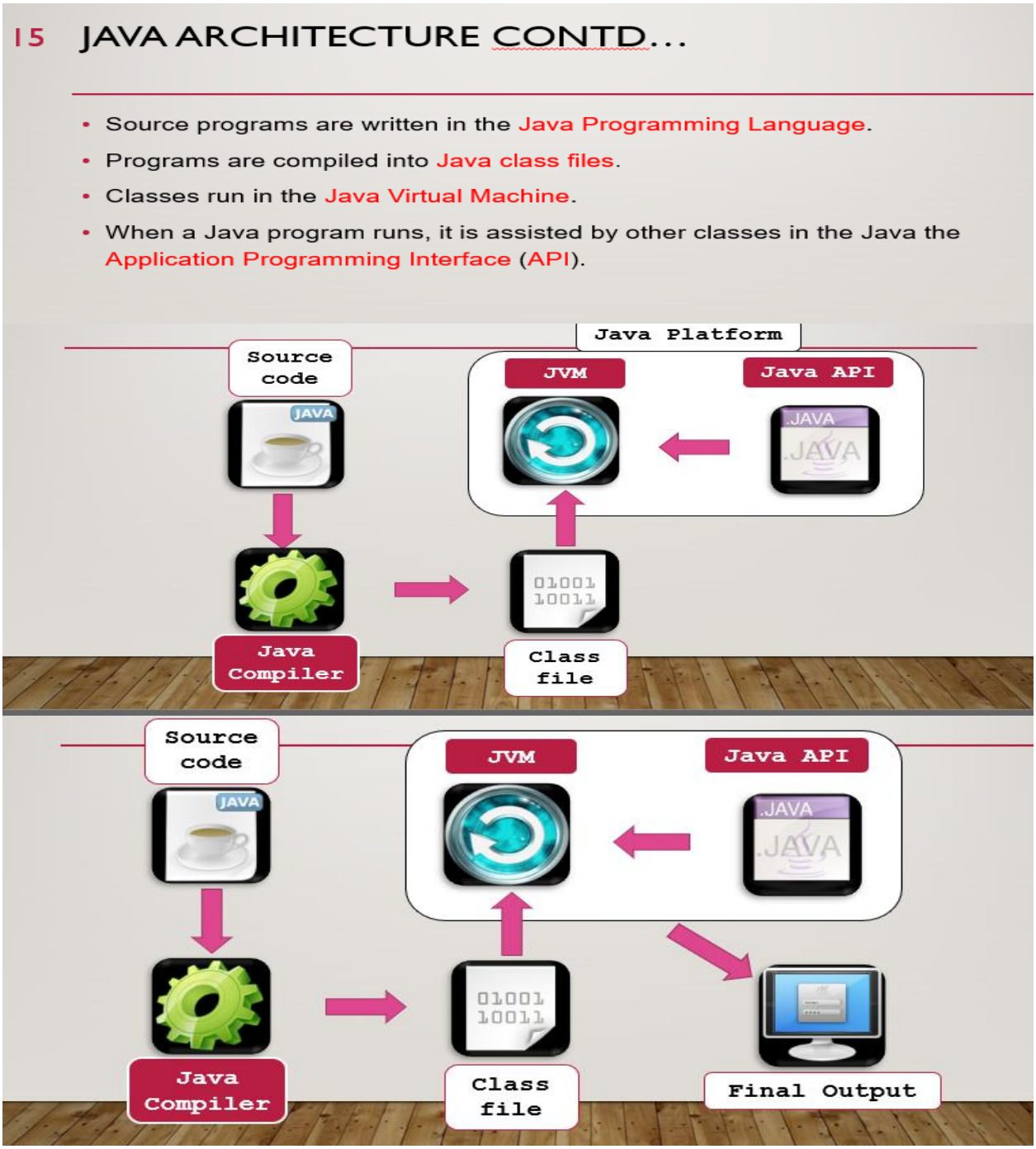
## Question 1


15 JAVA ARCHITECTURE CONTD...
• Source programs are written in the Java Programming Language.
• Programs are compiled into Java class files.
• Classes run in the Java Virtual Machine.
• When a Java program runs, it is assisted by other classes in the Java the Application Programming Interface (API).
Java Platform
Source code
JVM
Java API
Java Compiler
Class file
Source code
JVM
Java API
Java Compiler
Class file
Final Output

Question **2**

Correct

Mark 2.00 out of 2.00

Flag question

What is the Output of the Following java Expression

int K=(9&4|2);

Answer: 2

Question **3**

Not answered

Marked out of 2.00

Flag question

Explain **Garbage Collection** in Java

Java applications obtain objects in memory as needed. It is the task of garbage collection (GC) in the Java virtual machine (JVM) to **automatically determine what memory is no longer being used** by a Java application and to recycle this memory for other uses.

