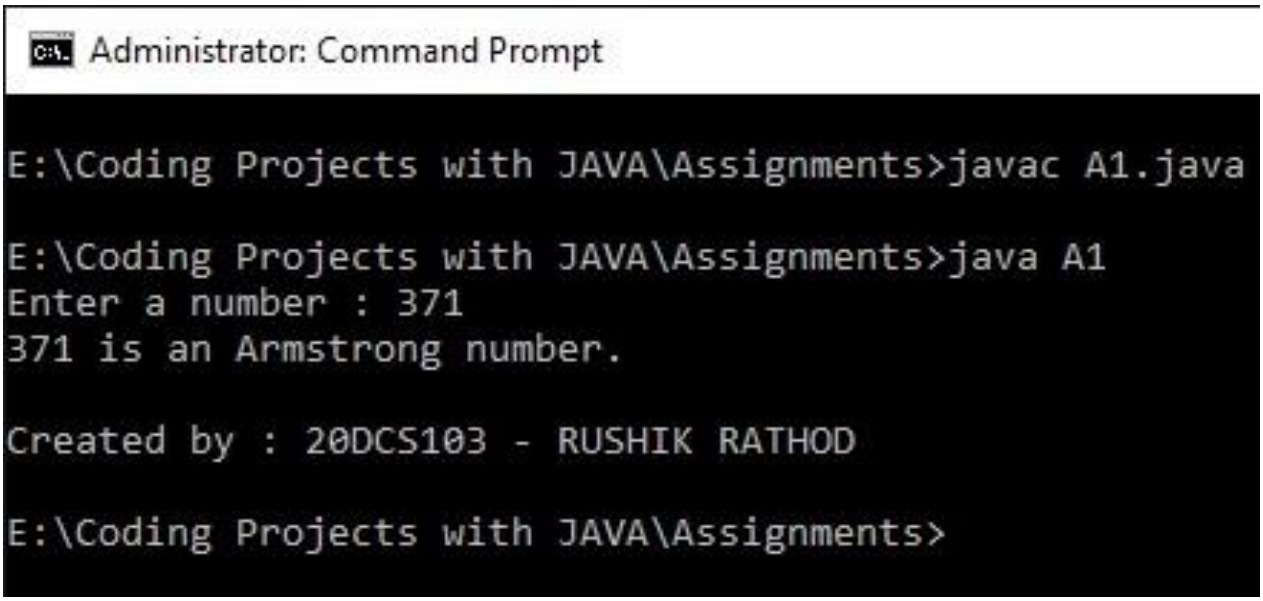
1. **Write a java program to find input value is Armstrong number or not.**

SOURCECODE:

```
import java.util.Scanner;


public class A1{
   public static void main(String[] args) {


      int number, originalNumber, remainder, result = 0;
      System.out.print("Enter a number : ");
      Scanner sc = new Scanner(System.in);
      number = sc.nextInt();
      originalNumber = number;


      while (originalNumber != 0)
      {
         remainder = originalNumber % 10;
         result += Math.pow(remainder, 3);
         originalNumber /= 10;
      }


      if(result == number)
         System.out.println(number + " is an Armstrong number.");
```

```
        else
            System.out.println(number + " is not an Armstrong number.");

        System.out.println("\nCreated by : 20DCS103 - RUSHIK RATHOD");
    }
}
```

OUTPUT:


Administrator: Command Prompt
E:\Coding Projects with JAVA\Assignments>javac A1.java
E:\Coding Projects with JAVA\Assignments>java A1
Enter a number : 371
371 is an Armstrong number.
Created by : 20DCS103 - RUSHIK RATHOD
E:\Coding Projects with JAVA\Assignments>

