BHARATI VIDYAPEETH'S

INSTITUTE OF COMPUTER APPLICATIONS & MANAGEMENT

(Affiliated to Guru Gobind Singh Indraprastha

University, Approved by AICTE, New Delhi)

Object-Oriented Programming and Java

(MCA-167)

Practical File

Submitted To:

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MCA 1st Year 1 Sem

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S. No.	Problem Description	Date of Execution	Sign.
AP1	Explore the basic java program development scenario in Notepad++ and cmd by creating a class Integer Adder. The adder prints sum of 5 integer numbers without using a single variable where input will be taken through command line arguments. a. Perform the above code using a function and call it in main(). a. Make another class and a function in it to perform the above task.	25-11-2022	
AP2	Develop a Number Reciprocator java application to computes the sum of the reciprocals in the format: 1/1 + 1/2 + 1/3 + ... + 1/10	25-11-2022	
Ap3	Demonstrate type conversion in a simple java program by casting and checking output in the following cases:- a. Conversion of int to byte b. Conversion of double to int c. Conversion of double to byte d. Conversion of int to char e. Conversion of float to short	25-11-2022	

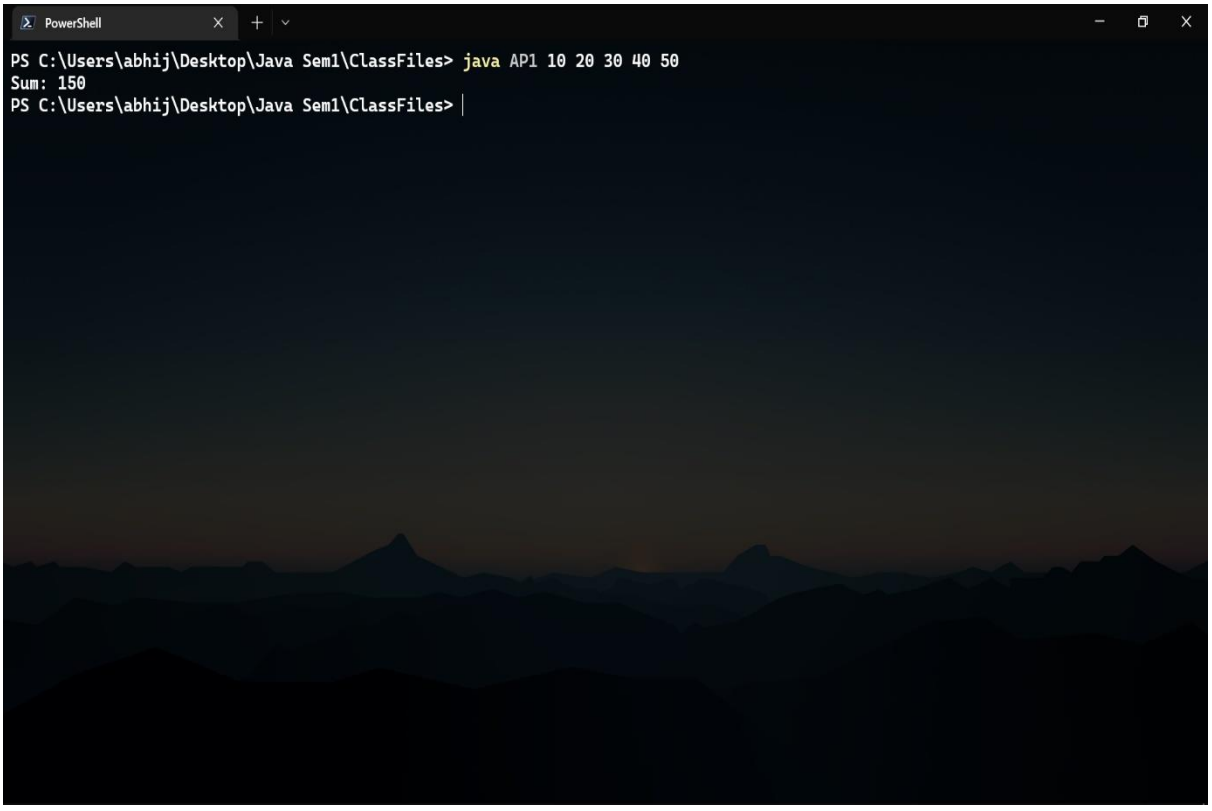
AP4	Construct a character counter that inputs a piece of text that is analyzed character by character to determine the vowels, spaces and letters used. Fill in the code that computes the number of spaces, vowels, and consonants. public class StringCharacters { public static void main(String[] args) { String text = "To be or not to be, that is the question;" +"Whether this nobler in the mind to suffer" +" the slings and arrows of outrageous fortune," +" or to take arms against a sea of troubles," +" and by opposing end them?"; int spaces = 0, vowels = 0, letters = 0; **//YOUR CODE HERE** System.out.println("The text contained vowels: " + vowels + "\n" + consonants " + (letters - vowels) + "\n"+ spaces: " + spaces); } }	25-11-2022	
AP5	Construct a number generator to accept three digits (i.e. 0 - 9) and print all its possible combinations. (For example if the three digits are 1, 2, 3 than all possible combinations are: 123, 132,213, 231, 312, 321.)	25-11-2022	
AP6	A java standalone application makes use of a parameterized method inside a class. Take the following case: Create a class Box and define a method in this class which will return the volume of the box. Initialize two objects for your class and print out the volumes respectively.	25-11-2022	