Question **4**

Complete

Marked out of 2.00

Flag question

The following Java code contains **Syntax Errors**. Correct the errors and rewrite the code

```
public static void main(String[] args)
{
        float r=45.78;
        sayHello();
}
void sayHello()
{
        System.out.println("Hello World");
}
```

```
public static void main(String[] args)
{
    float r 45.78f;
    sayHello();
}
public static void sayHello()
{
System.out.println("Hello World");
}
```

Question **5**
Complete
Marked out of 4.00
Flag question

Write a Java program to accept a base value and a power value as integers. The program should calculate and display the power to the base value.

**Sample Output:**
**Enter the base: 2**
**Enter the power: 3**
**Answer is 8**

```
import java.util.Scanner;
class Calculater
{
   public static void main(String[] args)
   {
      Scanner takeInput = new Scanner(System.in); //create an object for Scanner class
      System.out.print("Enter the base:"); //ask for inputs
      int base= takeInput.nextInt(); //get inputs
      System.out.print("Enter the power:");
      int power = takeInput.nextInt();
      takeInput.close(); //class getting inputs
      int answer =(int) Math.pow(base,power); //calculatiion
      System.out.println("Answer is "+answer); //print the answer
   }
}
```

Question **6**
Complete
Marked out of 8.00
Flag question

The following questions are based on validating the Serial Number of a piano.

i) The program should take the serial number as a user input. The **Serial Number** format contains **2 letters** and **4 digits**.
marks)

**Example: AB1234**

ii) The program should validate the serial number and display the **year of manufacture**, based on the following criteria.

**Hint: Consider the first two letters in the serial number as the letter part.**

| Letter Part | Year of Manufacture |
|---|---|
| IK | 1991 |
| IL | 1992 |
| IN | 1994 |

**Sample Output:**

**Insert a Serial Number: IK1234**

**Validation: Valid serial Number**

**Year of Manufacture: 1991**

```
package javaapplication1;

import java.util.Scanner;

class CheckSerial {

   public static void main(String[] args) {
      Scanner takeInput = new Scanner(System.in); //create an object for Scanner class
      System.out.print("Insert a Serial Number:"); //ask for inputs
      String SNumber = takeInput.nextLine(); //get inputs
      takeInput.close(); //class getting inputs
      ValidateNumber(SNumber); //call the method of ValidateNumber

   }

   public static boolean ValidateNumber(String Snumber)
   {
      String firstPart = Snumber.substring(0, 2); //get the first part of number
      String secondPart = Snumber.substring(2);//get the second part of the nubmer
      int year;

      if (firstPart.equals("IK") || firstPart.equals("IL") || firstPart.equals("IN"))
      {
         if (secondPart.length() == 4)
         {

            System.out.println("Validation : Valid Serial Number");

            switch (firstPart) {
```

```
                case "IK":
                    year = 1991;
                    break;
                case "IL":
                    year = 1992;
                    break;
                case "IN":
                    year = 1994;
                    break;
                default:
                    year = 0;
            }
            System.out.println("Year of Manufactrue : " +year);

        } else {
            System.out.print("Validation : This is not valid Serial Number");
        }
      }
      return true;
   }
}
```

Question **7**

Not answered

Marked out of 4.00

Flag question

What is the difference between **Method Overloading** and **Method Overriding? Give example for each**

The most basic difference is that **overloading is being done in the same class** while for overriding base and child classes are required. Overriding is all about giving a specific implementation to the inherited method of parent class. ... private and final methods can be overloaded but they cannot be overridden.