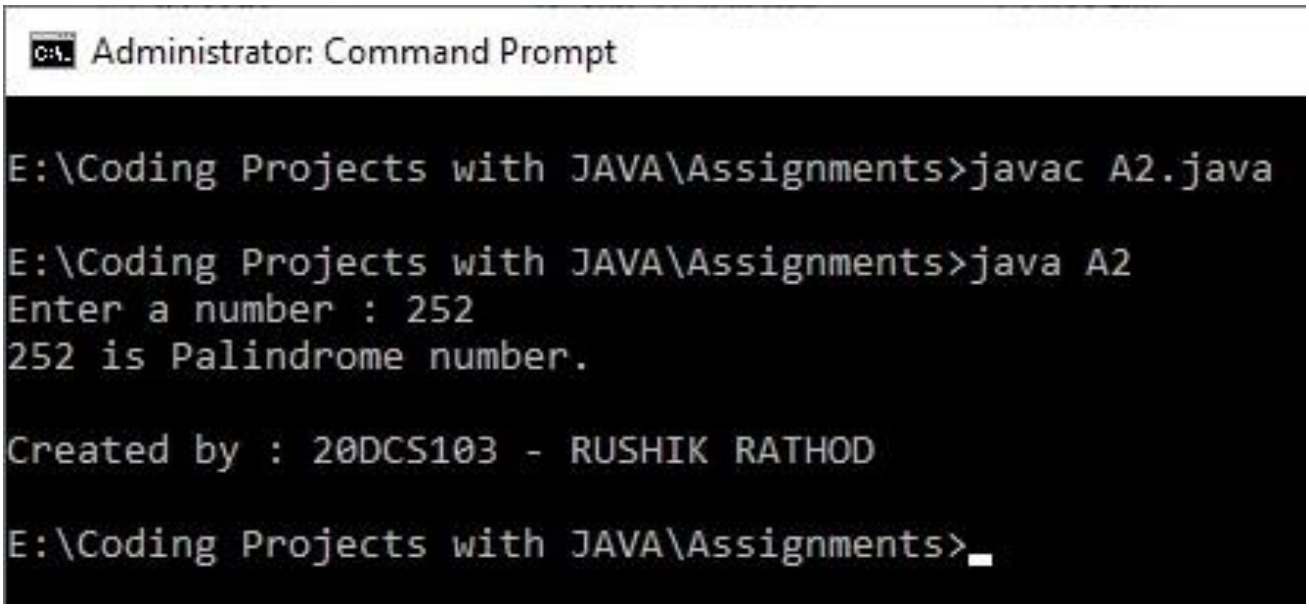
2. Write a java program to find input value is Palindrome number or not.

SOURCECODE:

```
import java.util.Scanner;

public class A2 {
   public static void main(String[] args) {

      int num, reversedNum = 0, remainder;

      Scanner sc = new Scanner(System.in);
      System.out.print("Enter a number : ");
      num = sc.nextInt();

      int originalNum = num;

      while (num != 0) {
         remainder = num % 10;
         reversedNum = reversedNum * 10 + remainder;
         num /= 10;
      }

      if (originalNum == reversedNum) {
         System.out.println(originalNum + " is Palindrome number.");
```

```
        } else {
            System.out.println(originalNum + " is not Palindrome number.");
        }

        System.out.println("\nCreated by : 20DCS103 - RUSHIK RATHOD");
    }
}
```

OUTPUT:

