CISSE INTERMEDIATE LEVEL

PROGRAMMING AND SYSTEMS ANALYSIS AND DESIGN

THURSDAY: 21 August 2025. Morning Paper. **Time Allowed: 3 hours.**

Answer ALL questions. This paper has two sections. SECTION I has twenty (20) short response questions carrying forty (40) marks. SECTION II has three (3) practical questions carrying sixty (60) marks. Marks allocated to each question are indicated in the question.

Required Resources:
- **A computer**
- **Java IDE**

SECTION I (40 MARKS)

1. The CPU executes instructions stored in main memory through a continuous cycle fundamental to program operation. In Java programming, what is the name given to this cycle? (2 marks)

2. System analysis focuses on identifying and documenting what a system must achieve to satisfy user requirements. What is the name given to the key aspects that define these features and capabilities? (2 marks)

3. In Java programming, an unexpected event that disrupts the normal flow of program execution is known as _____. (2 marks)

4. In the context of requirements elicitation, what term refers to the process of identifying the differences between the current system and the desired future system in order to determine the necessary changes? (2 marks)

5. Data type conversion is frequently necessary in Java programming to handle variables of various types. What is the name given to specific type of conversion that involves changing a value from a higher data type to a lower data type? (2 marks)

6. In object-oriented design, the process of defining classes and specifying their relationships to model a system's structure and behavior is known as _____. (2 marks)

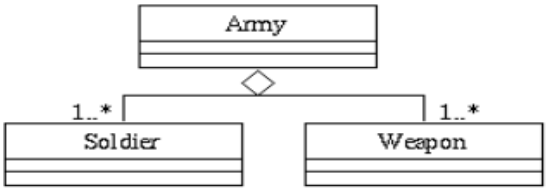
7. A junior programmer is supposed to create an array and initialise its elements. He writes the following awkward program that runs. As a senior programmer, rewrite the program more professionally. (2 marks)

```
int[] c= new int[5];
c[0]= 5; c[1]= 4; c[2]= 0; c[3]= 6; c[4]= 1;
```

8. In software testing, which testing approach focuses on evaluating an application's functionality without examining its internal code or implementation details? (2 marks)

9. In the context of program compilation, which component is responsible for breaking the input stream of characters into a stream of tokens such as identifiers, literals, reserved words, operators and separators. (2 marks)

10. Identify the type of association that is depicted by the diagram shown, as used in object-oriented programming design. (2 marks)



11. In object-oriented programming, certain classes are designed to serve as foundational templates and cannot be instantiated directly. These classes are primarily used to define common behavior and structure for derived classes. Such a class is known as _____. (2 marks)

12. Clear communication with end users is crucial in software development and release management, with user documentation used to inform stakeholders about new features, resolved issues and known limitations. What is the name given to this type of documentation? (2 marks)

13. During the SDLC implementation phase, handling existing data is crucial for a smooth transition to a new system. Identify one data conversion method used during this phase. (2 marks)

14. An individual or group who has a stake or interest in a business decision can be internal or external to the organisation. In system analysis and design, what is the term used to refer to such parties? (2 marks)

15. An IT graduate studies programming languages, encountering a platform-independent language with a formal specification for syntax, semantics and structure, ensuring consistency across different environments. Which language is the IT graduate studying? (2 marks)

16. Distributed systems often convert an object's state into a storable or transmittable format, enabling platform-independent reconstruction. In Java, what is the name given to the process of transforming an object's state into a byte stream? (2 marks)

17. What programming construct enables a function to be invoked before its complete definition appears in the source code? (2 marks)

18. A programmer might accidentally delete an object even though there are still references to that object. What is the type of error resulting from such a deletion? (2 marks)

19. A system analyst examines an organisational IT framework, viewing it as a collection of interdependent components working together to achieve shared objectives. What is the name given to this approach? (2 marks)

20. In Java programming, certain design scenarios require restricting inheritance to preserve class behavior and maintain system integrity. Which keyword is used to prevent a class from being inherited by another class? (2 marks)

SECTION II (60 MARKS)

21. Create a Word document called “Question 21” and use it to save solutions to questions (a) to (b).

(a) Use the screenshot showing the output of a Java program as shown below, without using the inheritance concept. The diagram below shows a sample pay slip.

Employee Name:	Caroline Mutua
Hours Worked:	30
Hourly Rate:	500
Gross Pay:	15,000.00
Tax (20%):	3,000.00
Net pay:	12,000.00

Required:

(i) Write a Java program called "Employees" using a class called "Main" and a method called "Staff". (2 marks)

(ii) Create an object called scanner using the scanner method of the Scanner class. (2 marks)

(iii) Write Java statements to capture **FIVE** employee records through the keyboard using a for loop. That is, the Employee's name, hours worked and the rate per hour. (4 marks)

(iv) Calculate the Gross Pay, given that gross pay is the product of the hours worked and the hourly rate. (2 marks)

(v) Calculate the tax, given that the tax is 20% of the gross pay. (2 marks)

(vi) Calculate the Net Pay given that net pay is the difference between the gross pay and the tax. (2 marks)

(vii) Generate the Pay slip as shown above with an additional 2 decimal formats display. (3 marks)

(b) Outline **THREE** elements of gap analysis in systems development. (3 marks)

Save "Question 21" and upload. **(Total: 20 marks)**

22. Create a Word document called "Question 22" and use it to save solutions to questions (a) to (b).

(a) Draw a program flow chart for a program that prompts the user to enter any number of integers to calculate and display on the console screen the total and the average of the entered numbers using the for-loop control structure. The program execution should terminate the loop when the user enters a zero. (6 marks)

(b) Write a single Java program called "Staffers" that meets the following specification:

(i) Defines an Employee class with attributes name, gender and year of birth. (3 marks)

(ii) Utilise both parameterised and non-parameterised constructors. (4 marks)

(iii) The method "getAge" includes a constant for the current year and is designed to compute and display the employee's age. (3 marks)

(iv) Instantiate the class with Emp1 and Emp2 in the main method, using one with the default constructor and the other with the parameterised constructor. (2 marks)

(v) Display the age of both Emp1 and Emp2. (2 marks)

Save and upload "Question 22" document. **(Total: 20 marks)**

23. Create a Word document called "Question 23" and use it to save solutions to questions (a) to (c).

(a) Write a Java program called "Products" that prompts a user to enter five cost prices for five products. The program should display the product and its cost in the form shown below. (7 marks)

```
Product.....Cost
Sugar                425.00
Tissue               200.00
Salt                 100.00
Rubber               50.00
Coffee               300.00
```

(b) Write a Java program called "Inverted" that prints the inverted half pyramid pattern using numbers as shown below. (6 marks)

```
**********
INVERTED PYRAMID
**********
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1
```

(c) Use the table shown below to write a Java Program called "Array" that calculates the totals and the average of the numbers given using an array. (7 marks)

Numbers	2	-9	0	5	12	-25	22	9	8	12

Save and upload "Question 23" document. **(Total: 20 marks)**

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CISSE INTERMEDIATE LEVEL

PROGRAMMING AND SYSTEMS ANALYSIS AND DESIGN

THURSDAY: 5 December 2024. Morning Paper. **Time Allowed: 3 hours.**

Answer ALL questions. This paper has two sections. SECTION I has twenty (20) short response questions carrying forty (40) marks. SECTION II has three (3) practical questions carrying sixty (60) marks. Marks allocated to each question are indicated in the question.

