Subject Code: YC COMPUTER 2	YASHWANT CLASSES Estd.1995	Subject: COMPUTER

Answer to this Paper must be written on the paper provided separately.
You will not be allowed to write during first 15 minutes.
This time is to be spent in reading the question paper.
The time given at the head of this Paper is the time allowed for writing the answers.
Section A is compulsory. Attempt any four questions from Section B.
The intended marks for questions or parts of questions are given in brackets [].

SECTION A (40 MARKS)
(Attempt all questions from this Section)

Question 1 **[20]**

(i) Identify the package used to handle input and output in Java.
- (a) java.awt
- (b) java.io
- (c) java.util
- (d) java.lang

(ii) What is the purpose of the `void` keyword in Java?
- (a) To define a class.
- (b) To define an empty method.
- (c) To specify that a method does not return any value.
- (d) None of the above.

(iii) Which operator is used to concatenate strings in Java?
- (a) `+`
- (b) `&`
- (c) `|`
- (d) `#`

(iv) What is the size of a `float` data type in Java?
- (a) 8 bytes
- (b) 2 bytes
- (c) 4 bytes
- (d) 1 byte

(v) Which method is used to find the length of a string?
- (a) `str.size()`
- (b) `str.length()`
- (c) `str.getLength()`
- (d) `str.charAt()`

(vi) What will be the output of the following code?
```
int x = 5, y = 10;
System.out.println(x * y + x / y);
```

(a) 51
(b) 52
(c) 50
(d) 49

(vii) What is the access level of a private member in Java?
(a) Within the same package
(b) Within the same class
(c) Within the same subclass
(d) Globally accessible

(viii) What is the value of the expression (10 > 5) && (3 < 1)?
(a) true
(b) false
(c) 1
(d) 0

(ix) Which method is used to parse a string to an integer?
(a) `parseInt()`
(b) `toInteger()`
(c) `Integer.parseInt()`
(d) `int.parseInt()`

(x) Name the element of Java represented by the following figure ?

(a) Encapsulation
(b) Abstraction
(c) Inheritance
(d) Polymorphism

(xi) Which keyword is used to define a subclass in Java?

(a) subclass
(b) inherit
(c) extends
(d) implements

(xii) What is the default value of a `String` variable in Java?
(a) ""
(b) null
(c) "default"
(d) Undefined

(xiii) What is the output of the following code?

```
System.out.println("Java" + 2 + 3);
```

(a) Java23
(b) Java5
(c) Compilation error
(d) 5

(xiv) In Java, what will happen if you divide an integer by zero?
(a) Compilation error

(b) Runtime exception (ArithmeticException)
(c) Returns infinity
(d) Returns NaN

(xv) Which of these is a valid declaration of a 2D array in Java?

(a) `int arr[][] = new int[3][3];`
(b) `int arr = new int[3][3];`
(c) `int[][] arr = new int[3][3];`
(d) Both a and c

(xvi) **Assertion:** Arrays in Java are of fixed size once initialized.
Reason: The size of an array can be dynamically increased or decreased during runtime.

(a) Both Assertion and Reason are true, and the Reason is the correct explanation of the Assertion.
(b) Both Assertion and Reason are true, but the Reason is not the correct explanation of the Assertion.
(c) Assertion is true, but the Reason is false.
(d) Both Assertion and Reason are false.

(xvii) **Assertion:** Strings in Java are immutable.
Reason: The `String` class in Java uses a mutable `char[]` array to store its content.

(a) Both Assertion and Reason are true, and the Reason is the correct explanation of the Assertion.
(b) Both Assertion and Reason are true, but the Reason is not the correct explanation of the Assertion.
(c) Assertion is true, but the Reason is false.
(d) Both Assertion and Reason are false.

(xviii) What is the output of the following code?

```
int i = 5;
while (i > 0)
{
    System.out.print(i + " ");
    i--;
}
```

(a) 5 4 3 2 1
(b) 5 4 3 2 1 0
(c) 4 3 2 1
(d) Infinite loop

(xix) What is the output of the following code?

```
int sum = 0;
for (int i = 1; i <= 3; i++) {
    sum += i;
}
System.out.println(sum);
```

(a) 10
(b) 6
(c) 3

(d) Compilation error

(xx) What is an infinite loop in Java?

(a) A loop that runs only once.
(b) A loop that has a fixed number of iterations.
(c) A loop that never terminates.
(d) None of the above.

Question 2 **[20]**

(i) What do you understand by type conversion? How is implicit conversion different from explicit conversion?

(ii) Write two advantages of using functions in a program.

(iii) What is an array? Write a statement to declare an String array of 20 elements.