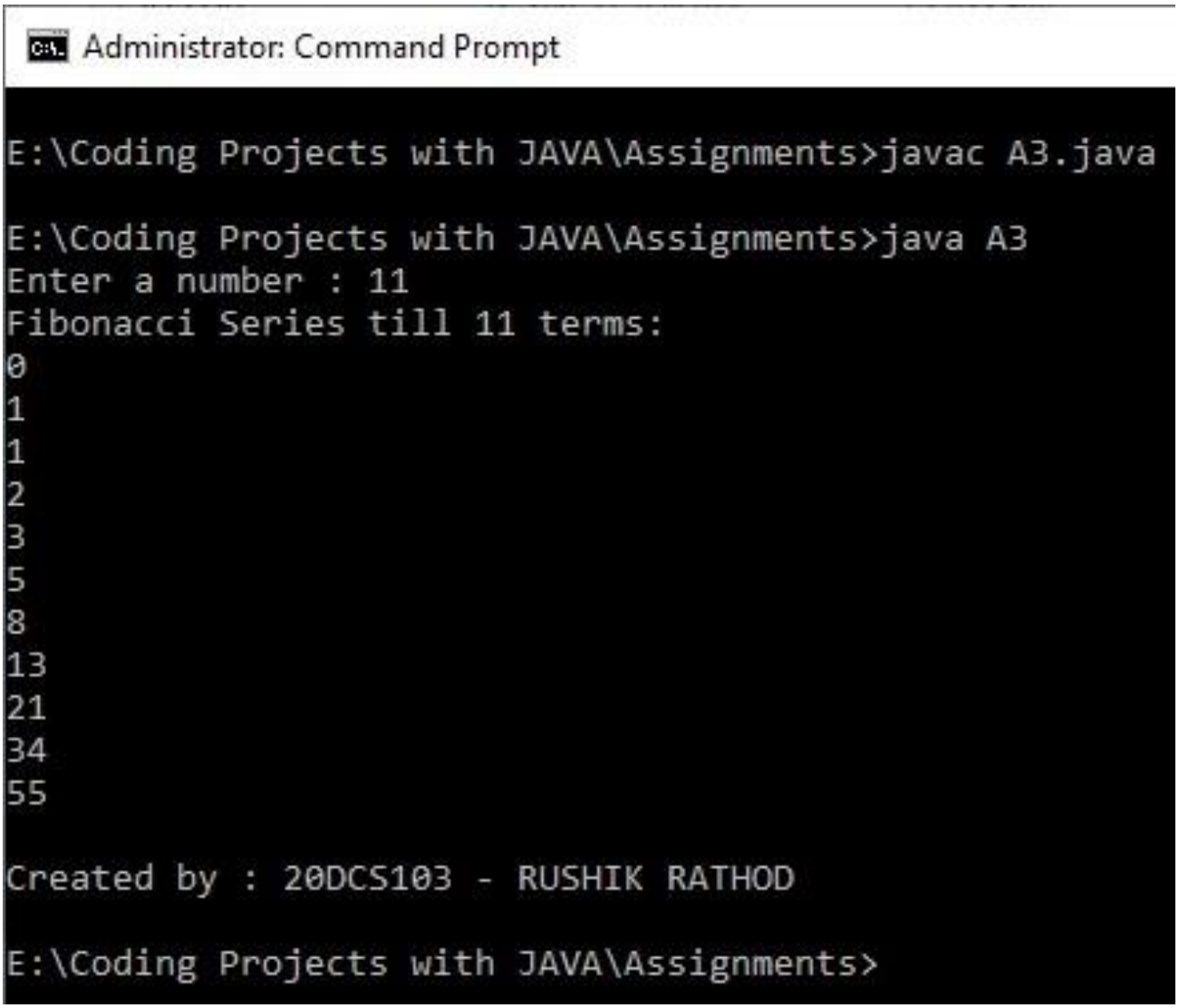

Administrator: Command Prompt
E:\Coding Projects with JAVA\Assignments>javac A2.java
E:\Coding Projects with JAVA\Assignments>java A2
Enter a number : 252
252 is Palindrome number.
Created by : 20DCS103 - RUSHIK RATHOD
E:\Coding Projects with JAVA\Assignments>

3. Write a java program to generate a Fibonacci series.

SOURCECODE:

```
import java.util.Scanner;

public class A3 {
   public static void main(String[] args) {

      int num = 10, firstTerm = 0, secondTerm = 1;
      Scanner sc = new Scanner(System.in);
      System.out.print("Enter a number : ");
      num = sc.nextInt();
      System.out.println("Fibonacci Series till " + num + " terms:");

      for (int i = 1; i <= num; ++i) {
        System.out.print(firstTerm + "\n");

        int nextTerm = firstTerm + secondTerm;
        firstTerm = secondTerm;
        secondTerm = nextTerm;
      }
      System.out.println("\nCreated by : 20DCS103 - RUSHIK RATHOD");
     }
}
```

OUTPUT:


Administrator: Command Prompt
E:\Coding Projects with JAVA\Assignments>javac A3.java
E:\Coding Projects with JAVA\Assignments>java A3
Enter a number : 11
Fibonacci Series till 11 terms:
0
1
1
2
3
5
8
13
21
34
55
Created by : 20DCS103 - RUSHIK RATHOD
E:\Coding Projects with JAVA\Assignments>

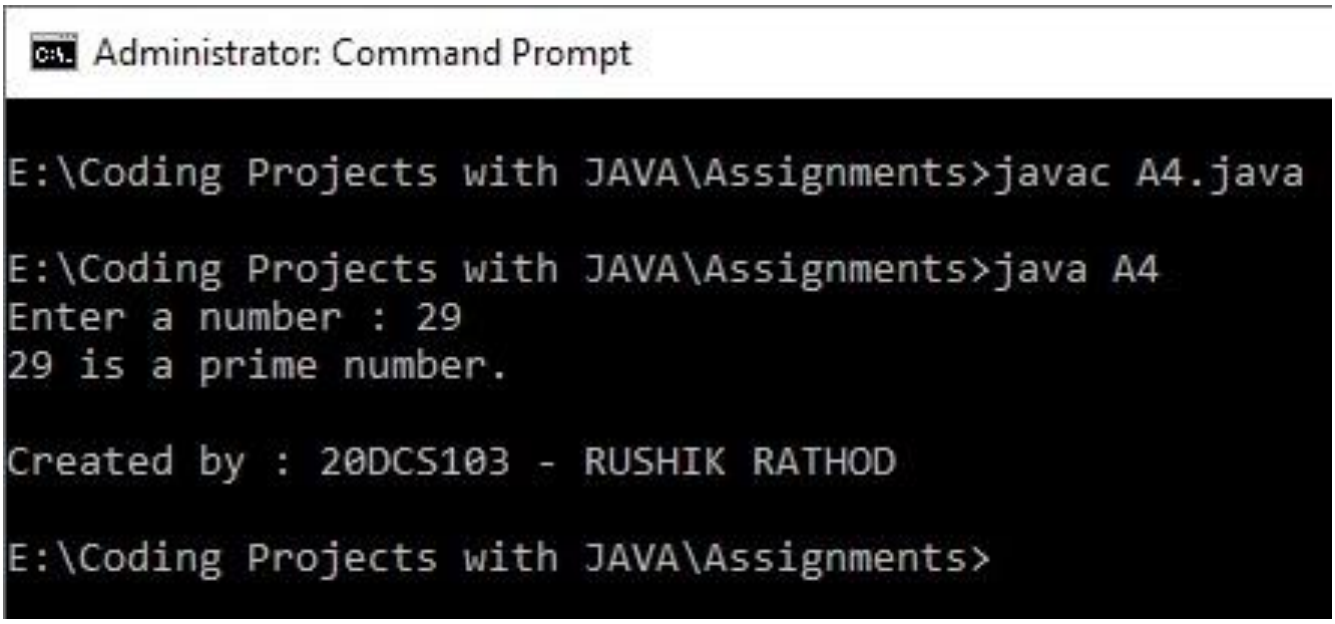
4. Write a java program to find number is prime or not.

