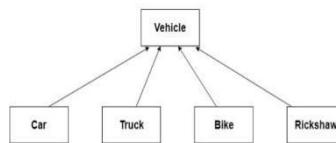


Question 1

[20]

(i) Name the principle of java shown in the above picture.

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



(ii) Assertion: Java supports object-oriented programming by using concepts like encapsulation and inheritance.

Reason: Encapsulation is achieved by making class variables private and providing public getter and setter methods.

- (a) Assertion is correct and Reason is correct for the given statement
- (b) Assertion is correct but Reason is not correct for the given statement
- (c) Assertion is not correct and Reason is correct statement
- (d) Assertion is not correct and Reason is not a correct statement

(iii) What does the keyword `static` signify in Java?

- (a) A variable or method belongs to the object.
- (b) A variable or method belongs to the class rather than an instance.
- (c) A variable cannot be modified.
- (d) A method can only be called once.

(iv) Parameters passed to a method during the method call are called:

- (a) Actual parameters
- (b) Formal parameters
- (c) Default parameters
- (d) Dynamic parameters

(v) The `.equals()` method in Java is used to:

- (a) Compare two strings for content equality.
- (b) Compare two strings using reference equality.
- (c) Check the length of a string.
- (d) Reverse a string.

- (vi) Identify the valid data type for storing fractional numbers in Java:
- (a) `int`
 - (b) `boolean`
 - (c) `float`
 - (d) `char`
- (vii) Which access modifier allows access to a class member only within the same package?
- (a) `public`
 - (b) `protected`
 - (c) `private`
 - (d) Default (no modifier)
- (viii) What is the result of the following code? `int a = 5, b = 10; System.out.println(a++ + ++b);`
- (a) 15
 - (b) 16
 - (c) 17
 - (d) 18
- (ix) Which of the following operators is a logical operator in Java?
- (a) `&`
 - (b) `||`
 - (c) `%`
 - (d) `==`
- (x) What is the default value of an instance variable of type `boolean`?
- (a) `true`
 - (b) `false`
 - (c) `null`
 - (d) `0`
- (xi) In Java, arrays are:
- (a) Fixed in size.
 - (b) Dynamic in size.
 - (c) Initialized automatically to non-zero values.
 - (d) Stored as primitive data types only.
- (xii) What will the output of the following code be? `double num = 7 / 2; System.out.println(num);`
- (a) 3.5
 - (b) 3
 - (c) 3.0
 - (d) Compilation Error
- (xiii) A constructor in Java is:
- (a) A method to destroy an object.
 - (b) A method called when an object is created.
 - (c) Used only with static methods.

(d) A method that must have a return type.

- (xiv) Identify the method that converts a string to an integer in Java:
- (a) `Integer.toInt()`
 - (b) `Integer.parseInt()`
 - (c) `toInteger()`
 - (d) `String.toInt()`
- (xv) The keyword `final` in Java can be used to declare:
- (a) A constant variable.
 - (b) A method that cannot be overridden.
 - (c) A class that cannot be inherited.
 - (d) All of the above.

- (xvi) The `switch` statement in Java supports which data types?
- (a) `int`, `char`, `String`
 - (b) `boolean`, `float`, `double`
 - (c) `long`, `float`, `char`
 - (d) Only `int`
- (xvii) What is the purpose of the `this` keyword in Java?
- (a) It refers to the current object.
 - (b) It refers to the superclass.
 - (c) It refers to static methods only.
 - (d) It refers to methods in other classes.
- (xviii) What is the output of the following code?
- ```
System.out.println(Math.min(5.5, 6.0));
```
- (a) 5.5
  - (b) 6.0
  - (c) `NaN`
  - (d) Compilation Error
- (xix) What is the default return type of a Java method that does not explicitly return a value?
- (a) `int`
  - (b) `void`
  - (c) `null`
  - (d) None of the above
- (xx) What does the `continue` statement do in a loop?
- (a) Terminates the loop entirely.
  - (b) Skips the remaining statements in the current iteration and moves to the next iteration.
  - (c) Exits the loop and returns to the calling method.
  - (d) Stops the program execution.

