



# Indian Institute of Information Technology Vadodara

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## **B. Tech (CSE/IT) Semester III (Autumn 2021-22)**

**Examination:** Mid Semester Examination (Remote Session)

**Course ID:** CS 201

**Course name:** Object Oriented Design and Programming

**Full Marks:** 40

**Date:** 10.11.2021

**Exam Slot:** 10:00 – 10:40

**Exam Duration:** 40 minutes

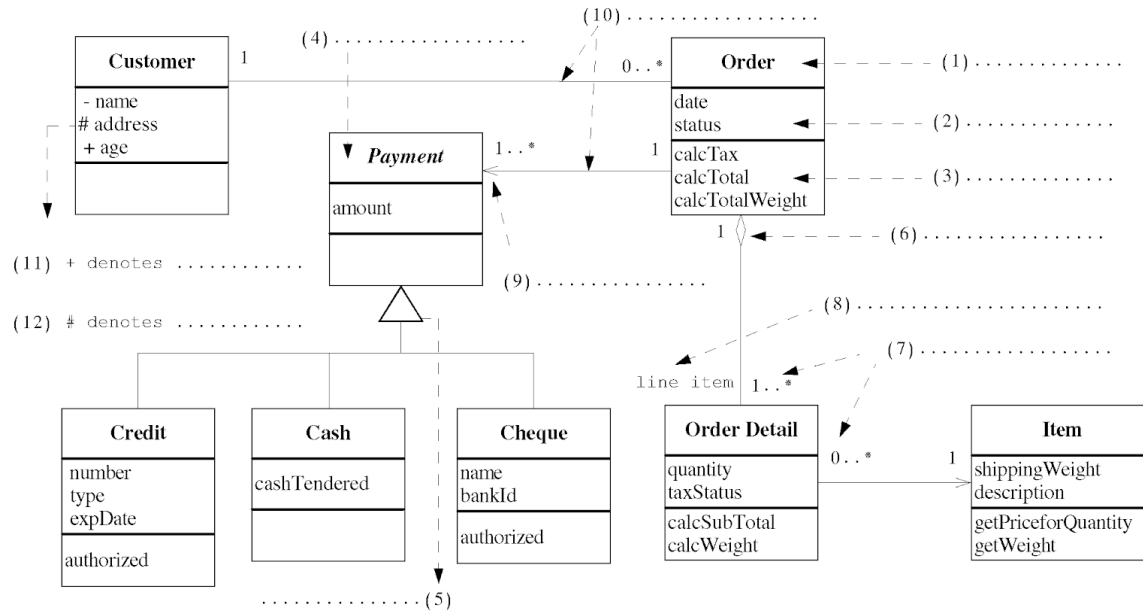
**Scan & Upload:** 10:40 – 11:00

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## **Instructions**

1. **Attempt ALL questions.**
2. Use a Notebook to write the answers to Remote session test.
3. Answer all questions in the same Notebook.
4. Answers should be readable, else they may not be considered for grading.
5. All answered pages should be scanned properly. Please check the scanned copy before submitting.
6. The final PDF uploaded should contain all pages sequentially arranged.
7. The uploaded PDF file should be renamed as **courseid\_rollno.pdf**.
8. Late submission is not allowed, and would be penalized during grading.

**Q.1.** Fill the numbered dotted lines with O-O specific class (or implementation) constructs. Mention the Number and Name, no need to draw the entire diagram. **[6 Marks]**



**Q.2.** Identify classes and their attributes for each of the requirements (F1 to F7). Use proper notations for representing classes. Need to present the class diagram. **[6 Marks]**

A point-of-sale application needs to record all purchases. Here are a few facts:

- F1: Customers make purchases.
- F2: Customers have names.
- F3: Purchases have dates.
- F4: One or more items are sold in a purchase.
- F5: Items have prices and descriptions.
- F6: Purchases have amounts equal to the sum of the prices of the items sold.
- F7: Customer Smith purchases copies of Ulysses and Moby Dick.

**Q.3.** Give three differences between an interface and an abstract class in Java. **[6 marks]**

**Q.4.** Consider the following class definition that is written without methods. Instead, it has comments followed by blank areas denoted by ..... to describe what each method has to do. Add method definitions in those blank areas as indicated in the

comment. You will get two marks for each correct method definition. Write only the five method definitions, no need to write the entire program. **[10 Marks]**

```
/**
 * The VideoTape class holds information about a single television programme recorded
 on *a video tape and it is used in a video shop system. It holds the video tape details.
 */

public class VideoTape
{
    private String title; // the title of the programme
    private String classification; // classification of the programme (comedy, drama, action,
or romance)
    private int time; // the running time of the programme in minutes

    // Create a new video tape with a given title, classification, and time.

    public VideoTape (String fullTitle, String programClassification, int runningTime )
    {
        title = fullTitle;
        classification = programClassification;
        time = runningTime;
    }

    // Return the title of this video tape.
    .....

    // Return the classification of this video tape.
    .....

    // Return the time of this video tape as a string in the following format: 2:06.
    .....

    // Set a new classification for this video tape.
    .....

    /* Print the details of the video tape to the output terminal in the following format:
    * Aman Singh (COMEDY) 2:16
    */
    .....
}
```

**Q.5.** Design a class called **ISBN** to represent an International Standard Book Number, or ISBN for short. The ISBN consists of 10 digits divided into 4 parts. For example, the ISBN 0 941831 39 6 represents the following information:

The first part: The first digit "0" signifies the book is from an English speaking country.  
The second part: "941831" identifies the publisher.  
The third part: "39" is the title number for the book.  
The fourth part: "6" is a check digit to indicate that the sum of the ISBN digits is 10.

The class should have a constructor and methods to set and get the ISBN as a string.

Design a **Book** class that represents relevant information about a book, including the book's title, author, publisher, city and date of publication, and price. The class should also include the field **ISBN** isbnNum; where **ISBN** is the class defined above.

This class should include a constructor and the following methods:

- **setBookISBN**: to set the ISBN for the book.
- **getAuthor**: to return the author of the book.
- **getBookISBN**: to get the ISBN of the book.
- **printDetails**: to print the information of a book in the following form:

Book Title: Object First with Java  
Book Author: David j. Barnes and Michael Kolling  
Publisher: Prentice Hall  
ISBN: 0 941831 39 6

Define only the two classes **Book** and **ISBN**.

**[8 Marks]**

**Q.6.** What is wrong with the following class definitions? How would you fix them? The line numbers are mentioned beside every program line. Mention the line number which needs modification (if any), and also depict what modification should be made. The explanation with respect to each modification should be mentioned. **[4 marks]**

```
[1] class Employee
[2] {
[3]     private String name;
[4]     private int id;

[5]     public Employee (String name, int id)
[6]     {
[7]         this.name = name;
[8]         this.id = id;
[9]     }

[10]    public String getName ( ) { return name; }
```

```
[11] public int getId ( ) { return id; }
[12] }

[13] class Manager extends Employee
[14] {
[15]     private String department;

[16]     public Manager (String name, int id, String department)
[17]     {
[18]         this.name = name;
[19]         this.id = id;
[20]         this.department = department;
[21]     }

[22]     public void getDeptment ( ) { return department; }
[23] }
```