Required Resources:
- **A computer**
- **Java Program**

SECTION I (40 MARKS)

1. The conventional methodology used in system analysis and design and often described as sequential and structured in software development is known as _____. (2 marks)

2. The architectural style used in application development where the applications are built as a collection of small independent services, running their processes and communicating with other applications via APIs or messaging systems is known as _____. (2 marks)

3. Java programming uses the keyword import to load its external classes containing various in-built methods. The Java in-built arithmetic function used for performing exponentiation numeric operations is _____. (2 marks)

4. What name is given to a set of conditions or inputs used to verify if a system behaves as expected in specific scenarios? (2 marks)

5. State the name given to the mechanism that enables encapsulation and isolation of the design and execution to deal with the problem of complexity in application development. (2 marks)

6. Java Programming has become a popular programming language for software development. Java programming is classified as _____ programming paradigm. (2 marks)

7. The ability of a system to handle increased business volumes and transactions in the future is called _____. (2 marks)

8. In Java programming, the high-level programming source code is converted into a bytecode by a java component commonly referred to as _____. (2 marks)

9. The powerful tool in system analysis and design that helps organise and structure complex systems by considering multiple perspectives and addressing key questions about data, processes, locations, people, timing and motivation is called _____. (2 marks)

10. Assume you are provided with String s1= “12” and String s2= “21” in Java. Write down the output from the statement, system.out.print(s1.concat(s2)); (2 marks)

11. The structured application development methodology that collaborates developers with stakeholders and users of the system, to aid in gathering the system requirements and design solutions inform of brainstorming meetings and workshops is known as _____. (2 marks)

12. What is the term for the automatic conversion of a primitive type into its corresponding wrapper class object, such as converting an int to an Integer? (2 marks)

13. What type of class in object-oriented programming cannot be instantiated directly and often includes both fully defined methods and abstract methods? (2 marks)

14. Before undertaking any software development, it is necessary to determine whether it is practical, viable or worth doing. State the stage in system analysis and design concerned with this determination. (2 marks)

15. State the type of operator in programming that negates a logical value and operates with only one operand, rather than two? (2 marks)

16. State the function in Java that is used to get any character that is present at a certain index of a string. (2 marks)

17. The sequences of data elements made available over time in Java programming to perform file input and output operations are referred to as _____. (2 marks)

18. What is the name given to a special notation that is added to your source code when writing your program to describe or explain the sections of the code? (2 marks)

19. The mechanism for grouping related classes in the same namespace to provide class organisation and inherent protection is known as _____. (2 marks)

20. Mwanzo Ltd. has planned a system conversion from the old system to a new system. All the customers have been notified of a planned downtime in advance. What type of system changeover technique requires the entire system being replaced with a new one? (2 marks)

SECTION II (60 MARKS)

21. Create a Word document called "Question 21" and use it to save solutions to questions (a) to (e).

The formulae for calculating the surface area and the area of a sphere are given below:

- Surface Area: $A = 4\pi r^2$, where r is the radius of the sphere.
- Volume: $V = (4/3)\ \pi r^3$, where r is the radius of the sphere.

Write a Java program called "sphereAreaVolume" to perform the tasks in question (a) to (e).

(a) Declare a class "Sphere" with an attribute "radius". Initialise this attribute using a constructor. (4 marks)

(b) Add a method "calculateSurfaceArea()" to the Sphere class to compute the surface area of the sphere. (4 marks)

(c) Add a method "calculateVolume()" to the Sphere class to compute the volume of the sphere. (4 marks)

(d) Add a method calculateArea() to the Sphere class to compute the area of the sphere. (3 marks)

(e) Type the "main()" method to create a Sphere object "mySphere", and display its surface area, volume, and area. (5 marks)

Save and Upload "Question 21".

(Total: 20 marks)

22. Create a Word document called "Question 22" and use it to save solutions to questions (a) to (g).

(a) Declare a class "Student" with two attributes "name" and "grade". Initialise these in a constructor. (3 marks)

(b) Declare a method "getDetails()" in the Student class that returns the student details. (2 marks)

(c) Create a subclass "Undergraduate" that extends "Student" and add an attribute "course". (4 marks)

(d) Override the "getDetails()" method in the "Undergraduate" class to include the course in the message. (2 marks)

(e) Create a subclass "Graduate" that extends "Student". Add attribute "thesisTitle". (2 marks)

(f) Override the "getDetails()" method in the "Graduate" class to include the "thesis title" in the message. (2 marks)

(g) Define class "Main" with the main method to execute the program with two objects; "undergrad" is created as an instance of the Undergraduate class and "graduate" as an instance of the Graduate class with relevant attributes in each case. Call both the undergrad and graduate objects and the getDetails() method to print their details. (5 marks)

Save and upload "Question 22".

(Total: 20 marks)

23. Create a Word document called "Question 23" and use it to save solutions to questions (a) and (b).

Read the following case study and use it to answer the questions that follow:

A library system is required for managing student library processes. The student is registered with the library after which he or she can borrow one or more books. If a book is not available in the library, they can reserve the book until it becomes available, after which it is loaned to the student. Before the loan is made, a confirmation is made that the student does not have overdue books. A loan lasts for two weeks, upon which they return the books.

Required:

(a) Identify two entities that are likely to be used in creating an Entity Relationship Diagram (ERD) for the library system. (2 marks)

(b) State two attributes for each of the entities identified in (a). (2 marks)

(c) Suggest a primary key for each entity identified in (a). (2 marks)

(d) Write an algorithm to manage the library system based on the requirements as per the case study. (7 marks)

(e) Rewrite the algorithm in (d) as a pseudocode. (7 marks)

Save and upload "Question 23".

(Total: 20 marks)

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CISSE INTERMEDIATE LEVEL

PROGRAMMING AND SYSTEMS ANALYSIS AND DESIGN

THURSDAY: 22 August 2024. Morning Paper. **Time Allowed: 3 hours.**

Answer ALL questions. This paper has two sections. SECTION I has twenty (20) short response questions carrying forty (40) marks. SECTION II has three (3) practical questions carrying sixty (60) marks. Marks allocated to each question are indicated in the question.