## Question 2

[20]

- (i) What is the output of the following code snippet?
- ```
int x = 10;
int y = 20;
if (x > y) {
    System.out.println("x is greater than y");
} else {
    System.out.println("y is greater than or equal to x");
}
```
- (ii) What is the output of the following code snippet?
- ```
int[] numbers = {10, 20, 30, 40, 50};
for (int i = 0; i < numbers.length; i++) {
 System.out.print(numbers[i] + " ");
}
```
- (iii) Convert the following segment into

```
 equivalent for loop. int i;
 i=20;
 while(i<=25)
 {
if(i==24)
 continu
 e;
 System.out.print(i+" ");
 i++;
 }
```

- (iv) Explain the concept of inheritance in Java.
- (v) What is the output of the following code snippet?  
int x = 10;  
int y = ++x;  
System.out.println  
(x);  
System.out.println  
(y);
- (vi) Explain the difference between == and equals() methods in Java
- (vii) Explain call by reference in java?
- (viii) Differentiate between Selection sort and Bubble sort?
- (ix) Write the output:
  - a) String str = "Programming"; System.out.println(str.substring(3, 8));
  - b) String str = "12345"; System.out.println(str.charAt(0) + str.charAt(4));
- (x) Explain the use of break statement along with a proper example?

## SECTION B (60 Marks)

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

The answers in this Section should consist 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

The new Multistoried Parking station of the city has been developed. Define a class called Parking Lot with the following description:

Instance variables/data members:

int vno — To store the vehicle number.

int hours — To store the number of hours the vehicle is parked in the parking

lot. double bill — To store the bill amount.

Member Methods:

void input() — To input and store the vno and hours.

void calculate() — To compute the parking charge at the rate of ₹ 20 for the first hour or part thereof, and ₹15 for each additional hour or part thereof.

void display() — To display the detail.

Write a main() method to create an object of the class and call the above methods

### Question 4

Write a program to input numbers in a 4 \* 5 Double Dimension array. Find the biggest element of each row of the array.

ARRAY

|    |    |    |    |   |
|----|----|----|----|---|
| 12 | 3  | 2  | 3  | 1 |
| 3  | 14 | 3  | 5  | 4 |
| 2  | 25 | 42 | 24 | 4 |
| 51 | 1  | 2  | 37 | 4 |

Sum row1=1  
of 2

Sum of  
row2=14 Sum  
of row3=42

Sum of  
row4=51

### Question 5

Write a menu driven program to accept a number from the user and check whether it is a Prime number or an Automorphic number.

(a) Prime number: (A number is said to be prime, if it is only divisible by 1 and itself)

Example: 3,5,7,11

(b) Automorphic number: (Automorphic number is the number which is contained in the last digit(s) of its square.)

Example: 25 is an Automorphic number as its square is 625 and 25 is present as the last two digits.

{

### Question 6

Write a program to input twenty names in an array. Arrange these names in descending order of letters, using the bubble sort technique.

### Question 7

Design a class to overload a function print\_design() as follows:

void print\_design (int n, char ch) — with one integer and one character type argument to draw a filled square of side n using the character stored in ch.

void print\_design (int x, int y) — with two integer arguments that draws a filled rectangle of length x and breadth y, using the symbol '#'.

void print\_design () — with no argument that draws a filled triangle shown below: Example:

Input value of n=3, ch = 'P'

Output:

PP

P

PP

P

PP

P

Input value of x = 2, y = 5

Output:

#####

#

#####

#

Output:

\*

\*\*

\*\*\*

### Question 8

Write a program to accept a word and convert it into lower case, if it is in upper case. Display the new word by replacing the vowels with the letter following it and the other letters with the letter before it.

Sample Input: traditional

Sample Output:

sqbcjsjnsjpmbk

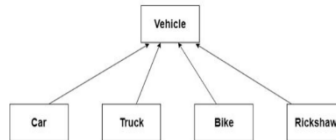


**Question 1**

**[20]**

(i) Name the principle of java shown in the above picture.

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



Ans. D

(ii) Assertion: Java supports object-oriented programming by using concepts like encapsulation and inheritance.

Reason: Encapsulation is achieved by making class variables private and providing public getter and setter methods.

- (a) Assertion is correct and Reason is correct for the given statement
- (b) Assertion is correct but Reason is not correct for the given statement
- (c) Assertion is not correct and Reason is correct statement
- (d) Assertion is not correct and Reason is not a correct statement

Ans. A

(iii) What does the keyword `static` signify in Java?

- (a) A variable or method belongs to the object.
- (b) A variable or method belongs to the class rather than an instance.
- (c) A variable cannot be modified.
- (d) A method can only be called once.