SOURCECODE:

```
import java.util.Scanner;

public class A4 {
   public static void main(String[] args) {

      int num;
      Scanner sc = new Scanner(System.in);
      System.out.print("Enter a number : ");
      num = sc.nextInt();
      boolean flag = false;
      for (int i = 2; i <= num / 2; ++i) {

         if (num % i == 0) {
            flag = true;
            break;
         }
      }

      if (!flag)
         System.out.println(num + " is a prime number.");
      else
         System.out.println(num + " is not a prime number.");
```

```
        System.out.println("\nCreated by : 20DCS103 - RUSHIK RATHOD");
    }
}
```

OUTPUT:

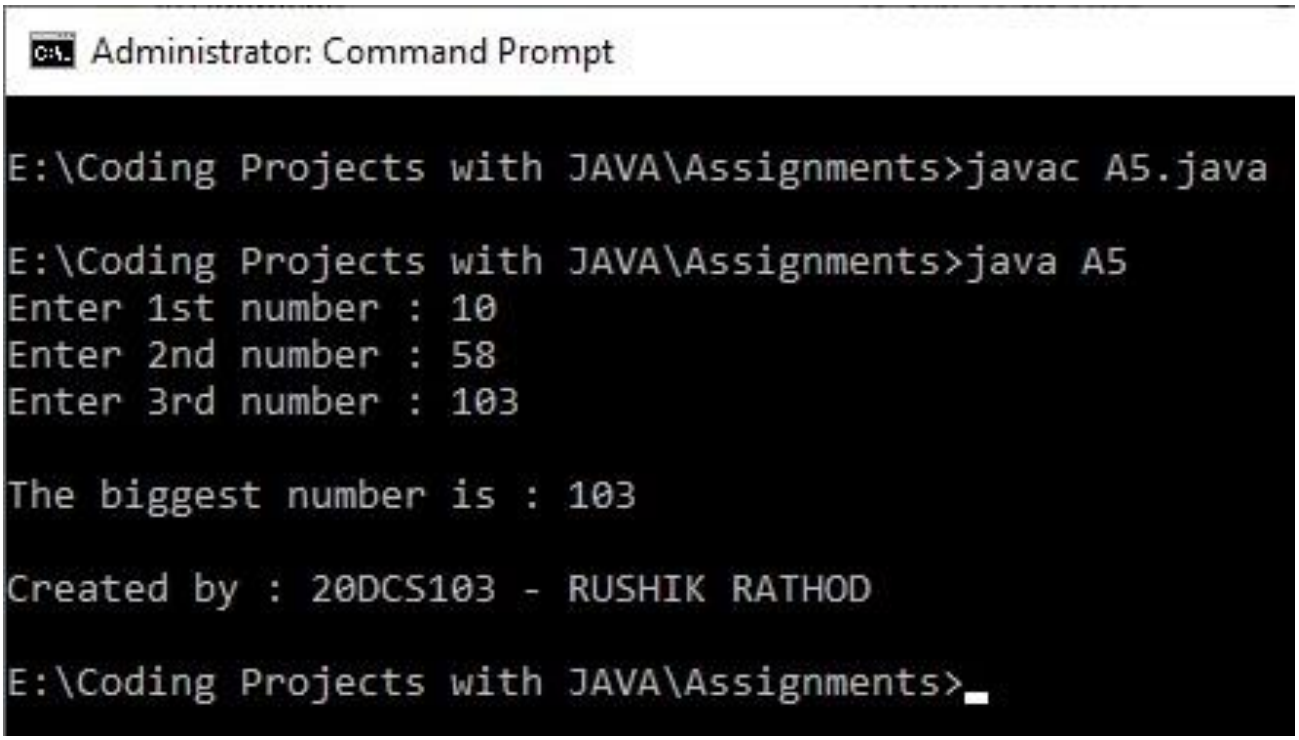

Administrator: Command Prompt
E:\Coding Projects with JAVA\Assignments>javac A4.java
E:\Coding Projects with JAVA\Assignments>java A4
Enter a number : 29
29 is a prime number.
Created by : 20DCS103 - RUSHIK RATHOD
E:\Coding Projects with JAVA\Assignments>

5. Find out biggest between 3 integer using ternary operator, 3 numbers should come from command line.

SOURCECODE:

```
import java.util.Scanner;


public class A5 {
    public static void main(String[] args) {


        int max, x, y, z;
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter 1st number : ");
        x = sc.nextInt();
        System.out.print("Enter 2nd number : ");
        y = sc.nextInt();
        System.out.print("Enter 3rd number : ");
        z = sc.nextInt();


        max = x > y ? (x > z ? x : z) : (y > z ? y : z);


        System.out.println("\nThe biggest number is : " + max);


        System.out.println("\nCreated by : 20DCS103 - RUSHIK RATHOD");
    }
}
```