AP7	A java standalone application reads in a sentence from the user and prints it out with each word reversed, but with the words and punctuation in the original order.	25-11-2022	
AP 8	Develop an employee pay generator that works on the following rules- 1. An employee gets paid (hours worked) × (base pay), for each hour up to 40 hours. 2. For every hour over 40, they get overtime = (base pay) × 1.5. 3.The base pay must not be less than the minimum wage ($8.00 an hour). 4.If it is, print an error. If the number of hours is greater than 60, print an error message.//System.err.println();	25-11-2022	

Q1) Explore the basic java program development scenario in Notepad++ and cmd by creating a class Integer Adder. The adder prints sum of 5 integer numbers without using a single variable where input will be taken through command line arguments. a) Perform the above code using a function and call it in main(). b) Make another class and a function in it to perform the above task

Ans 1)

```
import java.util.*;

import java.io.*;

class AP1{

	public static void main(String[] args){

		System.out.println("Sum: "+adder(args));

	}


	static int adder(String[] arr){

		return
Integer.parseInt(arr[0])+Integer.parseInt(arr[1])+Integer.parseInt(arr[2])+Integer.parseInt(arr[3])+Integer.parseInt(arr[4]);

	}

}
```

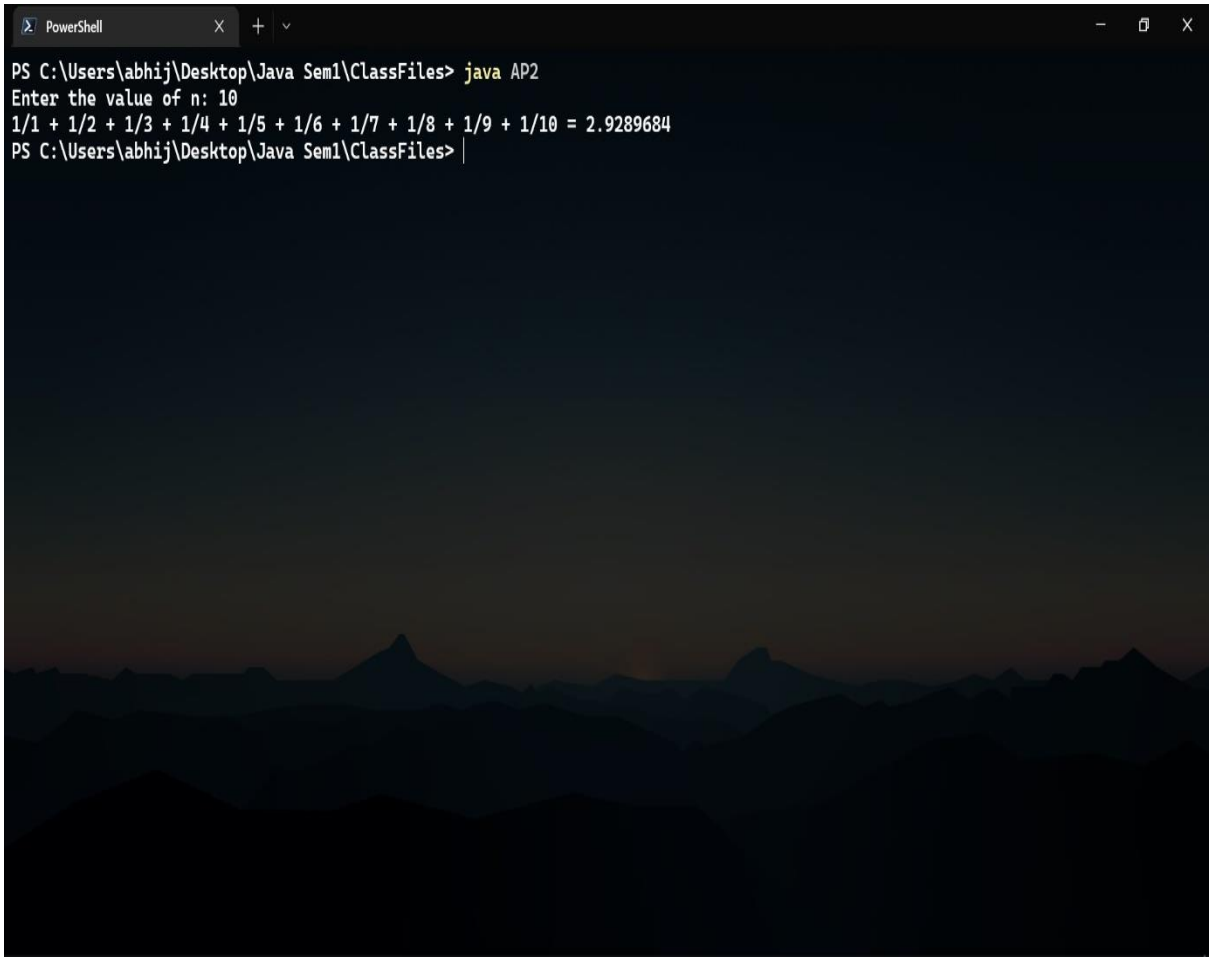


Q2) Develop a Number Reciprocator java application to computes the sum of the reciprocals in the format:

1/1 + 1/2 + 1/3 + ... + 1/10 ?