(iv) What are the values of b and t when the following statements are executed? int a = 54, b = 22; boolean b = (a < b)? true : false; int t = (a < b)? a : b

(v) Arrange the following primitive data types in descending order of their size:
(i) char (ii) byte (iii) double (iv) int

(vi) Rewrite the following program segment using while instead of for statement.

```
int s=0, i;
for(i = 1; i <= 5; i++){
   s+=i;
   System.out.println(s)
   ;
}
```

(vii)

(a) Name the mathematical function which is used to find cosine of an angle given in radians.
(b) Name the string function which finds the position of last occurrence of a character in a string.

(viii) Differentiate between length and length() ?

(ix) Write the output:

```
char ch ;
int
x=115;
do
{
   ch=(char)x;
   System.out.print(ch + " " );
   if(x%10 == 0)
   break;
   ++x;
} while(x<=120);
```

(x) If int y = 5 then find int z = (++y * (y++ + 7));

SECTION B (60 Marks)

*Attempt **any four** questions from this section.*

*The answers in this Section should consists of the **Programs in Blue J environment with the Java as the base.***

*Each program should be written using **Variable descriptions/ Mnemonic Codes** so that the logic of the program is clearly depicted.*

*Flow-Charts and Algorithms **are not required.***

Question 3

Define a class called Air_Lounge with the following description:

Instance Variables/Data Members:

String PNR — stores the PNR number of the guest String name — stores the name of the guest

long mob— stores the mobile number of the guest

Member methods:

1. void input() — To input and store the PNR,name and mobile number
2. void compute() — To accept the number of hours the guest stays in the lounge , calculate and display the rent at the rate of Rs. 2500 for upto 2 hours and for additional hours Rs. 780 per hour
3. void display() — To display the details .

Write a main method to create an object of the class and call the above member methods.

Question 4

Write a program to input numbers in a 4 * 4 Double Dimension array. Display the array. Double every element of the array and display the array.

Question 5

Using switch statement, write a menu driven program to:

(i) To find and display all the factors of a number input by the user Example:

Sample Input :

n = 25 Sample

Output : 1, 5,25

(ii) To find and display the factorial of a number input by the user (the factorial of a non-negative integer n, denoted by n!, is the product of all integers less than or equal to n.)

Example:

Sample Input : n = 4

Sample Output : 5! = 1*2*3*4 = 24

For an incorrect choice, an appropriate error message should be displayed.

Question 6

Write a program to input the names of 10 students and their marks in two different arrays. Using selection sort technique create a mark list in which names are arranged in descending order of the marks.

Question 7

Design a class to overload a function area( ) as follows :

(i) void area(double a, double b, double c) with three double arguments, finds the area of a scalene triangle using the formula :

area=$\sqrt{s(s-a)(s-b)(s-c)}$

where s=(a+b+c)/2

(ii) void area(int a, int b, int height) with three integer arguments, prints the area of a trapezium using the formula :

area = 1/2 height(a + b)

(iii) void area(double diagonal1, double diagonal2) with two double arguments, prints the area of a rhombus using the formula :

area = 1/2 (diagonal1 x diagonal2)

Question 8

Write a program to input a sentence and find those words which begin and end with a vowel. Also count the number of such words.

Sample Input: Ananya and Anushka went to Agra

Sample Output: Ananya

Anushka

Agra

Number of such words =3

Question 1 **[20]**

(i) Identify the package used to handle input and output in Java.

(a) java.awt
(b) java.io
(c) java.util
(d) java.lang

Ans. B

(ii) What is the purpose of the `void` keyword in Java?

(a) To define a class.
(b) To define an empty method.
(c) To specify that a method does not return any value.
(d) None of the above.

Ans. C

(iii) Which operator is used to concatenate strings in Java?

(a) `+`
(b) `&`
(c) `|`
(d) `#`

Ans. A

(iv) What is the size of a `float` data type in Java?

(a) 8 bytes
(b) 2 bytes
(c) 4 bytes
(d) 1 byte

Ans. C

(v) Which method is used to find the length of a string?

(a) `str.size()`
(b) `str.length()`
(c) `str.getLength()`
(d) `str.charAt()`

Ans. B

(vi) What will be the output of the following code?

```
int x = 5, y = 10;
System.out.println(x * y + x / y);
```

(a) 51
(b) 52
(c) 50
(d) 49

Ans. C

(vii) What is the access level of a private member in Java?

(a) Within the same package

(b) Within the same class
(c) Within the same subclass
(d) Globally accessible

Ans. B

(viii) What is the value of the expression (10 > 5) && (3 < 1)?