Ans. B

(iv) Parameters passed to a method during the method call are called:

- (a) Actual parameters
- (b) Formal parameters
- (c) Default parameters
- (d) Dynamic parameters

Ans. A

(v) The `.equals()` method in Java is used to:

- (a) Compare two strings for content equality.
- (b) Compare two strings using reference equality.
- (c) Check the length of a string.
- (d) Reverse a string.

Ans. A

(vi) Identify the valid data type for storing fractional numbers in Java:

- (a) `int`
- (b) `boolean`
- (c) `float`

(d) ``char``

Ans. C

(vii) Which access modifier allows access to a class member only within the same package?

- (a) ``public``
- (b) ``protected``
- (c) ``private``
- (d) Default (no modifier)

Ans. D

(viii) What is the result of the following code? `int a = 5, b = 10;`  
`System.out.println(a++ + ++b);`

- (a) 15
- (b) 16
- (c) 17
- (d) 18

Ans. C

(ix) Which of the following operators is a logical operator in Java?

- (a) ``&``
- (b) ``||``
- (c) ``%``
- (d) ``==``

Ans. B

(x) What is the default value of an instance variable of type ``boolean``?

- (a) ``true``
- (b) ``false``
- (c) ``null``
- (d) ``0``

Ans. B

(xi) In Java, arrays are:

- (a) Fixed in size.
- (b) Dynamic in size.
- (c) Initialized automatically to non-zero values.
- (d) Stored as primitive data types only.

Ans. A

(xii) What will the output of the following code be? `double num = 7 / 2;`  
`System.out.println(num);`

- (a) 3.5
- (b) 3
- (c) 3.0
- (d) Compilation Error

Ans. B

(xiii) A constructor in Java is:

- (a) A method to destroy an object.
- (b) A method called when an object is created.
- (c) Used only with static methods.
- (d) A method that must have a return type.

Ans. B

(xiv) Identify the method that converts a string to an integer in Java:

- (a) ``Integer.toInt()``
- (b) ``Integer.parseInt()``
- (c) ``toInteger()``
- (d) ``String.toInt()``

Ans. B

(xv) The keyword `final` in Java can be used to declare:

- (a) A constant variable.
- (b) A method that cannot be overridden.
- (c) A class that cannot be inherited.
- (d) All of the above.

Ans. D

- (xvi) The `switch` statement in Java supports which data types?
- (a) `int`, `char`, `String`
  - (b) `boolean`, `float`, `double`
  - (c) `long`, `float`, `char`
  - (d) Only `int`

Ans. A

- (xvii) What is the purpose of the `this` keyword in Java?
- (a) It refers to the current object.
  - (b) It refers to the superclass.
  - (c) It refers to static methods only.
  - (d) It refers to methods in other classes.

Ans. A

- (xviii) What is the output of the following code?
- ```
System.out.println(Math.min(5.5, 6.0));
```
- (a) 5.5
 - (b) 6.0
 - (c) `NaN`
 - (d) Compilation Error

Ans. A

- (xix) What is the default return type of a Java method that does not explicitly return a value?
- (a) `int`
 - (b) `void`
 - (c) `null`
 - (d) None of the above

Ans. B

- (xx) What does the `continue` statement do in a loop?
- (a) Terminates the loop entirely.
 - (b) Skips the remaining statements in the current iteration and moves to the next iteration.
 - (c) Exits the loop and returns to the calling method.
 - (d) Stops the program execution.

Ans. B

Question 2

[20]

- (i) What is the output of the following code snippet?
- ```
int x = 10;
int y =
20; if (x
> y) {
 System.out.println("x is greater than y");
} else {
 System.out.println("y is greater than or equal to x");
}
```

Ans. y is greater than or equal to x

- (ii) What is the output of the following code snippet?
- ```
int[] numbers = {10, 20, 30, 40, 50};
for (int i = 0; i < numbers.length; i++) {
```

```
    System.out.print(numbers[i] + " ");  
}
```

Ans. 10 20 30 40 50

(iii) Convert the following segment into equivalent for loop.

```

int i;
i=20;
while(i<=25)
{
    if(i==24)
        continue;
    System.out.print(i+" ");
    i++;
}

```

Ans.

20
21
22
23
25

(iv) Explain the concept of inheritance in Java.

Ans. Inheritance is a fundamental concept in object-oriented programming that allows one class to inherit properties and methods from another class. It promotes code reusability and helps in creating hierarchical relationships between classes.

(v) What is the output of the following code snippet?

```

int x = 10;
int y = ++x;
System.out.println(x);
System.out.println(y);

```

Ans.