Ans 2)

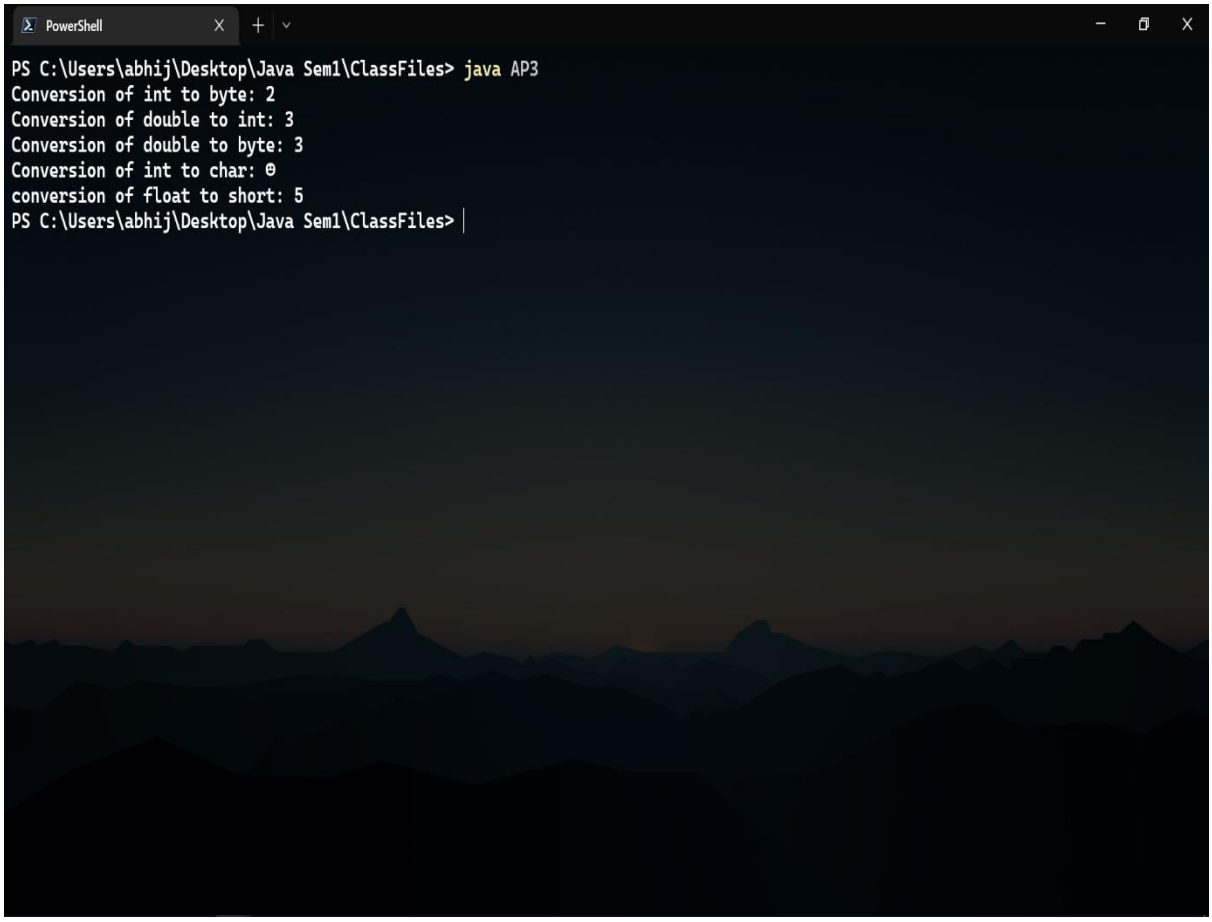
```
import java.util.*;
import java.io.*;
class AP2{
	public static void main(String[] args){
		Scanner sc = new Scanner(System.in);
		System.out.print("Enter the value of n: ");
		int n = sc.nextInt();
		reciprocalSum(n);
	}

	static void reciprocalSum(int n){
		float sum=0;
		for(int i=1;i<=n;i++){
			sum+=(1/(float)i);
			if(i!=n){
				System.out.print("1/"+i+" + ");
			}else if(i==n){
				System.out.print("1/"+i+" = ");
			}
		}
		System.out.println(sum);
	}
}
```


PowerShell
PS C:\Users\abhij\Desktop\Java Sem1\ClassFiles> java AP2
Enter the value of n: 10
1/1 + 1/2 + 1/3 + 1/4 + 1/5 + 1/6 + 1/7 + 1/8 + 1/9 + 1/10 = 2.9289684
PS C:\Users\abhij\Desktop\Java Sem1\ClassFiles>

Q3) Demonstrate type conversion in a simple java program by casting and checking output in the following cases:- a) Conversion of int to byte b) Conversion of double to int c) Conversion of double to byte d) Conversion of int to char e) Conversion of float to short?