Required Resources:
- **A computer**
- **Java Program**

SECTION I (40 MARKS)

1. What term is assigned to changes made to a system to minimise future chances of failure? (2 marks)

2. The specifications and constraints a software product must meet for proper functionality and user satisfaction are known as _____. (2 marks)

3. In programming, what is the term for the sequence in which statements are executed by the compiler or interpreter? (2 marks)

4. State the name of a process of tailoring a software application to meet the specific needs of an organisation. (2 marks)

5. What is the name of the technique used in system analysis to break down a complex system into smaller, more manageable parts? (2 marks)

6. What methodology in systems design uses graphical diagrams to represent the interactions between users and the system? (2 marks)

7. What term is used to describe the ability of a system to perform multiple computations in overlapping time periods? (2 marks)

8. In software development, who is the professional responsible for the overall design and integrity of a system's design? (2 marks)

9. What is the name of the Java file that contain compiled Java classes and metadata, typically used for deploying Java applications? (2 marks)

10. State the type of documentation that guides developers and IT personnel on how to implement, maintain and support a system. (2 marks)

11. What is the name of the concept in programming that allows a function to call itself to solve smaller instances of the same problem? (2 marks)

12. In relation to software development, state the name of the early sample, model or release of a product that is built to test a concept or process. (2 marks)

13. What is the term given to the ability of a computer system to handle multiple tasks concurrently by allocating resources efficiently? (2 marks)

14. Which project development phase identifies and expresses requirements, prioritises requirements, updates project plan and communicates the requirements statement? (2 marks)

15. In Java memory management, what is the term for the runtime data area where method invocations and local variables are stored? (2 marks)

16. What is the term for a detailed description of a software system's characteristics such as its features and constraints? (2 marks)

17. What is the term for automatically converting a primitive data type to its corresponding wrapper class in Java? (2 marks)

18. Which project management methodology involves completing work in a linear and sequential manner where each phase must be completed before the next begins? (2 marks)

19. Name the term given to the process of converting a byte stream into a live object in Java. (2 marks)

20. Which Java utility class provides methods to operate on collections such as sorting and searching? (2 marks)

SECTION II (60 MARKS)

21. Create a word document called "Question 21" to capture and save the screenshots for questions (a) to (e).

    (a) Create a Java project called "LibrarySystem" and a Java file "BookInfo" to write a program to capture information about five books using a for loop. The class and the methods are named "BookInfo". (4 marks)

    (b) Capture the titles, authors and ISBNs of the books entered through the keyboard using the Java scanner class. (4 marks)

    (c) Create a method to calculate the length of the title of each book and determine if it is a bestseller (based on a predefined list). (4 marks)

    (d) Write a method to display the details of each book including its bestseller status. (4 marks)

    (e) Display a user-friendly list of all books on the console screen. (4 marks)

    Save and Upload "Question 21". **(Total: 20 marks)**

22. Create a word document called "Question 22" to capture and save the screenshots for the questions (a) to (i).

    (a) Create a Java project called "CourseManagement" and a Java file called "courseInfo". (2 marks)

    (b) Create a Java class "Course" to store the course name, course code, instructor and duration (in weeks) using the most appropriate data type. (2 marks)

    (c) Create a parameterised Java constructor using the class created in (a) above. (2 marks)

    (d) Create getter and setter methods for the attributes of the class. (3 marks)

    (e) Create a toString() method to print course details. (3 marks)

    (f) Create a new Course object. (2 marks)

    (g) Print course details using getter methods. (2 marks)

    (h) Update course details using setter methods. (2 marks)

    (i) Print updated course details using getter methods. (2 marks)

    Save and Upload "Question 22". **(Total: 20 marks)**

23. Create a word document called “Question 23” to capture and save the screenshots for questions (a) and (b) below.

(a) Sokomoko Holdings Company sells sodas in wholesale or retail. The mode of payment is either cash or credit. The company motivates customers by offering discount incentives to retain them. If the customer is a wholesaler, they are given a 2% discount. If a customer is a wholesaler or a retailer and pays in cash, they are given an additional 2% discount. If a customer purchases more than 50 crates, they are given an additional 2%.

Required:
Create a decision table using System Analysis and Design. (10 marks)

(b) Write a Java program to do the following:

(i) Create a class called “Device” with two instance variables brand and model. (2 marks)

(ii) Create parameterised setter methods for the brand and model instance variables. (2 marks)

(iii) Create a class Smartphone that inherits the characteristics of the class Device to return the full description of the device. (3 marks)

(iv) Create an object using the class created in (b) (iii) above and use the object to pass actual parameters using the relevant methods. (3 marks)

Save and Upload “Question 23”. **(Total: 20 marks)**

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CISSE INTERMEDIATE LEVEL

PROGRAMMING AND SYSTEMS ANALYSIS AND DESIGN

THURSDAY: 25 April 2024. Morning Paper. **Time Allowed: 3 hours.**

Answer ALL questions. This paper has two sections. SECTION I has twenty (20) short response questions carrying forty (40) marks. SECTION II has three (3) practical questions carrying sixty (60) marks. Marks allocated to each question are shown at the end of the question.

Required Resources:

- **A computer**
- **Java Program**

SECTION I (40 MARKS)

1. Which Java operator compares object references to determine whether two references link to the same location in memory? (2 marks)

2. In the context of system analysis and design, what is the term used to describe the level of interdependence between software modules or components? (2 marks)

3. Which part of the computer's memory is used to store objects produced during the execution of a Java program? (2 marks)

4. A fast-growing service company is developing its information technology internally. What is the first step in the company's systems development life cycle? (2 marks)

5. The feature that allows Java programs to run on any device or operating system and to manage and optimise program memory is known as _____. (2 marks)

6. Which agile framework gives teams a structured, yet flexible method to collaborate and produce software that satisfies high standards? (2 marks)

7. Write a Java statement that declares and allocates a 2-dimensional array of integers with four rows and five columns. (2 marks)

8. Which strategy in system implementation or business process allows organisations to test the new system in a real-world setting while continuing to use the previous system? (2 marks)

9. Write a line of code in Java that shifts the binary literal 0b00000101 left by 2 bits into a variable named byteValue of type byte that has previously been declared. (2 marks)

10. The document which is generated at the time of requirement gathering as agreement between the developer and the customer containing all the functional and non-functional requirements of the software is referred to as_____. (2 marks)

11. Write Java code to build an object named myObject by instantiating a class called MyClass and giving the String literal “hello” to the constructor. (2 marks)

12. In systems design, what is the technique for arranging classes, interfaces and other types into logical groups to manage complexity, promote modularity and facilitate code reuse and maintenance? (2 marks)

13. What is the name of the Object-Oriented programming feature that involves bundling data and methods that operate on that data into a single unit to encourage data hiding and abstraction by allowing objects to interact with each other through well-defined interfaces? (2 marks)

14. What is the name given to a person that acts as a bridge between business stakeholders and technical developers, facilitating communication, gathering requirements, analysing systems and designing solutions that meet business needs? (2 marks)

15. The process by which an item can be transformed into a byte stream such that it can conveniently be stored in a file or sent over a network is known as _____. (2 marks)