11
11

(vi) Explain the difference between == and equals() methods in Java

Ans.

==	equals
Compares references of two objects.	Compares the contents of two objects.
Used for primitive data types	Used for String data type

(vii) Explain call by reference in java ?

Ans. Call by Reference is a concept in programming where a reference to the actual memory address of an argument is passed to a method. Any changes made to the argument inside the method affect the original object or variable since both refer to the same memory location.

(viii) Differentiate between Selection sort and Bubble sort ?

Ans.

Selection sort	Bubble sort
In each iteration, the smallest element is found and placed at its correct position.	Compares adjacent elements and swaps them if they are in the wrong order.

(ix) Write the output:

- a) `String str = "Programming"; System.out.println(str.substring(3, 8));`
- b) `String str = "12345"; System.out.println(str.charAt(0) + str.charAt(4));`

Ans.

- a) grammi
- b) 56

(x) Explain the use of break statement along with a proper example ?

Ans. break statement is used to take the program out of the loop. When the specific condition arises the loop execution stops.

Example:

```
int i;  
for(i=1;i<=10;i++)  
{  
    if(i==4)  
        break;  
    System.out.println(i);  
}
```

Ans.

- 1
- 2
- 3

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

The new Multistoried Parking station of the city has been developed. Define a class called ParkingLot with the following description:

Instance variables/data members:

int vno — To store the vehicle number.

int hours — To store the number of hours the vehicle is parked in the parking lot.

double bill — To store the bill amount.

Member Methods:

void input() — To input and store the vno and hours.

void calculate() — To compute the parking charge at the rate of ₹ 20 for the first hour or part thereof, and ₹15 for each additional hour or part thereof.

void display() — To display the detail.

Write a main() method to create an object of the class and call the above methods

.Ans.


```

import java.util.*;

class ParkingLot
{
    int vno;
    int hours;
    double bill;

    void input() {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter vehicle number: ");
        vno = input.nextInt();
        System.out.print("Enter hours: ");
        hours = input.nextInt();
    }

    void calculate() {
        if (hours <=
            1)
            bill = 20;
        else
            bill = 20+ (hours - 1) * 15;
    }

    void display() {
        System.out.println("Vehicle number: " + vno);
        System.out.println("Hours: " + hours);
        System.out.println("Bill: " + bill);
    }

    public static void main(String args[])
    {
        ParkingLot ob = new ParkingLot();
        ob.input();
        ob.calculate();
        ob.display();
    }
}

```

VARIABLE DESCRIPTION TABLE

Variable name	Type	Description
vno	int	To input the vehicle number
hours	int	To input the hours
bill	double	To find the bill

Question 4

Write a program to input numbers in a 4 * 5 Double Dimension array. Find the biggest element of each row of

the array.

ARRAY

12	3	2	3	1
3	14	3	5	4
2	25	42	24	4
51	1	2	37	4

Sum of row1=12

Sum of row2=14

Sum of row3=42

Sum of row4=51

Ans.

```
import java.util.*;
class ddamax
{
    public static void main(String args[])
    {
        Scanner input=new Scanner(System.in);
        int a[][]=new int[4][5];
        int i,j,s;
        for(i=0;i<4;i++)
        {
            for(j=0;j<5;j++)
            {
                System.out.println("Enter a number");
                a[i][j]=input.nextInt();
            }
        }
        for(i=0;i<4;i++)
        {
            m=0;
            for(j=0;j<5;j++)
            {
                If(a[i][j]>m)
                m=a[i][j];
            }
            System.out.println("Biggest element of row "+(i+1)+"="+m);
        }
    }
}
```

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
m	int	To find the biggest element of the row

Question 5

Write a menu driven program to accept a number from the user and check whether it is a Prime number or an Automorphic number.

(a) Prime number: (A number is said to be prime, if it is only divisible by 1 and itself) Example: 3,5,7,11

(b) Automorphic number: (Automorphic number is the number which is contained in the last digit(s) of its square.)

Example: 25 is an Automorphic number as its square is 625 and 25 is present as the last two digits.