Ans 3)

```
import java.util.*;
import java.io.*;
class AP3{
    public static void main(String[] args){
            int a=2;
            double b=3.14;
            float f=5.5f;
            byte x=(byte)a;
            int y=(int)b;
            byte z=(byte)b;
            char c=(char)a;
            short s=(short)f;
            System.out.println("Conversion of int to byte: "+x);
            System.out.println("Conversion of double to int: "+y);
            System.out.println("Conversion of double to byte: "+z);
            System.out.println("Conversion of int to char: "+c);
            System.out.println("conversion of float to short: "+s);
    }
}
```

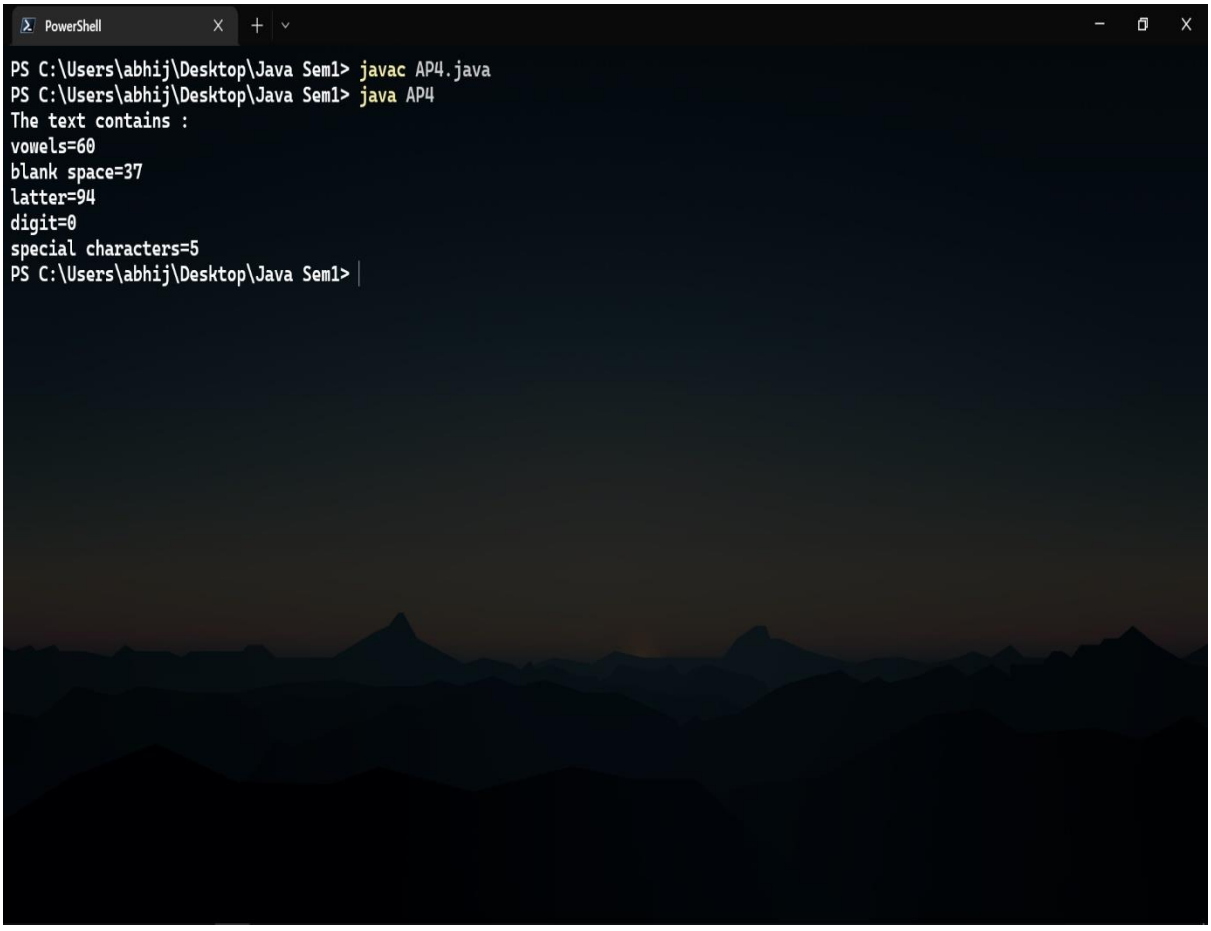

PowerShell
PS C:\Users\abhij\Desktop\Java Sem1\ClassFiles> java AP3
Conversion of int to byte: 2
Conversion of double to int: 3
Conversion of double to byte: 3
Conversion of int to char: ☻
conversion of float to short: 5
PS C:\Users\abhij\Desktop\Java Sem1\ClassFiles>

Q4) Construct a character counter that inputs a piece of text that is analyzed character by character to determine the vowels, spaces and letters used. Fill in the code that computes the number of spaces, vowels, and consonants. public class StringCharacters { public static void main(String[] args) { String text = "To be or not to be, that is the question;" +"Whether this nobler in the mind to suffer" +" the slings and arrows of outrageous fortune," +" or to take arms against a sea of troubles," +" and by opposing end them?"; int spaces = 0, vowels = 0, letters = 0;

Ans 4)

```
import java.util.*;
import java.io.*;
class AP4{
    public static void main(String[] args) {
        String text = "To be or not to be, that is the question;"
                    +"Whether this nobler in the mind to suffer"
                    +" the slings and arrows of outrageous fortune,"
                    +" or to take arms against a sea of troubles,"
                    +" and by opposing end them?";
        text=text.toLowerCase();
        int spaces=0, vowels=0, letters=0, digit=0, splchar=0;

        for(int i=0;i<text.length();i++) {
            if(text.charAt(i)=='a'||text.charAt(i)=='i'||text.charAt(i)=='e'||text.charAt(i)=='o'||text.char
            At(i)=='u'){
                    vowels++;
                }
             else if((text.charAt(i)>='a'&& text.charAt(i)<='z')){
                            letters++;
                    }
              else if(text.charAt(i)==' ') {
                            spaces++;
              }
              else if(text.charAt(i)>='0'&&text.charAt(i)<='9') {
                    digit++;
```