(a) true
(b) false
(c) 1
(d) 0

Ans. C

(ix) Which method is used to parse a string to an integer?

(a) `parseInt()`
(b) `toInteger()`
(c) `Integer.parseInt()`
(d) `int.parseInt()`

Ans. C

(x) Name the element of Java represented by the following figure ?

(a) Encapsulation
(b) Abstraction
(c) Inheritance
(d) Polymorphism

Ans. B

(xi) Which keyword is used to define a subclass in Java?

(a) subclass
(b) inherit
(c) extends
(d) implements

Ans. B

(xii) What is the default value of a `String` variable in Java?

(a) ""
(b) null
(c) "default"
(d) Undefined

Ans. B

(xiii) What is the output of the following code?

```
System.out.println("Java" + 2 + 3);
```

(a) Java23
(b) Java5
(c) Compilation error
(d) 5

Ans. A

(xiv) In Java, what will happen if you divide an integer by zero?

(a) Compilation error
(b) Runtime exception (ArithmeticException)
(c) Returns infinity
(d) Returns NaN

Ans. B

(xv) Which of these is a valid declaration of a 2D array in Java?

(a) `int arr[][] = new int[3][3];`
(b) `int arr = new int[3][3];`
(c) `int[][] arr = new int[3][3];`
(d) Both a and c

Ans. D

(xvi) **Assertion:** Arrays in Java are of fixed size once initialized.

Reason: The size of an array can be dynamically increased or decreased during runtime.

(a) Both Assertion and Reason are true, and the Reason is the correct explanation of the Assertion.
(b) Both Assertion and Reason are true, but the Reason is not the correct explanation of the Assertion.
(c) Assertion is true, but the Reason is false.
(d) Both Assertion and Reason are false.

Ans. C

(xvii) **Assertion:** Strings in Java are immutable.

Reason: The `String` class in Java uses a mutable `char[]` array to store its content.

(a) Both Assertion and Reason are true, and the Reason is the correct explanation of the Assertion.
(b) Both Assertion and Reason are true, but the Reason is not the correct explanation of the Assertion.
(c) Assertion is true, but the Reason is false.
(d) Both Assertion and Reason are false.

Ans. C

(xviii) What is the output of the following code?

```
int i = 5;
while (i > 0)
{
    System.out.print(i + " ");
    i--;
}
```

(a) 5 4 3 2 1
(b) 5 4 3 2 1 0
(c) 4 3 2 1
(d) Infinite loop

Ans. A

(xix) What is the output of the following code?

```
int sum = 0;
for (int i = 1; i <= 3; i++) {
    sum += i;
}
System.out.println(sum);
```

(a) 10
(b) 6
(c) 3
(d) Compilation error

Ans. B

(xx) What is an infinite loop in Java?

(a) A loop that runs only once.
(b) A loop that has a fixed number of iterations.
(c) A loop that never terminates.
(d) None of the above.

Ans. C

Question 2 **[20]**

(i) What do you understand by type conversion? How is implicit conversion different from explicit conversion?

Ans. The process of converting one predefined type into another is called type conversion. In an implicit conversion, the result of a mixed mode expression is obtained in the higher most data type of the variables without any intervention by the user.

(ii) Write two advantages of using functions in a program.

Ans. 1.Methods help to manage the complexity of the program by dividing a bigger complex task into smaller, easily understood tasks.
2. Methods help with code reusability.

(iii) What is an array? Write a statement to declare an String array of 20 elements.

Ans. An array is a structure to store a number of values of the same data type in contiguous memory locations.
The following statement declares a String array of 20 elements:
String n[] = new String[20];

(iv) What are the values of b and t when the following statements are executed?

```
int a = 54, b = 22;
boolean b = (a < b)? true :
false; int t = (a < b)? a : b
```

Ans.
b=false
t=22

(v) Arrange the following primitive data types in descending order of their size:

(i) char (ii) byte (iii) double (iv) int

Ans.
double>int>char>byte

(vi) Rewrite the following program segment using while instead of for statement.

```
int s=0, i;
for(i = 1; i <= 5; i++){
  s+=i;
  System.out.println(
  s);
}
```

Ans.

```
int s = 0, i;
while (i <= 5) {
   s+= i;
   System.out.println(s);
   i++;
}
```

(vii)

(a) Name the mathematical function which is used to find cosine of an angle given in radians.

(b) Name the string function which finds the position of last occurrence of a character in a string.

Ans.

(a) Math.acos()

(b) lastIndexOf()

(viii) Differentiate between length and length() ?

Ans.

length	Length()

It is used to find the number of elements in the array	It is used to find the number of characters present in a string.