OUTPUT:


Administrator: Command Prompt
E:\Coding Projects with JAVA\Assignments>javac A5.java
E:\Coding Projects with JAVA\Assignments>java A5
Enter 1st number : 10
Enter 2nd number : 58
Enter 3rd number : 103
The biggest number is : 103
Created by : 20DCS103 - RUSHIK RATHOD
E:\Coding Projects with JAVA\Assignments>

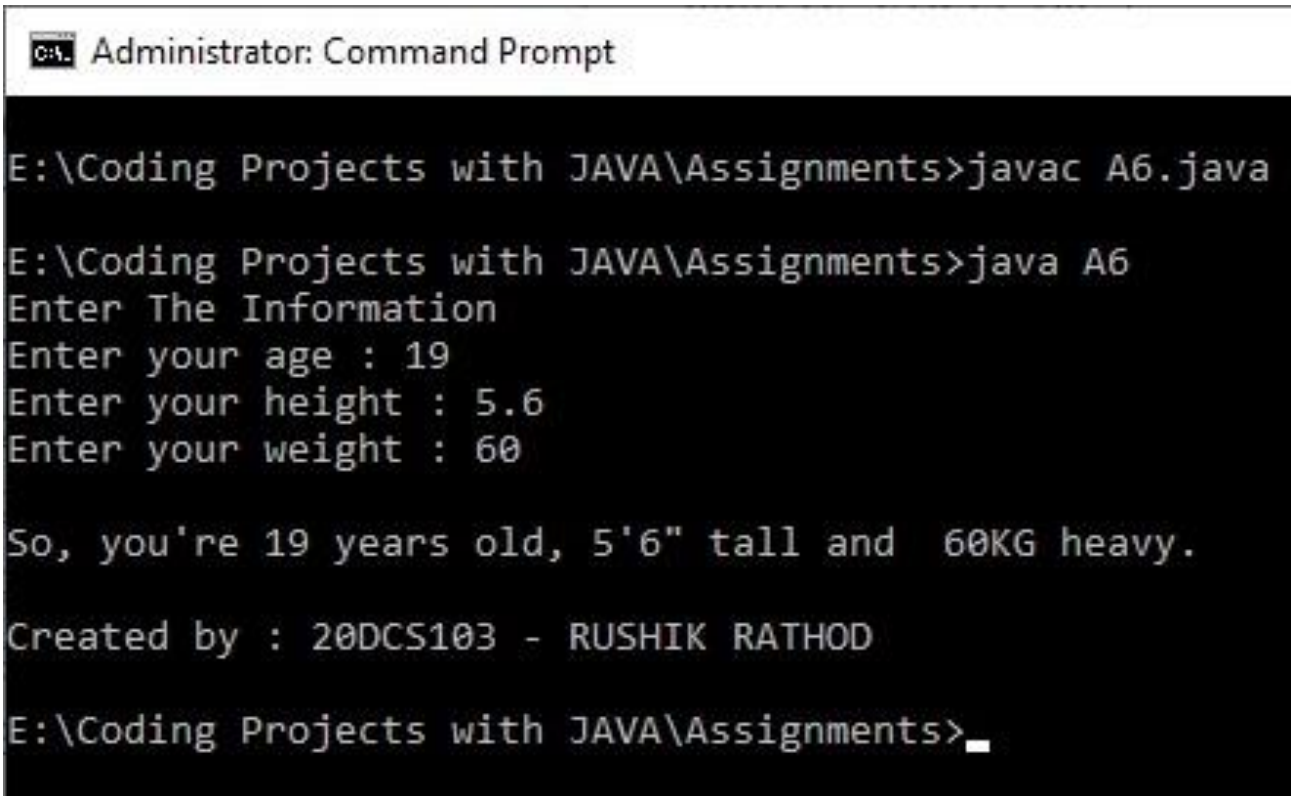
6. **Write a java program to input some kind of information of a person from the keyboard. Age of a person Height of a person Weight of a person and display it in the following manner. e.g. So, you're 35 years old, 6'2" tall and 60KG heavy.**

SOURCECODE:

```
import java.util.Scanner;


public class A6 {
   public static void main(String[] args) {


      int age, h1, w;
      float h, h2;
      Scanner sc = new Scanner(System.in);


      System.out.println("Enter The Information");
      System.out.print("Enter your age : ");
      age = sc.nextInt();
      System.out.print("Enter your height : ");
      h = sc.nextFloat();
      System.out.print("Enter your weight : ");
      w = sc.nextInt();


      h1 = (int)h;
      h2 = (h*10) - (h1*10);
```

```
        System.out.println("\nSo, you're " + age + " years old, " + h1 + "'" + (int)h2 +
"\" tall and  " + w + "KG heavy." );

        System.out.println("\nCreated by : 20DCS103 - RUSHIK RATHOD");

    }

}
```