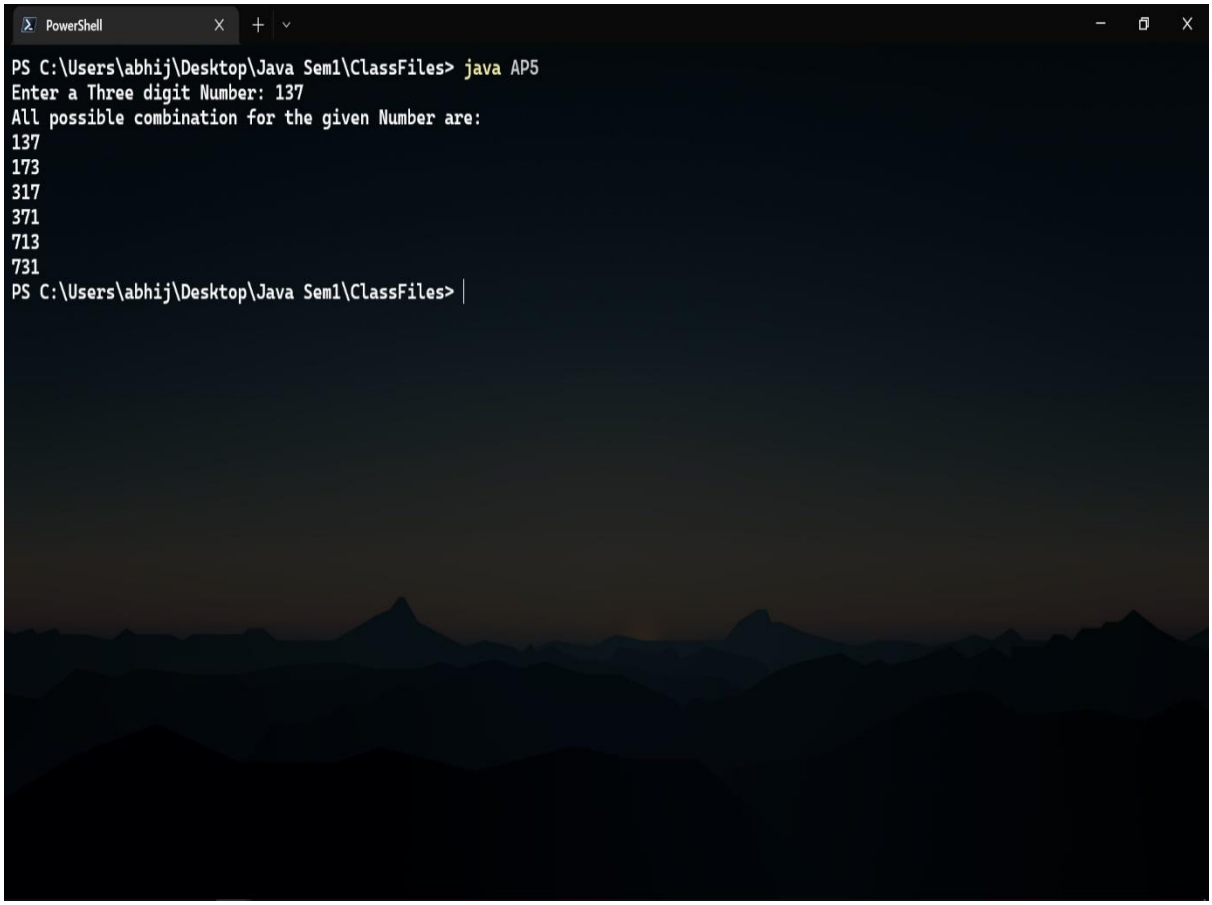
```
            }
            else{
                splchar++;
            }
        }
        System.out.println("The text contains : ");
        System.out.println("vowels="+vowels);
        System.out.println("blank space="+spaces);
        System.out.println("latter="+letters);
        System.out.println("digit="+digit);
        System.out.println("special characters="+splchar);

    }
}
```



Q5) Construct a number generator to accept three digits (i.e. 0 - 9) and print all its possible combinations. (Forexample if the three digits are 1, 2, 3 than all possible combinations are: 123, 132,213, 231, 312, 321.)?

Ans 5)