## Java Method Overloading example

```
class OverloadingExample{
static int add(int a,int b){return a+b;}
static int add(int a,int b,int c){return a+b+c;}
}
```

## Java Method Overriding example

```
class Animal{
void eat(){System.out.println("eating...");}
}
class Dog extends Animal{
void eat(){System.out.println("eating bread...");}
}
```

Question **8**

Not answered

Marked out of 8.00

Flag question

Write a Java program for the below problem using **Compound Operator.**

A program is required to take a salary of a person and years of experiences as **command line argument** and decide the category of the person based on the age. Evaluation criteria is as follows:

| Age | Category |
|---|---|
| >18 | Adult |
| <=18 | Minor |

**Sample Output:**

**Enter person's age: 8**

**Category is Minor**

```
package javaapplication1;

import java.util.Scanner;

class Kasun {

  public static void main(String[] args) {

      Scanner takeInput = new Scanner(System.in); //create an object for Scanner

      Kasun obj = new Kasun(); //create an object for Kasun class

      System.out.print("Enter person's age: "); //asks for inputs

      int age = takeInput.nextInt(); //getting inputs

      takeInput.close(); //close inputs

      obj.checkCategory(age); //call the method

   }

  public boolean checkCategory(int age) {

      String Category = (age > 18) ? "Adult" : "Minor";

      System.out.println("Category is " + Category);

      return true;

   }

}
```

## Question 9.

```
public abstract class Speaker { //no instance should be able created from the speaker class
   final double noise= 12.3; //noise variable should be read only
   private double SpeakerID;//speakerID variable shoudl accessible by other classes
   double RentalPrice;

   public Speaker(double sid, double rp)
   {
      SpeakerID =sid;
      RentalPrice =rp;
   }

   abstract double getMarketValue();
   protected String TestData()  //TestDate() method cannot be overriden  by the subclasses
   {
      return RentalPrice+ " "+SpeakerID;
   }

}
```

Question **10**
Not answered
Marked out of 4.00
Flag question

what is the output of the Following program

```
class Sample {

    int m = 20 ;
    static int n = 4 ;
    public static void main(String[] args) {
        new Sample().PlayWithVal();
        new Sample().PlayWithVal();

    }
    void PlayWithVal() {
        int m += 6;
        System.out.println("Sample n " + Sample.n);
        System.out.println("m " + m);
       n+=3  ;
    }
}
```

**Output->**

**Sample n 4**
**m 6**

**Sample n 7**
**m 6**

Question 11
Not answered
Marked out of 1.00
Flag question

State the main **disadvantage** of a **Array** vs an **ArrayList**

- Arrays are of fixed length. You can not change the size of the arrays once they are created. But Arraylist is a re-sizable array. And size of the arraylist is not fixed
- You can not accommodate an extra element in an array after they are created. But in ArrayLists , Element can be inserted at or deleted from a particular position
- Memory is allocated to an array during it's creation only, much before the actual elements are added to it.
  But in Arraylists, Arraylist class has many method to manipulate the stored objects.

Question 12
Not answered
Marked out of 2.00
Flag question

Compare and contrast a **ragged array** and a **rectangular array**

```
Int[ ][ ] rectangularArray = new int[10][10];
int[ ][ ] raggedArray = new int[10][ ];

    for(int i = 0;i < 10; i++)
      raggedArray[i] = new int[i+1];
```

First one creates a 10x10 **rectangular** array, the second one creates a **ragged** array, with the 2nd dimension going from 1 to 9 elements.

There are no significant differences, but Java supports ragged arrays unlike some other languages

Question **13**

Not answered

Marked out of 4.00

Flag question

Write a Java code segment to do the followings

- Create an int array of size 5 and fill the array with the user input.
- Calculate and display the summation of the numbers which are greater than 50

```
import java.util.Scanner;
class ArrayTest {
   public static void main(String[] args) {
      int[] array = new int[5]; //create new array
      int sum = 0;
      Scanner takeInput = new Scanner(System.in); //create a object for scanner class
      System.out.println("Enter 5 number :"); //ask for inputs

      for (int i = 0; i < array.length; i++) {
         System.out.println("Number " + (i + 1) + " - ");
         array[i] = takeInput.nextInt();
         if (array[i] > 50) {
            sum = sum + array[i];
         }
      }
      System.out.println("Sum of the numbers which greater than 50 is " + sum);
   }

}
```

Question **14**

Not answered

Marked out of 6.00

Flag question

Write a Java program which can perform the following tasks.

i) Create an **ArrayList** Object. (Available in the java.util Package).

ii) Insert any 5 **float numbers** between 0 and 1 to the Vector.

iii) Remove the 3rd element from the Vector.