16. The process of ensuring that the system meets specified requirements and quality standards through testing, validation and verification activities is known as _____. (2 marks)

17. In Java, which keyword is used to create inheritance between classes? (2 marks)

18. The process of ranking requirements based on their importance, urgency and impact on system functionality or goals is referred to as _____. (2 marks)

19. What keyword in Java is used to indicate that a variable should not be serialised when the object is serialised? (2 marks)

20. State the output from the following Java code when executed. (2 marks)

```
public class CountNumbers {
public static void main(String[] args) {
for (int i = 1; i <= 6; i++) {
 System.out.print(i);
}
}
}
```


SECTION II (60 MARKS)

21. Create a word document called "Question 21" to capture and save the screenshots for the questions that follow:

Create a project called "Code1" and write a Java program called "Calculate" to do the following:

(a) Implement a class named Rectangle and a constructor to initialise attributes length and width. (6 marks)

(b) Create two methods to calculate area and perimeter of the rectangle respectively. (6 marks)

(c) Create a method to display the length, width, area and perimeter of the rectangle. (4 marks)

(d) Create a Rectangle object and code to display the output from the method main. (4 marks)

Save "Question 21" and upload. **(Total: 20 marks)**

22. Create a word document called "Question 22" to capture and save the screenshots for questions (a) to (f).

Create a Java project called "Trial2" and a java file named "Code2" to write a Java program that accepts a pair of integers and a pair of floating-point numbers and then uses an overloaded method named "max" to return the bigger value in each case. The program should output the bigger values.

Required:

(a) Define a class and name it "MaxValueFinder". Inside the class, create an overloaded method named "max" that takes two integer parameters and returns the bigger value. Implement the logic inside the "max" method to compare the two integers and return the larger one. (3 marks)

(b) Create another overloaded method named "max" that takes two floating-point number parameters and returns the bigger value. Implement the logic inside the second "max" method to compare the two floating-point numbers and return the larger of the two numbers. (3 marks)

(c) In the main method, write code that prompts the user to enter two integers and two floating-point numbers. (5 marks)

(d) Use the "max" method to find the bigger values for both integer pairs and floating-point pairs respectively. (3 marks)

(e) Output the bigger values obtained from the "max" method. (3 marks)

(f) Capture the screen shot of the complete code and save the Java file as "Code2". (3 marks)

Save "Question 22" and upload. **(Total: 20 marks)**

23. Create a word document called "Question 23" to capture and save the screenshots for questions (a) to (c).

(a) Create a Java project called "Totals" and write a Java program that adds two integers and returns the result. Capture and save the screenshots for the code.

The program should be able to do the following:

(i) Define a method called "add" that takes two integer parameters "num1" and "num2" and returns their sum. (1 mark)

(ii) Inside the "main" method, declare two integer variables "num1" and "num2" and assign them the values 5 and 10, respectively. (2 marks)

(iii) Call the "add" method, passing "num1" and "num2" as arguments, and store the result in the "sum" variable. (1 mark)

(iv) Display the sum of the two numbers on the console. (1 mark)

(b) Write a simple Java code to create an object named myObject by instantiating a class called MyClass and passing the constructor a String literal "babe" as the argument. Capture and save the screenshots for the code.

The program should be able to do the following:

(i) Define a class called "MyClass" with a private instance variable "message" and a constructor that takes a "String" argument. The constructor initialises the "message" variable with the value passed as an argument. (2 marks)

(ii) In the "main" method, create an object named "myObject" by instantiating the "MyClass" class and passing the constructor the String literal "hello". (2 marks)

(iii) Use "myObject.getMessage()" to retrieve the value of the "message" variable and print it on the console using "System.out.println()". (2 marks)

(c) (i) Write a class named "employee" that instantiates a kanju_emp object from the class you created. Prompt the user to enter personal details such as idno, name, occupation and then display all the values entered by the user. Capture and save the screenshots for the code. (2 marks)

(ii) Create a class named "Employee" that includes a "main" method. (1 mark)

(iii) Inside the "main" method, use a "Scanner" object to prompt the user to enter the ID number, name and occupation. (2 marks)

(iv) Create a "KanjuEmp" object named "kanju_emp" by passing the entered values to its constructor. (2 marks)

(v) Display the entered personal details by calling the getter methods of the "kanju_emp" object and printing them on the console using "System.out.println()". (2 marks)

Save "Question 23" and upload. **(Total: 20 marks)**

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CISSE INTERMEDIATE LEVEL

PROGRAMMING AND SYSTEMS ANALYSIS AND DESIGN

THURSDAY: 7 December 2023. Morning Paper. **Time Allowed: 3 hours.**

Answer ALL questions. This paper has two sections. SECTION I has twenty (20) short response questions carrying forty (40) marks. SECTION II has three (3) practical questions carrying sixty (60) marks. Marks allocated to each question are indicated in the question.

Required Resources:

- **A computer**
- **Java Program**

SECTION 1 (40 MARKS)

1. Bringing together a small group of stakeholders to discuss specific aspects of the project can be useful for exploring opinions and preferences. What is the name given to this technique as used in requirements gathering elicitation? (2 marks)

2. Data modeling is the process of creating a visual representation of how data is structured, organised, and related within a system or database. Which type of data model gets into implementation details and represents how data will be stored in a particular database system, including the table structures, data types, indexes, and constraints? (2 marks)

3. A set of low-level instructions that a Java virtual machine or runtime environment can carry out are expressed as a series of bytes is known as: (2 marks)

4. In the context of a software development project, a team is reviewing a set of program flowcharts to understand the logical structure of a proposed system. The team has encountered a flowchart symbol in a figure and needs to correctly identify it. Identify the program flowchart symbol shown in the figure below: (2 marks)

5. You are part of a team responsible for testing critical medical device software. State the testing strategy that you would employ to ensure that the user interface is intuitive and that the software could be used effectively by medical professionals. (2 marks)

6. The Agile framework that provides a structured way to manage and control software development projects, consisting of roles, events, artifacts to promote transparency, inspection, and adaptation, fostering collaboration among team members and delivering value incrementally is called? (2 marks)

7. State the name given to the concept of the method where multiple methods are defined with the same name but different parameters. (2 marks)

8. The process of identifying the difference between the current state and the desired future state as used in requirements gathering is called: (2 marks)

9. A set of tools for developing Java applications, including the Java compiler (javac) and various utilities to help developers create applications for specific platforms, software frameworks, or hardware devices is referred to as: (2 marks)

10. In the world of modern software development, efficient database management is crucial for the success of any application. To ensure that developers can seamlessly connect to and manipulate relational databases, a set of functions and classes for connecting to and working with relational databases is called: (2 marks)

11. An approach that considers the entire system and its interactions, rather than focusing on isolated parts used in solving complex problems is referred to as: (2 marks)