(ix) Write the output:

```
char ch ;
int
x=115;
do
{
  ch=(char)x;
  System.out.print(ch + " " );
  if(x%10 == 0)
  break;
  ++x;
} while(x<=120);
```

Ans.

stuvwx

(x) If int y = 5 then find int z = (++y * (y++ + 7));

Ans.

z = (++y * (y++ + 5))

z = (6 * (6 + 7))

z = (6 * 13)

z = 78

SECTION B (60 Marks)

*Attempt **any four** questions from this section.*

*The answers in this Section should consists of the **Programs in Blue J environment with the Java as the base.***

*Each program should be written using **Variable descriptions/ Mnemonic Codes** so that the logic of the program is clearly depicted.*

*Flow-Charts and Algorithms **are not required.***

Question 3

Define a class called Air_Lounge with the following description:

Instance Variables/Data Members:

String PNR — stores the PNR number of the guest

String name — stores the name of the guest

long mob— stores the mobile number of the guest

Member methods:

1. void input() — To input and store the PNR,name and mobile number
2. void compute() — To accept the number of hours the guest stays in the lounge , calculate and display the rent at the rate of Rs. 2500 for upto 2 hours and for additional hours Rs. 780 per hour
3. void display() — To display the details .

Write a main method to create an object of the class and call the above member methods.

Ans.

```
import java.util.*;
class Air_Lounge()
{
int hr,r;
```

```
String PNR,name;
```

```
long mob;

  void input() {
     Scanner input = new Scanner(System.in);
     System.out.print("Enter PNR, name and mobile number: ");
     PNR= input.next();
     name = input.next();
     mob= input.nextLong();
  }

 void compute()
{
     Scanner input = new Scanner(System.in);
     System.out.print("Enter number of hours of stay ");
     hr= input.next();

     if (hr <= 2)
        r=2500
     else
       r= 2500+ (hr - 2) * 780;
  }

void display() {
     System.out.println("PNR number: " + PNR);
     System.out.println("Hours: " + hr);
     System.out.println("Rental: " + r);
  }

  public static void main(String args[])
{
     Air_Loungeob = new Air_Lounge();
     ob.input();
     ob.compute();
     ob.display();
  }
}
```

VARIABLE DESCRIPTION TABLE

Variable name	Type	Description
PNR	String	To input the PNR
name	String	To input the name
mob	long	To input the mobile number
hr	int	To input the hours
b	int	To find the bill

Question 4

Write a program to input numbers in a 4 * 4 Double Dimension array.
Display the array. Double every element of the array and display the array.

Ans.

```
import java.util.*;
class double_dda
{
public static void main(String args[]){ Scanner
        input = new Scanner(System.in); int a[][] =
        new int[4][4];
        System.out.println("Enter elements of the array");
              for(int i = 0; i < 4; i++)
        {
           System.out.println("Enter elements of row " + (i+1));
           for(int j = 0; j < 4; j++)
           {
              a[i][j] = input.nextInt();
           }
        }

        System.out.println("Original array :");
        for(int i = 0; i < 4; i++)


           for(int j = 0; j < 4; j++)
           {
              System.out.print(a[i][j] + "\t");
           }
           System.out.println();
        }
```

```
    for(int i = 0; i < 4; i++)
    {
      for(int j = 0; j < 4; j++)
      {
        a[i][j] = a[i][j] * 2;
      }
    }


    System.out.println("New Array");
    for(int i = 0; i < 4; i++)
    {
      for(int j = 0; j < 4; j++)
      {
         System.out.print(a[i][j] + "\t");
      }
      System.out.println();
    }
  }
}
```

VARIABLE DESCRIPTION TABLE

Variable name	Type	Description
a[][]	Integer Array	To input the array
i	int	To use in the loop
j	int	To use in the loop

Question 5

Using switch statement, write a menu driven program to:

(i) To find and display all the factors of a number input by the user Example:

Sample Input : n = 25

Sample Output : 1, 5,25

(ii) To find and display the factorial of a number input by the user (the factorial of a non-negative integer n, denoted by n!, is the product of all integers less than or equal to n.)

Example:

Sample Input : n = 4

Sample Output : 5! = 1*2*3*4 = 24

For an incorrect choice, an appropriate error message should be displayed.

Ans.