Ans.

```
import java.util.*;
class numbers
{
    public static void main(String args[])
    {
        Scanner input = new Scanner(System.in);

        System.out.println("1. Prime number");
        System.out.println("2. Automorphic number");
        System.out.print("Enter your choice: ");
        int ch = input.nextInt();
        System.out.print("Enter number: ");
        int num = input.nextInt();

        switch (ch) {
            case 1:
                int c = 0;
                for (int i = 1; i <= num; i++) {
                    if (num % i == 0) {
                        c++;
                    }
                }
                if (c == 2)
                    System.out.println(num + " is Prime");
                else
                    System.out.println(num + " is not Prime");
                break;
            case 2:
                int t = num;
                int sq = num *
                num; int d = 0;
                while(num > 0) {
                    d++;
                    num /= 10;
                }
            }
```

```

int ld = (int)(sq % Math.pow(10, d));
if (ld == t)
    System.out.println(numCopy + " is automorphic");
else
    System.out.println(numCopy + " is not automorphic");
break;
default:
System.out.println("Incorrect Choice");
break;
}
}

```

TABLE DESCRIPTION

Variable name	Type	Description
ch	int	To input the choice
num	int	To input the number
c	int	To find the number of factors
t	int	To store a copy of the number
sq	int	To find the square of the number
d	int	To count the number of digits

Question 6

Write a program to input twenty names in an array. Arrange these names in descending order of letters, using the bubble sort technique.

Ans.

```

import java.util.*;
class bsorts
{
public static void main(String args[])
{
Scanner input=new Scanner(System.in));
int i,j;
String t="";
String n[]=new String[20];
for(i=0;i<20;i++)
{
System.out.println("enter a name");
n[i]=input.next();
}
for(i=0;i<19;i++)
{
for(j=0;j<19-i;j++)
{
if(n[j].compareTo(n[j+1])<0)
{

```

```
t=n[j];
```

```

n[j]=n[j+1];
n[j+1]=t;
}
}
}
System.out.println("Sorted array in descending order:");
for(i=0;i<20;i++)
{
System.out.println(n[i]);
}
}
}
}

```

VARIABLE DESCRIPTION TABLE

Variable name	Type	Description
n[]	String Array	To input the array
t	String	To store the string temporarily
i	int	To use in the loop
j	int	To use in the loop

Question 7

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

void print_design (int n, char ch) — with one integer and one character type argument to draw a filled square of side n using the character stored in ch.
void print_design (int x, int y) — with two integer arguments that draws a filled rectangle of length x and breadth y, using the symbol '#'.
void print_design () — with no argument that draws a filled triangle shown below:
Example:

Input value of n=3, ch = 'P'

Output:

PPP

PPP

PPP

Input value of x = 2, y = 5

Output:

#####

#####

Output:

*

**

Ans.

class overload

```

{
Void print_design(int n, char ch) {

```



```

        for (int i = 1; i <= n; i++) {
            for (int j = 1; j <= n; j++) {
                System.out.print(ch);
            }
            System.out.println();
        }
    }

    void print_design(int x, int y) {
        for (int i = 1; i <= x; i++) {
            for (int j = 1; j <= y; j++) {
                System.out.print('#');
            }
            System.out.println();
        }
    }
}

```

```

void print_design() {
    for (int i = 1; i <= 3; i++) {
        for (int j = 1; j <= i; j++)
        {
            System.out.print('*');
        }
        System.out.println();
    }
}

```

```

public static void main(String args[]) {
    overload ob = new overload();
    ob. print_design (3, 'P');
    ob. print_design (2, 5);
    ob. print_design ();
}

```

} VARIABLE DESCRIPTION TABLE

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

Question 8

Write a program to accept a word and convert it into lower case, if it is in upper case. Display the new word by replacing the vowels with the letter following it and the other letters with the letter before it.

Sample Input: traditional

Sample Output: sqbcjsjnsjpmbk

Ans. import java.util.*;

www.yashwantclasses.in

class restructure

```

{
    public static void main(String args[])
    {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter a word: "); String
        str = input.nextLine();
        str = str.toLowerCase();
        String newStr = "";
        int len = str.length();

        for (int i = 0; i < len; i++) {
            char ch = str.charAt(i);

            if (str.charAt(i) == 'a' ||
                str.charAt(i) == 'e' ||
                str.charAt(i) == 'i' ||
                str.charAt(i) == 'o' ||
                str.charAt(i) == 'u')
            {
                char nextChar = (char)(ch + 1);
                newStr = newStr + nextChar;
            }
            else {
                char nextChar = (char)(ch - 1);
                newStr = newStr + nextChar;
            }
        }

        System.out.println(newStr);
    }
}

```

VARIABLE DESCRIPTION TABLE

Variable name	Type	Description
str	String	To input the sentence
newstr	String	To create a new String
len	int	To find the length of the string
i	int	To use in the loop
ch	char	To extract the character