12. The smallest unit of a program that can be independently scheduled by the operating system in Java programming is called: (2 marks)

13. Which type of feasibility analysis evaluates whether the project can be integrated into the existing operations and processes of an organisation and examines how the project will affect day-to-day activities, personnel and workflows? (2 marks)

14. E-Shop is a successful e-commerce platform that has been in operation for over a decade. Due to an upcoming change in the payment gateway API, there is a need to modify payment processing components to accommodate changes in the API? What type of software maintenance approaches should they adopt? (2 marks)

15. The tool used to assess the financial implications of various system design or improvement options, helping in making informed decisions is known as: (2 marks)

16. A special value assigned to object references and variables to indicate the absence of a value in Java programming is called: (2 marks)

17. State the Java function that is used to convert a string to an integer. (2 marks)

18. Designing interfaces that adapt to various screen sizes and devices, ensuring a consistent user experience is known as: (2 marks)

19. A document that provides a detailed description of the functional and non-functional requirements of the system such as use cases, data flow diagrams, user interface designs, data specifications and other system requirements is called: (2 marks)

20. The process of moving data from the old system to the new system in data conversions is referred to as: (2 marks)

SECTION II (60 MARKS)

21. Create a word document called “Question 21” and use it to save solutions to questions (a) to (f) below:

Use the integer numbers 5, 7, 3, 2, 7, 8 to answer the questions that follow:

Create a Java program called “arrays” to perform the tasks in question (a) to (f).

(a) Declare an array of integers of size 6 called “intArr” (3 marks)

(b) Initialise the array with the six 6 integer elements. (3 marks)

(c) Display the array elements on the console screen. (4 marks)

(d) Display the second element of the array. (3 marks)

(e) Append the first element with a new value of 15. (2 marks)

(f) Display the modified array and the total of all its elements. (5 marks)

Save Question 21 document and upload. **(Total: 20 marks)**

22. Create a word document called “Question 22” and use it to save solutions to questions (a) to (f) below.

Use the case study below to answer the questions that follows:

Malimingi Ltd. pays its casual salespersons as follows:

The sales persons are paid on commission basis, based on their sales and an additional retainer salary of 15,000. If the sales are greater than or equal to 500,000 then the commission is calculated as 20 percent of sales, else the commission is 10 percent of the total sales. The Gross salary is given by adding commission plus retainer salary. The gross pay is subjected to a 30 percent of tax. The Net Pay is calculated by subtracting tax from the gross pay.

You are required to develop a Java program to compute the commission, Gross pay, tax and the Net pay by prompting the user to enter the sales through the keyboard using the scanner class and having the retainer salary declared and initialised as a constant value of 15,000 by writing a Java program called "casualStaff" to perform the tasks in question (a) to (f).

(a) Create a class called "SalesPerson", declare and initialise it with constant variables for the retainer salary, commissions' rate and tax rates. (3 marks)

(b) Create the method main and call a scanner class. (3 marks)

(c) Prompt the user to enter the salesperson's name and the total sales through the keyboard. (3 marks)

(d) Calculate the commission using the conditions given in the scenario. (4 marks)

(e) Calculate gross pay, tax, and net pay. (4 marks)

(f) Display the results showing the name, sales, commission, gross pay, tax and net pay. (3 marks)

Save Question 22 document and upload. **(Total: 20 marks)**

23. Create a word document called "Question 23" and use it to save solutions to questions (a) to (g) below:

You are required to write a Java program called "Rectangle" to show how to use constructors in a program to calculate the area and perimeter of a rectangle. Write the Java statements to do each of the following tasks given from questions (a) to (g).

(a) Define a class named "Rectangle", with two instance variables length and width. (3 marks)

(b) Using the class created in question 22 (a), create a constructor to initialise the length and width of the rectangle. (4 marks)

(c) Create a method to calculate the area of the rectangle called "calculateArea". (3 marks)

(d) Create a method to calculate the perimeter of the rectangle called "calculatePerimeter". (3 marks)

(e) Create the class Main and method main. (2 marks)

(f) Create a Rectangle object using the constructor and provide the dimension values for length and width of the rectangle (2 marks)

(g) Call the calculateArea and calculatePerimeter methods to calculate and display the area and perimeter of the rectangle. (3 marks)

Save Question 23 document and upload. **(Total: 20 marks)**

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CISSE INTERMEDIATE LEVEL

PROGRAMMING AND SYSTEMS ANALYSIS AND DESIGN

THURSDAY: 24 August 2023. Morning Paper. **Time Allowed: 3 hours.**

Answer ALL questions. This paper has two sections. SECTION I has twenty (20) short response questions carrying forty (40) marks. SECTION II has three (3) practical questions carrying sixty (60) marks. Marks allocated to each question are indicated in the question.

Required Resources:

- **A computer**
- **Java Program**

SECTION 1 (40 MARKS)

1. State the name given to the type of software testing in which individual components or modules are used to verify their correctness and functionality. (2 marks)

2. Given the Java statement, **C=C % 5**. Rewrite its shorthand operator equivalent. (2 marks)

3. The type of the feasibility study done in system analysis and design to evaluate the proposed system's timeline and whether it can be developed and implemented within the desired period is called? (2 marks)

4. Which keyword in Java is used to declare a constant or prevent a class, method, or variable from being overridden or modified? (2 marks)

5. The ability to define multiple methods in the same class with the same name but different parameter lists to provide flexibility and convenience when working with different types of data is referred to as: (2 marks)

6. _____ is a graphical representation that illustrates how data flows within a system, is used to help in understanding the system's processes, data inputs and outputs, and the interactions between different components. (2 marks)

7. The variables declared in the method signature, representing the data types that the method expects to receive is called: (2 marks)

8. State the name given to the portion of memory shared by all threads in a Java application where objects are created and live until they are no longer referenced as used in Java memory management. (2 marks)

9. The software development methodology that is sequential in nature and each phase of the development process follows a linear, top-down approach is called? (2 marks)

10. State the output after the execution of the following Java program?

```
public class Calculate{
   public static void main(String[] args) {
      int x = 5;
      int y = 2;
      int result = x / y;
      System.out.println(result);
   }
}
```

(2 marks)

11. The essential aspect of software development that describe the characteristics, constraints, and qualities of a system, rather than its specific functionalities is known as: (2 marks)

12. The Java method that is used to initialise objects of a class with the same name as the class and does not have a return type is called: (2 marks)

13. _____ maintenance involves modifying or adapting the software to accommodate changes in the environment, such as operating system upgrades, hardware changes, or new regulations. (2 marks)

14. The Java programming powerful technique for solving problems that can be divided into smaller sub problems in which a method calls itself to solve a problem is referred to as: (2 marks)

15. State the name given to the process of reading or writing data in chunks rather than one byte or character at a time as used in Java Input/Output streams. (2 marks)

16. When developing software, it is broken into smaller and smaller components, into packages of classes, then into the classes themselves. This ability to divide a software system into discrete portions is called? (2 marks)

17. In Java programming, escape sequences are special characters used to represent certain characters that have special meanings. Write down the escape sequence used to represent a newline character. (2 marks)

18. State the Java package used to provide a convenient and consistent way of handling various input and output operations as used in Java programming. (2 marks)

19. The standardised modelling language used in Object Oriented Programming to visualise, design, and document software systems by providing a set of diagrams such as use case diagrams, class diagrams, sequence diagrams, and activity diagrams which aid in capturing the structure, behaviour and interactions of the system components is known as: (2 marks)

20. The Java mechanism used to handle and manage runtime errors or exceptional conditions that may occur during the execution of a program is called: (2 marks)

SECTION II (60 MARKS)

21. Create a word document called “Question 21”. Use the word document to capture and save your source code and the output in this question.