OUTPUT:


Administrator: Command Prompt
E:\Coding Projects with JAVA\Assignments>javac A6.java
E:\Coding Projects with JAVA\Assignments>java A6
Enter The Information
Enter your age : 19
Enter your height : 5.6
Enter your weight : 60
So, you're 19 years old, 5'6" tall and 60KG heavy.
Created by : 20DCS103 - RUSHIK RATHOD
E:\Coding Projects with JAVA\Assignments>

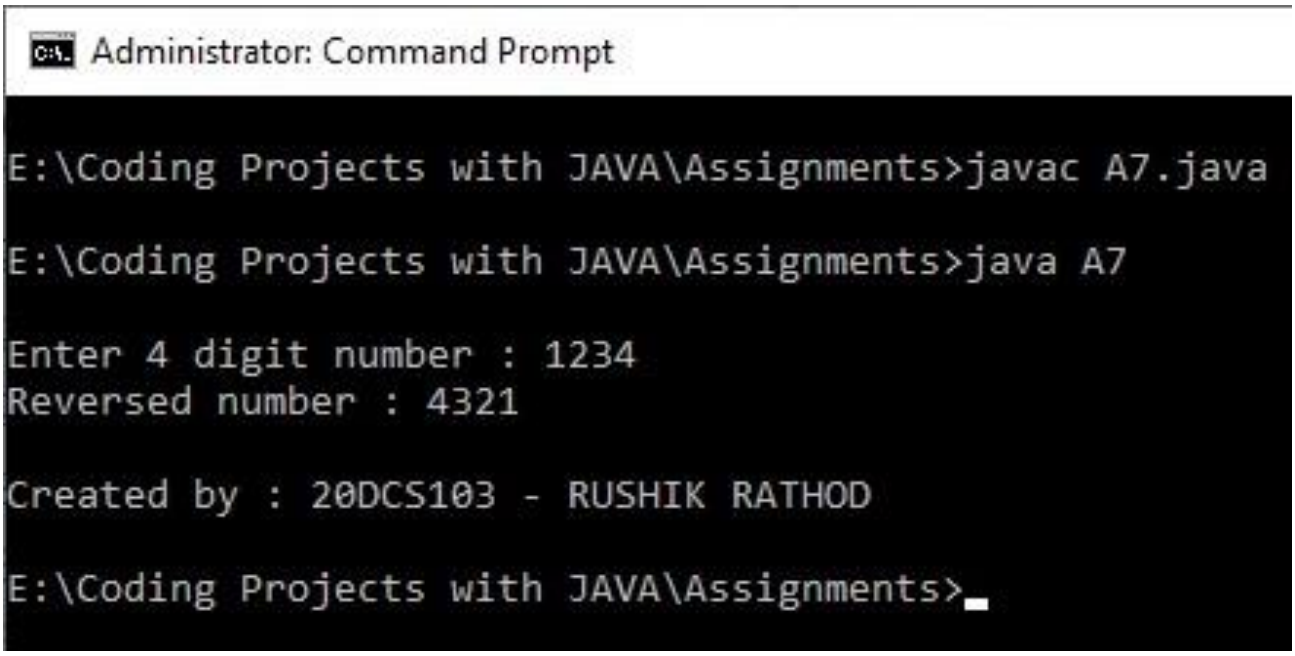
7. **A 4-digit number is entered through keyboard. Write a program to print a new number with digits reversed as of original one.**
   E.g.-
   INPUT: 1234 OUTPUT: 4321
   INPUT: 5982 OUTPUT: 2895

SOURCECODE:

```
import java.util.Scanner;


public class A7 {
   public static void main(String[] args) {


      int number, reverse = 0;
      Scanner sc = new Scanner(System.in);
      System.out.print("\nEnter 4 digit number : ");
      number = sc.nextInt();


      if(number>=1000 && number<=9999)
      {
         while (number != 0) {
            int remainder = number % 10;
            reverse = reverse * 10 + remainder;
            number = number / 10;
         }
         System.out.println("Reversed number : " + reverse);
      }
```

```
        else
        {
            System.out.println("\nInvalid Entry !");
        }
        System.out.println("\nCreated by : 20DCS103 - RUSHIK RATHOD");
    }
}
```

OUTPUT:


Administrator: Command Prompt
E:\Coding Projects with JAVA\Assignments>javac A7.java
E:\Coding Projects with JAVA\Assignments>java A7
Enter 4 digit number : 1234
Reversed number : 4321
Created by : 20DCS103 - RUSHIK RATHOD
E:\Coding Projects with JAVA\Assignments>