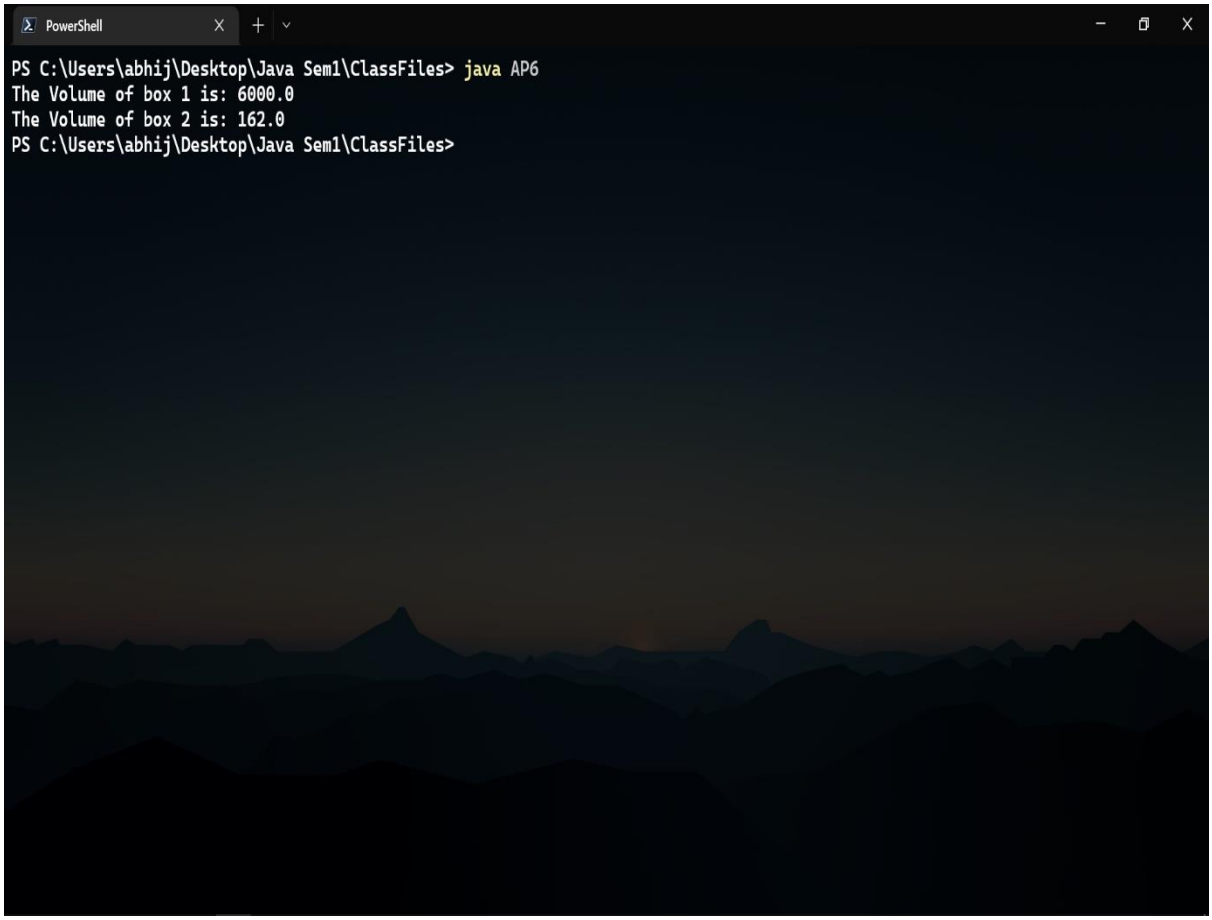
```
import java.util.*;
import java.io.*;
class AP5{
  public static void main(String[] args){
        System.out.print("Enter a Three digit Number: ");
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        int len = (int) (Math.log10(n)+ 1); //calculating the length of the number entered by the user
        if (len==3) {
              System.out.println("All possible combination for the given Number are: ");
              numberGenerator(n);
        }else{
              System.out.println("You did not enter a three digit number !");
        }
  }
  public static void numberGenerator(int n){
        char[] c = String.valueOf(n).toCharArray();
        for (int i=0;i<3 ;i++ ) {
              for(int j=0;j<3;j++){
                    for(int k=0;k<3;k++){
                          if (i!=j && j!=k && k!=i) {
                                System.out.println(c[i]+""+c[j]+""+c[k]);
                          }
                    }
              }
        }
  }
}
```


PowerShell
PS C:\Users\abhij\Desktop\Java Sem1\ClassFiles> java AP5
Enter a Three digit Number: 137
All possible combination for the given Number are:
137
173
317
371
713
731
PS C:\Users\abhij\Desktop\Java Sem1\ClassFiles>

Q6) A java standalone application makes use of a parameterized method inside a class. Take the following case: Create a class Box and define a method in this class which will return the volume of the box. Initialize two objects for your class and print out the volumes respectively ?

Ans 6)