    Using a relevant Java Integrated Development Environment, write a Java program that prompts the user to enter marks for five arbitrary subjects: Chemistry, Kiswahili, CRE, History and Physics. Calculate the totals and average to assign a grade based on the average marks obtained. If the average marks are 70 or above, print "Grade: A," if they are between 60 and 69, print "Grade: B," if they are between 50 and 59, print "Grade: C," if they are between 40 and 49, print "Grade: D," and for any marks below 40, print "Grade: F."

    Save Question 21 document and upload.

    (Total: 20 marks)

22. Create a word document called “Question 22” and use it to capture and save your source code and the output for questions (a) to (c) below.

    (a) Create a Java class called “Employee” with two private variable instances; “name” and “age” of an employee with a constructor method called “Employee” having two instance variables; name and age. (5 marks)

    (b) Create Java subclass called "Supervisor" that inherits from the "Employee" class including the employee’s department. (5 marks)

    (c) Write the main method that demonstrates the usage of the “Employee” and “Supervisor” classes created in (a) and (b) above, by creating an instance of the Employee class and accessing the name and age instance variables of the Employee class. Create an instance of the Supervisor class, adding the employee’s and display the name, age, and department instance variables of the Supervisor class. (10 marks)

    Save Question 22 document and upload.

    (Total: 20 marks)

23. Create a word document called “Question 23” and use it to capture and save your source code and the output for Question 23 (a) and (b) below.

(a) Write a Java program to calculate the area and the perimeter of a rectangle by prompting the user to enter the length and width and display the area on the console screen. (10 marks)

(b) Consider the following process descriptions:

(i) The User: The user interacts with the system and initiates the login process.

(ii) Authentication System: The user's login credentials are sent to the authentication system for verification.

(iii) Credential Validation: The authentication system checks the provided credentials to determine if they are correct.

(iv) Flight Record: If the credentials are correct, the system retrieves flight details from the flight record. This could include information such as flight schedules, destinations, and availability.

(v) Price and Availability: The flight details are then passed to the price and availability module, which checks the flight details and determines the price and availability information.

(vi) User: The response containing the flight price and availability is sent back to the user.

(vii) Incorrect Credentials: If the user enters incorrect credentials, the system provides an option for password recovery.

(viii) Password Recovery: The user can choose the password recovery option, which triggers the password recovery module though the email.

(ix) Password Recovery Confirmation: The password recovery module assists the user in resetting their password. Once the password is recovered and confirmed, the user can retry logging in with the new credentials.

(x) Authentication System: The new credentials are sent to the authentication system for verification.

(xi) User: Upon successful login with the new credentials, the system issues a personal number reference to the user.

(xii) Personal Number Record: The personal number reference is then updated in the personal number record.

(xiii) User Booking: The user can proceed with making a booking, and the user booking module displays the booking status and payment details to the user.

(xiv) User: The booking status and payment details are sent back to the user for viewing and confirmation

Draw a data flow diagram for an Airline Management System for the above process descriptions. (10 marks)

Save Question 23 document and upload.

(Total: 20 marks)

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CISSE INTERMEDIATE LEVEL

PROGRAMMING AND SYSTEMS ANALYSIS AND DESIGN

THURSDAY: 27 April 2023. Morning Paper. **Time Allowed: 3 hours.**

Answer ALL questions. This paper has two sections. SECTION I has twenty (20) short response questions carrying forty (40) marks. SECTION II has three (3) practical questions carrying sixty (60) marks. Marks allocated to each question are shown at the end of the question.

Required Resources:

- **A computer**
- **Java Program**

SECTION 1 (40 MARKS)

1. There are several programming approaches that can be used to solve problems and build software applications. Which programming approach involves giving the computer a set of instructions to follow in order to achieve a desired outcome where a programmer specifies how the program should execute by defining a series of steps for the computer to follow? (2 marks)

2. A set of functional and non-functional specifications that a software system must meet to satisfy stakeholders' needs and goals is referred to as? (2 marks)

3. Software development methodologies are approaches or frameworks used to manage and organise the process of software development. Which methodology focuses on delivering small, incremental improvements to the software product in short iterations and emphasises communication, collaboration, and transparency between team members? (2 marks)

4. State the name given to the order of processing conditions or equations with the multiple operators, similar to the mathematical concept of order of operations. (2 marks)

5. SysPro Ltd sells on-the-shelf software to their clients. What name is given to the process of setting up the system to meet the specific needs of the organisation? (2 marks)

6. The name given to a class that wraps around a primitive data type, such as an integer or a boolean, and provides additional functionality is called: (2 marks)

7. Which technique in system analysis and design is used to define the logic of a system using natural language to develop structured programming code? (2 marks)

8. The ability of a Java program to perform multiple tasks simultaneously, allowing for more efficient use of resources and faster execution times is known as: (2 marks)

9. Which personnel in systems analysis and design is responsible for designing the overall software system architecture, including the software components, modules, and interfaces? (2 marks)

10. A package file format used to aggregate multiple Java class files and associated metadata (such as images and other resources) into a single file for distribution or deployment is referred to as: (2 marks)

11. The ministry of finance is still using its payroll application written in COBOL programming despite being outdated, unsupported and not scalable. These systems run on older Pentium III hardware and Widows Server 2003 operating systems. Which name is given to such systems? (2 marks)

12. Java provides several classes for performing input/output operations on files. What do you call a sequence of data that is read from or written to a file? (2 marks)

13. The methodology used in system analysis to identify, clarify and organise system requirements by describing interaction between the user and the system to achieve a specific goal is called? (2 marks)

14. Identify the Java programming feature illustrated in the code below: (2 marks)

```
public class Animal {
    public void makeSound() {
        System.out.println("The animal makes a sound");
    }
}
public class Dog extends Animal {
    public void bark() {
        System.out.println("The dog barks");
}
}
```

15. In Rapid Application Development (RAD) a working model of a system or a part of a system is created for testing or for demonstration purposes. What name is given to the model? (2 marks)

16. The manual conversion where a larger data type is converted to a smaller data type in Java programming is known as: (2 marks)