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

```
public class Num_Menu
{
   public static void main(String args[])
{
       Scanner input = new Scanner(System.in);
       System.out.println("1. Factors of number");
       System.out.println("2. Factorial of number");
       System.out.print("Enter your choice: ");
       int choice = input.nextInt();
       int num;

            switch (choice) {
         case 1:
         System.out.print("Enter number: ");
         num = input.nextInt();
         for (int i = 1; i <= num; i++) {
            if (num % i == 0)
{
               System.out.print(i + " ");
            }
         }
  System.out.println();
         break;
         case 2:
         System.out.print("Enter number: ");
         num = input.nextInt();
         int f = 1;
         for (int i = 1; i <= num; i++)
            f *= i;
         System.out.println("Factorial = " + f);
         break;



          default:
          System.out.println("Incorrect Choice");
          break;
      }
   }
}
```

}VARIABLE DESCRIPTION TABLE

Variable name	Type	Description
num	int	To input the number

ch	int	To input the choice
i	int	To use in loop
f	int	To find the factorial

Question 6

Write a program to input the names of 10 students and their marks in two different arrays. Using selection sort technique create a mark list in which names are arranged in descending order of the marks.

Ans.

```
import java.util.*;

class ssortm
{
public static void main(String args[])
{
Scanner input=new Scanner(System.in);
int i,j,max=0,t;String x;
String n[]=new String[10];
int m[]=new int[10];
for(i=0;i<10;i++)
{

System.out.println("enter a name");
n[i]=input.next();
System.out.println("enter marks");
m[i]=input.nextInt();
}
for(i=0;i<9;i++)
{
max=i;
for(j=i+1;j<10;j++)
{
if(m[j]>m[max])
max=j;
}
```

```
t=m[max];
x=n[max];
m[max]=m[i];
n[max]=n[i];
m[i]=t;
n[i]=x;
}
System.out.println("Sorted Marks List in descending order:");
for(i=0;i<10;i++)
{
System.out.println(n[i]+"\t"+m[i]);
}
}
```

}VARIABLE DESCRIPTION TABLE

Variable name	Type	Description
n[]	String Array	To input the String array
m[]	Integer Array	To input the Integer array
i	int	To use in the loop
j	int	To use in the loop

Question 8

Design a class to overload a function area( ) as follows :

(i) void area(double a, double b, double c) with three double arguments, finds the area of a scalene triangle using the formula :

area=$\sqrt{s(s-a)(s-b)(s-c)}$

where s=(a+b+c)/2

(ii) void area(int a, int b, int height) with three integer arguments, prints the area of a trapezium using the formula :

area = 1/2 height(a + b)

(iii) void area(double diagonal1, double diagonal2) with two double arguments, prints the area of a rhombus using the formula :

area = 1/2 (diagonal1 x diagonal2)

Ans.

```
class AreaOverload
{
  void area(double a, double b, double c)
{
      double s = (a + b + c) / 2;
      double x = s * (s-a) * (s-b) * (s-c);
      double result = Math.sqrt(x);
      System.out.println("Area of triangle ="+result);
   }

   void area (int a, int b, int height)
 {
      double result = (1.0 / 2.0) * height * (a + b);
           System.out.println("Area of trapezium ="+result);

   }

void area (double diagonal1, double diagonal2) { double
      result = 1.0 / 2.0 * diagonal1 * diagonal2;
      System.out.println("Area of Rhombus ="+result);

   }
}
}
```

VARIABLE DESCRIPTION TABLE

Variable name	Type	Description
i	int	To use in the loop
j	int	To use in the loop

Question 9

Write a program to input a sentence and find those words which begin and end with a vowel. Also count the number of such words.

Sample Input: Ananya and Anushka went to Agra

Sample Output: Ananya
Anushka
Agra

Number of such words =3

```
Ans. import java.io.*;
class strvowel
{
public static void main(String args[])
{
Scanner input=new Scannerr (System.in);
String s,w="";
```

```
int i,l,f=0; char
c,c1,c2;
System.out.println("enter a sentence");
s=input.nextLine();
s=s.toUpperCase();
s=s+" ";
l=s.length();
for(i=0;i<l;i++)
{
c=s.charAt(i);
if(c!=' ') w=w+c;
else
{
c1=w.charAt(0);
c2=w.charAt(w.length()-1);
if((c1=='A'||c1=='E'||c1=='I'||c1=='O'||c1=='U')&&(c2=='A'||c2=='E'||c2=='I'||c2=='O'||c2=='U'))
{
System.out.println(w); f++;
} w="";
}
}
System.out.println("Number of times such word occured="+f);
}
}
```

VARIABLE DESCRIPTION TABLE

Variable name	Type	Description
s	String	To input the sentence
l	int	To find the length of the string
i	int	To use in the loop
c	char	To extract the character
w	String	To form the word
c1	char	To extract the first character
c2	char	To extract the last character
f	int	To count number of words which begin and end with vowel