iv) Print the remaining elements in the Vector.

```
package javaapplication1;

import java.util.ArrayList;

public class ArrayListCheck {


   public static void main(String[] args)

   {

      ArrayList<Float> KasunList = new ArrayList<Float>(); //create an Arraylist object called KasunList

      KasunList.add(0.1f); //add 5 float numbers
      KasunList.add(0.2f);
      KasunList.add(0.3f);
      KasunList.add(0.4f);
      KasunList.add(0.5f);


      KasunList.remove(2); //remove 3rd element

      for(float i : KasunList) //print the arraylist

      {

         System.out.println(i);

      }

   }

}
```

Question **15**

Not answered

Marked out of 7.00

Flag question

Write a Java program to store the following price list using a **Java 2D Array.** Your program should calculate and print the total price of the price list.

| Item Number | Price |
|---|---|
| 1001 | 255 |
| 1002 | 135 |
| 1004 | 522 |

```
package javaapplication1;

public class Java2DArray {


   public static void main(String[] args) {

      int[][] PriceList = {{1001, 225}, {1002, 135}, {1004, 522}};  //cretate 2d array and fill array

      int sum = 0;

      for (int i = 0; i < PriceList.length; i++) {

         sum = sum + PriceList[i][1];

      }

      System.out.println("Total price is " + sum);

   }

}
```

Question **16**

Not answered

Marked out of 2.00

Flag question

What is a **Checked Exception**? Give **one** example.

Checked exceptions are checked at compile-time. It means if a method is throwing a checked exception then it should handle the exception using **try-catch block** or it should declare the exception using **throws keyword**, otherwise the program will give a compilation error.

Not only that checked exception can be handled and this is user error.

Example->

**ClassNotFoundException**

**IOException**

**SQLException**

Question **17**

Not answered

Marked out of 5.00

Flag question

Write the Answer to the Questions based on the Exception given below.

**Note the question is case sensitive**

```
Exception in thread "main" java.lang.ArrayIndexOutOfBoundsException: 7
        at DetailsArray.Change(DetailsArray.java:9)
        at DetailsArray.main(DetailsArray.java:4)
```

1. What is the Exception class: **ArrayIndexOutofBoundsException**
2. Which array index is out of bounds: **7**
3. What method throws the exception: **DetailsArray.main**
4. What file contains the method : **DetailsArray.java**
5. What line of the file throw the exception: **9**

Question **18**

Not answered

Marked out of 3.00

Flag question

Rewrite the Following Question After Handling the Exceptions

```
public static void main(String[] args) {
            int num = Integer.parseInt("Cartoon");
            System.out.println(num);
            String n = null;
            int le = n.length();
            System.out.println("length is "+le);
}
```

```
public class HandlingException {
   public static void main(String[] args) {
      try {
         int num = Integer.parseInt("Cartoon");
         System.out.println("num");
         String n = null;
         int le = n.length();
         System.out.println("length is " + le);

      } catch (NumberFormatException ex) {
         System.out.println("Enter integer number");
      } catch (NullPointerException ex) {
         System.out.println("n cannot be null");
      } catch (ArrayIndexOutOfBoundsException ex) {
         System.out.println("no length in null values");
      } catch (Throwable ex) {
         System.out.println(ex.getMessage());
      }
      finally{
         System.out.println("This is the Handling Exception");
      }
   }
}
```

Question **19**

Not answered

Marked out of 4.00

Flag question

Answer the following Questions related to unit testing

1. Sate Two Examples libraries for Unit Testing frameworks belongs to xUnit Family
2. What is the Purpose of having Annotations in a Junit Testing Like @Before @After

**X unit family**

C# -> NUnit

Java -> Junit

Python _> PyUnit

**@Beforte ->it is used to specify that method will be called before each test case**

**@After -> it is used to specify that method will be called after each test case.**

Question **20**

Not answered

Marked out of 6.00

Flag question

Design a Junit Test for the Following Code Segment

```
public class LoanCal
{
     public double getTotalAmount(double amount)
    {
        return amount*1.1;
    }
}
```

```
package Test;
import org.junit.jupiter.api.*;
import Models.LoanCal;


public class Junit {

   static LoanCal c;

   double actual;

   @BeforeAll
   public static void initializeLoanCal() {
      c = new LoanCal();
   }

   @BeforeEach
   public void InitiliazegetTotalAmount() {
      actual = c.getTotalAmount(7);
   }

   @Test
   public void TestTotalAmount() {
      Assertions.assertEquals(7.7, actual);
   }

   @AfterEach
   public void cleanVarialble() {
      actual = 0;
   }

   @AfterAll
   public static void DeleteLoanCal() {
      c = null;
   }
}
```