17. The developers and IT personnel responsible for the system's implementation, maintenance, and support are guided by a manuscript called: (2 marks)

18. The Object-Oriented Programming mechanism that protect the internal state of an object from external access and modification is called: (2 marks)

19. What name is given to the difference between the current state and the desired state of the system used to represent the deficiencies or shortcomings that need to be addressed to achieve the desired state? (2 marks)

20. The process of converting an object into a stream of bytes that can be saved to a file or transmitted over a network is known as? (2 marks)

SECTION II (60 MARKS)

21. Create a word document called “Question 21” to capture and save the screenshots for the questions that follows.

    (a) Create a Java project called “EmployeePayslip” and a Java file “empInfo” to write a program to capture five employees using the for loop. (3 marks)

    (b) Capture the names of the employee, and the basic pay entered through the keyboard using the Java scanner class (3 marks)

    (c) Calculate the house allowance, calculated as 30% of the basic pay. (3 marks)

    (d) Calculate the taxable income, calculated as basic pay plus house allowance. (3 marks)

    (e) Calculate tax, calculated as 30% of the taxable income. (3 marks)

    (f) Calculate the net pay calculated as taxable income less the tax. (2 marks)

    (g) Display a user friendly payment details as a Pay slip on the console screen. (3 marks)

    (Total 20 marks)

22. Create a word document called “Question 22” to capture and save the screenshots for the questions that follow.

    (a) Create a Java project called “Student” and a Java file “studInfo” (2 marks)

    (b) Create a Java class student to store the name, age, id, course and email using the most appropriate data. (2 marks)

    (c) Create a parameterised Java constructor using the class created in 22 (b) (2 marks)

    (d) Create the getter and setter methods for the attributes of the class (4 marks)

(e) Create toString() method to print student details. (2 marks)

(f) Create a new Student object (2 marks)

(g) Print student details using getter methods. (2 marks)

(h) Update student details using setter methods. (2 marks)

(i) Print updated student details using getter methods. (2 marks)

(Total 20 marks)

23. Create a word document called "Question 23" to capture and save the screenshots for the questions that follows. Create a Java project called "Shape" to do the following:

(a) Write a Java program to create a class called "Shape" with two instance variables width and height. (2 marks)

(b) Create the parameterised setter methods for the width and height instance variables. (3 marks)

(c) Create a class rectangle that inherits the characteristics of the class shape created in 23 (a) to return the area. (2 marks)

(d) Create an object using the class created in 23 (c) and use the object to pass actual parameters using the relevant methods (3 marks)

(e) Talanda Holdings Company sells sodas in wholesale or in retail. The mode of payment is either in cash or credit. The company motivates the customers by use of discount incentives to retain them in their business. If the customer are wholesalers, then they are given a 2% discount. If customers are wholesalers or a retailers and pay in cash, then they are given an additional of 2% discount. If customer purchases are more than 50 crates, then the customers are given an additional 2% discount.

Required:
Create a decision table for the case study in the document named "Question 23". (10 marks)

(Total: 20 marks)

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CISSE INTERMEDIATE LEVEL

PROGRAMMING AND SYSTEMS ANALYSIS AND DESIGN

THURSDAY: 8 December 2022. Morning Paper. **Time Allowed: 3 hours.**

Answer ALL questions. This paper has two sections. SECTION I has twenty (20) short response questions of forty (40) marks. SECTION II has three (3) practical questions of sixty (60) marks. Marks allocated to each question are shown at the end of the question.

Required Resources:
- **A computer**
- **Java Program**

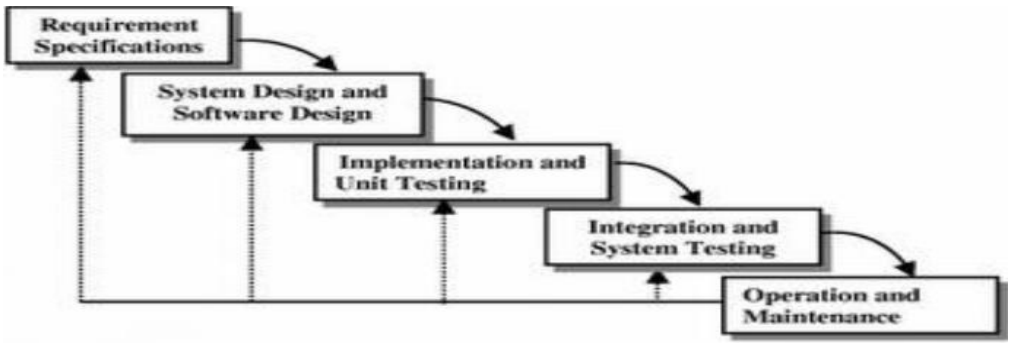
SECTION 1

1. State the term given to the process of development of software products using well-defined scientific principles, methods and procedures and in a systematic approach. (2 marks)

2. The methodology used to describe the system concept as a collection of objects incorporating both data and processes in System Analysis and Design is known as. (2 marks)

3. The name given, to the object in Java that defines an unusual or erroneous situation, such as dividing a number by zero is called. (2 marks)

4. Identify the software development life cycle model illustrated by the figure below. (2 marks)



5. A capability of creating a single class with multiple superclasses is called _____. (2 marks)

6. The risky approach of complete replacement of the old system with the new system, in system implementation stage of system analysis and design is referred to as? (2 marks)

7. State the name given to the translator that converts a source code, written in a high level language to an object code line by line. (2 marks)

8. During the system development, there are individuals and organisations with a lot of interest in the successful implementation of the systems because it affects them. State the name given to such people. (2 marks)

9. Indicate the output after execution of the following Java program function. (2 marks)
double n=Math.floor(6.34)

10. In Java programming, classes operate data through functions. Write code to create an instance of a keyword. (2 marks)

11. The _____ is a tool used in System Analysis and Design to create formal descriptions of business process. (2 marks)

12. The interdisciplinary field that seeks to understand the general properties of systems of interrelated parts and their interactions over time is known as _____. (2 marks)

13. The system used to automatically allocate and de-allocate objects in memory is known as_____. (2 marks)

14. The name given to the process of finding out whether it is economically worthwhile to invest in a system development project by looking at the investment returns and the project expenses is known as _____. (2 marks)

15. The class blueprint in Java programming that has both static constants and abstract methods is referred to as _____. (2 marks)

16. The separation between an information system and its environment where the inputs and the outputs cross is called _____. (2 marks)

17. The Java Virtual Machine (JVM) problem that allocates the memory, but fails to release it and leads to JVM running out of memory is referred to as: (2 marks)

18. The abstract representation of the data flows, inputs and outputs of the systems is known as _____. (2 marks)

19. The Java standard input stream used to read characters entered from the keyboard is called _____. (2 marks)

20. State the CASE tool that displays the various conditions that could exist in a system and the different actions that the computer should take as a result of these conditions. (2 marks)

SECTION II

21. Write a Java program called "Question21" in a class named "Palidrome" to create an array called "mynumbers" of three integers 454, 567 and 323 and determine if each of the three integers is a palindrome or not using looping control structure. Palindrome is a sequence that reads the same backwards as forwards.