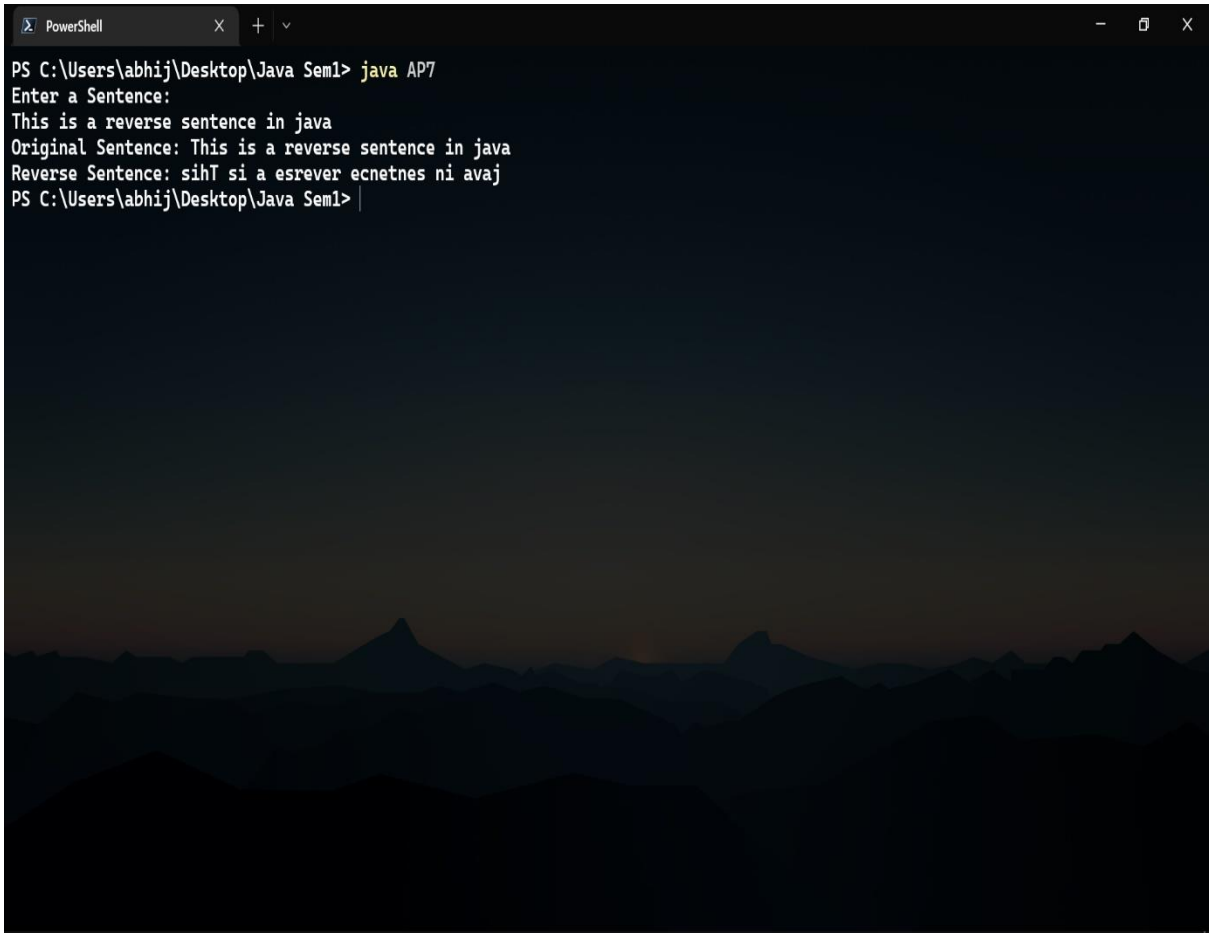
```
import java.io.*;
import java.io.*;
class Ans6 {

	public static void main(String[] args) {
		Box obj1=new Box();
		Box obj2=new Box();
		System.out.println("volume of box 1="+obj1.Volume(2,3,5));
		System.out.println("volume of box 2="+obj2.Volume(3,4,5));
	}
}

class Box{
	double len,br,wd;
	double Volume(int l,int b,int w) {
		len=l;
		br=b;
		wd=w;
		return len*br*wd;

	}
}
```


PowerShell
PS C:\Users\abhij\Desktop\Java Sem1\ClassFiles> java AP6
The Volume of box 1 is: 6000.0
The Volume of box 2 is: 162.0
PS C:\Users\abhij\Desktop\Java Sem1\ClassFiles>

Q7) A java standalone application reads in a sentence from the user and prints it out with each word reversed, but with the words and punctuation in the original order?

Ans 7)

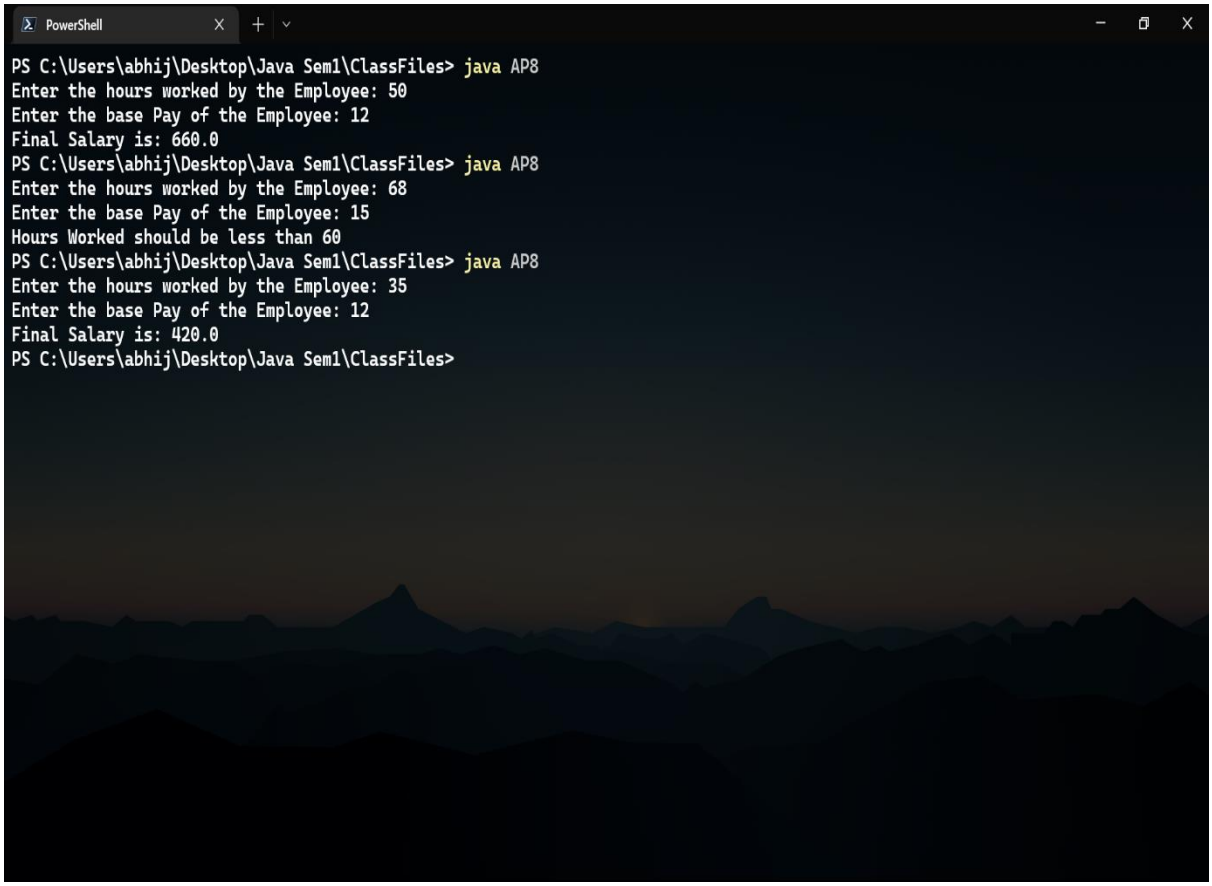
```
import java.util.*;
import java.io.*;
class AP7{
	public static void main(String[] args){
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter a Sentence: ");
		String s = sc.nextLine();
		System.out.print("Original Sentence: ");
		System.out.println(s);
		String rev = reverseSentence(s);
		System.out.print("Reverse Sentence: ");
		System.out.println(rev);
	}
	public static String reverseSentence(String str){
		String[] words=str.split("\\s");
		String reverseWord="";
		for(String w:words){
   StringBuilder sb=new StringBuilder(w);
   sb.reverse();
   reverseWord+=sb.toString()+" ";
		}
		return reverseWord.trim();
	}
}
```