Question **21**

Not answered

Marked out of 5.00

Flag question

Create an **Abstract** class called **Animal** as follows:

| | |
|---|---|
| Private Instance Fields(S) | · String **name**<br>· static float **price** |
| Constructor | Write a **constructor** to assign values (taken as parameters) to its instance fields respectively. |
| Public Methods | · String **getName()** - returns the name<br>· String **getPrice()** - returns the price<br>· abstract String **getSound()** |

```
public abstract class Animal {

   private String name;
   private static float price;

   public Animal(String name, float price)

   {
      this.name=name;
      this.price = price;
   }

   public String getName() {
      return name;
   }

   public static float getPrice() {
      return price;
   }

  public abstract String getSound();

}
```

Question **22**

Not answered

Marked out of 10.00

Flag question

Create sub classes **Dog** and **Cat** which **extend** the ***Animal*** class as given below.

**Cat**

| | |
|---|---|
| Private Instance Fields(S) | int **climbdistance** |
| Constructor | Write a **constructor** to assign values (taken as parameters) to its instance fields respectively. |
| Override Public Methods | · abstract String **getSound() -** return a string "Meow Meow"<br>· public void **climbdistance() -** prints the climb distance to the screen |

```
public class Cat extends Animal {
    private int climbdistance;
    public Cat(int climbdistance, String name) {
        super.getName();
        this.climbdistance = climbdistance;
    }
    @Override
    public String getSound() {
        return "Meow Meow";
    }
    public void climbdistance() {
        System.out.println(climbdistance );
    }
}
```

**Dog**

| | |
|---|---|
| Private Instance Fields(S) | int **noofSharpTeeth** |
| Constructor | Write a **constructor** to assign values (taken as parameters) to its instance fields respectively. |
| Override Public Methods | · abstract String **getSound() -** return a string "Woof Woof"<br>· public void **getnoofSharpTeeth() -** prints the number of sharp teeth. |

```
public class Dog extends Animal {
   private int noofSharpTeeth;
   public Dog(int noofSharpTeeth, String name)
   {
      super.getName();
      this.noofSharpTeeth=noofSharpTeeth;
   }
    @Override
   public  String getSound()
   {
      return "Woof Woof";
   }
   public void climbdistance()
   {
      System.out.println(noofSharpTeeth);
   }
}
```

Question **23**

Not answered

Marked out of 5.00

Flag question

Create **a class** called **PetShop,** which contains the **main()** method, to achieve the following tasks.

i) Create the dog instance using the values "German Shepard", 30000 and 32.

ii) Create the cat instance using the values "Persian cat", 10000 and 12.

iii) Print the following conversation with the use of fields and methods of the above classes.

**Sample Output:**

**German Shepard: Hello I am a German Shepard Dog. In my language, I say hello by saying Woof Woof.**

**Persian cat: Hello I am a Persian cat. In my language, I say hello by saying Meow Meow.**

**German Shepard: I have 32 Sharp Teeth.**

**Persian cat: I can climb 12 feet.**

**German Shepard: I can be bought at Rs.30000.00.**

**Persian cat: I can be bought at Rs.10000.00.**

```
package Models;

public class PetShop

{

   public static void main(String[] args) {


     Dog lucky = new Dog(32,"German Shepard",30000);
     Cat Chooti = new Cat(12,"Persian Cat",10000);


 System.out.println(lucky.getName()+": Hello I am a "+lucky.getName()+". In my language, I say hello by saying "+lucky.getSound());

 System.out.println(Chooti.getName()+": Hello I am a "+Chooti.getName()+". In my language, I say hello by saying "+Chooti.getSound());


       System.out.println(lucky.getName()+" I have ");
       lucky.getnoofSharpTeeth();
       System.out.println("Shape Teeth");



       System.out.print(Chooti.getName()+" I have ");
        Chooti.getclimbdistance();
       System.out.print("Shape Teeth");


       System.out.println(lucky.getName()+" I can be bought at Rs. "+Animal.getPrice());
       System.out.println(Chooti.getName()+" I can be bought at Rs. "+Animal.getPrice());


   }

}
```