(20 marks)

22. Write a Java program called "Question22" in a class named "PassVerify", that prompts the user to enter a password through the keyboard, and store in a variable named "pass1". Prompt the user to re-enter the password for confirmation entered through the keyboard, stored in a variable named "pass2". If the password matches correctly, it should display the message "VALID password entered", or else display the message "INCORRECT password entered".

(20 marks)

23. (a) A wholesale store has a pool of clients who purchase goods through placing an order to pay either in cash or on credit basis. Using a word processing program named Question 23. Draw a decision tree followed by the business in giving discounts to its clients based on the criteria below: (10 marks)

    (i) If transaction is on credit and the client's credit history is good, the order is accepted but not given any discount otherwise, if client's credit history is bad then it is rejected

    (ii) If transaction is in cash and the purchase is more than $10000, a discount of 15% is given

    (iii) If transaction is in cash and purchase amount lies between $20000 and $30000 then a discount of 13% is given.

    (iv) If transaction is on cash and sale amount is less than $20000 the order is accepted but discount is rejected.

    Upload Question 23 document.

    (b) Use the information provided in question 23 (a) to create a decision table for cash paying clients, clearly showing the conditions/actions stubs and entries. (10 marks)

(Total: 20 marks)

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CISSE INTERMEDIATE LEVEL

PROGRAMMING AND SYSTEMS ANALYSIS AND DESIGN

THURSDAY: 4 August 2022. Morning paper. **Time Allowed: 3 hours.**

This paper has two sections. SECTION I has twenty (20) questions of forty (40) marks. SECTION II has three (3) practical questions of sixty (60) marks. All questions are compulsory. Marks allocated to each question are shown at the end of the question.

SECTION 1

1. What is the output of the Java code below after program execution? (2 marks)

```
public static void main(String args[]) {
int a=5;
int b=++a;
System.out.println(b);
}
```

2. A _____system is the one which utilizes presently achieved output of the system for causing variation in the applied input signal in order to get the required output. (2 marks)

3. The abstract computing machine that drives the Java code and converts Java bytecode into machines language is called_____? (2 marks)

4. Systems design is the process of identifying the problems, collecting and interpreting facts and decomposition of a system into its components. (2 marks)

5. The type of system development life cycle which give you flexibility in performing the activities, with certain rules that need to be followed and is a mix of incremental and iterative development is known as. (2 marks)

6. A programming paradigm is a way of doing things. Which programming paradigm does Java belong to? (2 marks)

7. A primitive data type, is a predefined type of data, that are supported by the programming language type built into a programming language. The data type that contain two-state values such as true/false, yes/no is called? (2 marks)

8. What is the name of the byte input stream class in Java programming that provides methods for reading bytes from a file? (2 marks)

9. The process of specifying in detail how components of an information system should be physically implemented is referred to as _____ (2 marks)

10. _____ tools are automated to improve the speed and quality of system development work. (2 marks)

11. The collaborative framework for teams that encourages teams to learn via experiences, self-organize while working on a problem, and reflect on their victories and losses is called the _____ framework (2 marks)

12. _____ is the feature in object-oriented programming that shows the essential details and hides non-essential details? (2 marks)

13. The type of feasibility concerned with making sure hardware, software, and training will be available to facilitate the design of a new system is called _____ feasibility. (2 marks)

14. The principle of program modules in which each module is independent of other module is called _____ module (2 marks)

15. _____ requirements are the activities the system must perform. (2 marks)

16. When writing Java loop code, a programmer may make a mistake in the loop exit condition that will always evaluate the loop condition as true. What name is given to this kind of loop? (2 marks)

17. The representation of organizational data which includes all the major entities and relationship in system design is known as _____ (2 marks)

18. What name is given to the type of software testing technique used for software validation by ignoring the internal working mechanisms of the software and focuses on the output (2 marks)

19. The name given to abstract class in Java that stores the data in the form of key-value pairs is referred to as? (2 marks)

20. The looking into business problem in great detail, completely understanding problem, and choosing best solution in system analysis and design is given the name _____ (2 marks)

SECTION II

21. Create a word processor document named Question 21 and use it to save solution to question given below. Save screenshots to demonstrate how you have performed the task given.

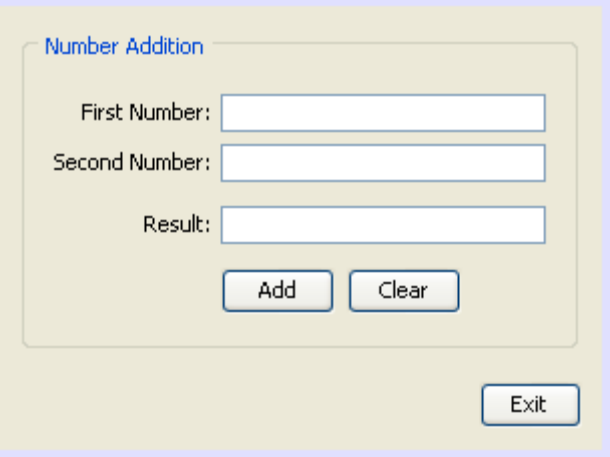
Create a java project named “pasad_aug” and create a new Java file named “area”. Use the file created to write a Java program to calculate the area and the perimeter of a rectangle, by prompting the user to enter the length and width through the keyboard, and display the area on the console screen.

Upload question 21 document.

(20 marks)

22. Create a word processor document named Question 22 and use it to save solution to questions (i) to (iii) in form of screenshots.

Study the screen shot given below to answer the questions that follows:



Required:

(i) Create a new Java file named "sum" in the project named "pasad_aug". Use a Java IDE to create the user interface shown above, using the information provide in the following table. (9 marks)

Label	**Object name**
First Number	**jTxtnum1**
Second Number	**jTxtnum2**
Result	**jTxtans**
Add	**JbtnCalculate**
Clear	**jBtnClear**
Exit	**jBtnExit**

(ii) Write a program to calculate the "sum" of two numbers entered by the user through the form created in (i) above and display the result on the result text field when the user clicks the "Add" button. (9 marks)

(iii) Write the program to clear all the text filed when a user clicks on the button "clear". (2 marks)

Upload question 22 document.

23. Create a word processor document named Question 23 and use it to save solution to questions (i) to (iii) below in form of screenshots.

(i) Create a new Java file called "loops" in the project "pasad_aug". Write a Java application which prompts the user to enter 15 integers, then computes the sum, and prints the sum to the screen. (10 marks)

(ii) Write a Java program that generates 80 random integers between 5 and 15 and displays the count for each number using a class named "randnum2022". (10 marks)

Upload question 23 document.