8. Write down the names of 10 of your friends in an array and then sort those in alphabetically ascending order.

SOURCECODE:

```
import java.util.Scanner;


public class A8 {
   public static void main(String[] args) {


      int i, n = 10;
      Scanner sc = new Scanner(System.in);
      String[] names = new String[10];
      String temp;


      System.out.println("Enter 10 names...");


      for (i = 0; i < 10; i++) {
         names[i] = sc.nextLine();
      }


      for (i = 0; i < 10; i++) {
         for (int j = i + 1; j < 10; j++) {
            if (names[i].compareTo(names[j]) > 0) {
               temp = names[i];
               names[i] = names[j];
```

```
                names[j] = temp;
            }
        }
    }

    System.out.println("\nThe names in alphabetical order are: ");
    for (i = 0; i < 10; i++) {
        System.out.println(names[i]);
    }
    System.out.println("\nCreated by : 20DCS103 - RUSHIK RATHOD");
  }
}
```

OUTPUT:


Administrator: Command Prompt
E:\Coding Projects with JAVA\Assignments>javac A8.java
E:\Coding Projects with JAVA\Assignments>java A8
Enter 10 names...
Tom
Jerry
Ironman
Superman
Spiderman
Thor
Hulk
Doraemon
Nobita
Batman
The names in alphabetical order are:
Batman
Doraemon
Hulk
Ironman
Jerry
Nobita
Spiderman
Superman
Thor
Tom
Created by : 20DCS103 - RUSHIK RATHOD
E:\Coding Projects with JAVA\Assignments>

9. Write a following pattern:

1

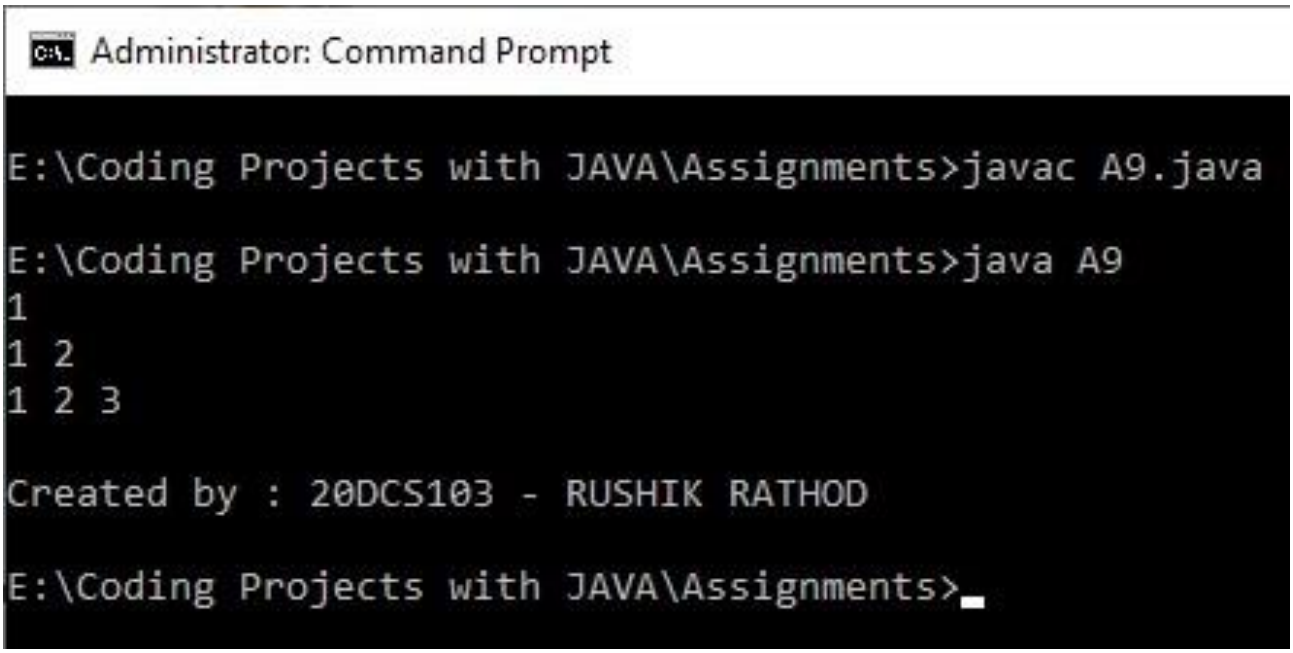
1 2

1 2 3

SOURCECODE:

```
public class A9 {
   public static void main(String[] args) {

      int i, j;
      for(i = 1; i<=3; i++)
      {
         for(j = 1; j<=i; j++)
         {
            System.out.print(j + " ");
         }
         System.out.println();
      }
      System.out.println("\nCreated by : 20DCS103 - RUSHIK RATHOD");
   }
}
```

OUTPUT:


Administrator: Command Prompt
E:\Coding Projects with JAVA\Assignments>javac A9.java
E:\Coding Projects with JAVA\Assignments>java A9
1
1 2
1 2 3
Created by : 20DCS103 - RUSHIK RATHOD
E:\Coding Projects with JAVA\Assignments>

10. Create a person inherit two classes from it politician & sportsman provide constructors & calculate salary and display functions.