PowerShell
PS C:\Users\abhij\Desktop\Java Sem1> java AP7
Enter a Sentence:
This is a reverse sentence in java
Original Sentence: This is a reverse sentence in java
Reverse Sentence: sihT si a esrever ecnetnes ni avaj
PS C:\Users\abhij\Desktop\Java Sem1>

Q8) Develop an employee pay generator that works on the following rules1. An employee gets paid (hours worked) × (base pay), for each hour up to 40 hours. 2. For every hour over 40, they get overtime = (base pay) × 1.5. 3. The base pay must not be less than the minimum wage ($8.00 an hour). 4. If it is, print an error. If the number of hours is greater than 60, print an error message. //System.err.println() ?

Ans 8)

```
import java.util.*;
class AP8{
	public static void main(String[] args){
		Scanner sc = new Scanner(System.in);
		float finalPay=0, overTime=0;
		System.out.print("Enter the hours worked by the Employee: ");
		int hoursWorked = sc.nextInt();
		System.out.print("Enter the base Pay of the Employee: ");
		float basePay = sc.nextFloat();
		if (hoursWorked>60) {
			System.err.println("Hours Worked should be less than 60");
		}else if(basePay<8){
			System.out.println("Base Pay cannot be less than 8$");
		}else if(hoursWorked<=40){
			finalPay = hoursWorked*basePay;
		}else if (hoursWorked>40) {
			overTime=(hoursWorked-40);
			hoursWorked-=overTime;
			finalPay = (basePay*hoursWorked)+(overTime*(basePay*(1.5f)));
		}
		if (finalPay>0) {
			System.out.println("Final Salary is: "+finalPay);
		}



	}
}
```


PowerShell
PS C:\Users\abhij\Desktop\Java Sem1\ClassFiles> java AP8
Enter the hours worked by the Employee: 50
Enter the base Pay of the Employee: 12
Final Salary is: 660.0
PS C:\Users\abhij\Desktop\Java Sem1\ClassFiles> java AP8
Enter the hours worked by the Employee: 68
Enter the base Pay of the Employee: 15
Hours Worked should be less than 60
PS C:\Users\abhij\Desktop\Java Sem1\ClassFiles> java AP8
Enter the hours worked by the Employee: 35
Enter the base Pay of the Employee: 12
Final Salary is: 420.0
PS C:\Users\abhij\Desktop\Java Sem1\ClassFiles>

Q9) A Financial Calculator to calculate the Simple Interest and Compound Interest by taking command line values for principal, rate and time. 1. Extend the code to calculate 'Final Value' of investment (V) of an investment (principal P) compounded yearly for T years at interest rate R is given by the formula: V = P (1 + R) T 2. Perform the above code using a function and call it in main(). Make another class and a function in it to perform the above task.

Ans 9)

```
import java.util.*;
import java.io.*;


class Interest{
	public static void simpleInterest(double p, double r, double t){
		double s = (p*r*t)/100;
		System.out.println("Simple Interest is : "+s);
	}
	public static void compoundInterest(double p, double r, double t){
		double c =  p * (Math.pow((1 + r/ 100), t)) - p;
		System.out.println("Compound Intererst is : "+c);
	}


	public static void finalValue(double p, double r, double t){
		double v = p*(Math.pow((1+r),t));
		System.out.println("final value of the investment is : "+v);
	}
}
class AP9{
	public static void main(String[] args) {
		Interest i = new Interest();
		Scanner sc = new Scanner(System.in);
		System.out.print("Enter the principal value: ");
		double p = sc.nextDouble();
		System.out.print("Enter the Rate of Interest: ");
		double r = sc.nextDouble();
```

```
            System.out.print("Enter the time period: ");
            double t = sc.nextDouble();
            i.simpleInterest(p,r,t);
            i.compoundInterest(p,r,t);
            i.finalValue(p,r,t);
        }
}
```