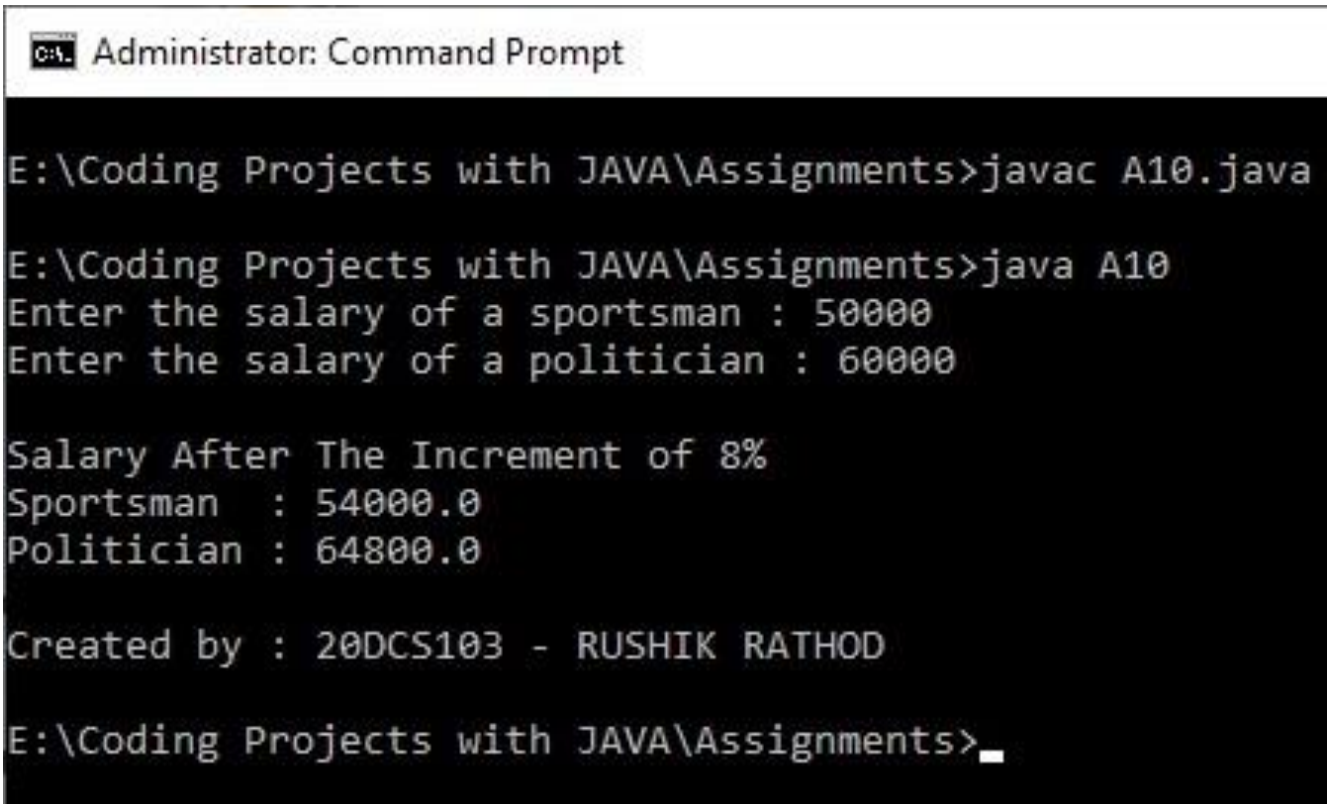
SOURCECODE:

```
import java.util.Scanner;


class Person
{
   float salary;
   static float displaySalary(float salary)
   {
      salary = (float)(salary + 0.08*salary);
      return salary;
   }
}


class Sportsman extends Person
{
   Scanner sc = new Scanner(System.in);


   Sportsman()
   {
      salary = 0;
   }
   float getSalary()
```

```
    {
        System.out.print("Enter the salary of a sportsman : ");
        salary = sc.nextFloat();
        return salary;
    }
 }

class Politician extends Person {

    Scanner sc = new Scanner(System.in);
    Politician()
    {
        salary = 0;
    }

    float getSalary()
    {
        System.out.print("Enter the salary of a politician : ");
        salary = sc.nextFloat();
        return salary;
    }
}

public class A10 {
    public static void main(String[] args) {
```

```
        Sportsman s1 = new Sportsman();
        Politician p1 = new Politician();
        float ss, ps;

        ss = s1.getSalary();
        ps = p1.getSalary();

        System.out.println("\nSalary After The Increment of 8%");
        System.out.println("Sportsman  : "+ s1.displaySalary(ss));
        System.out.println("Politician : "+ p1.displaySalary(ps));

        System.out.println("\nCreated by : 20DCS103 - RUSHIK RATHOD");
    }
}
```

OUTPUT:



Thank you…