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National University of Computer and Emerging Sciences, Lahore Campus

	Course Name:	Software Design and Analysis	Course Code:	CS3004
	Degree Program:	BS(Computer Science)	Semester:	Fall 2021
	Exam Duration:	60 Minutes	Total Marks:	30
	Paper Date:	20-Oct-2021	Weight	10%
	Section:	ALL	Page(s):	4
	Exam Type:	Midterm-I		

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Instruction/Notes: Attempt all questions. Programmable calculators are not allowed.

Q1. [10 marks]   10

1. _____ focuses on hiding the internal implementations of a process or method from the user. In this way, the user knows what he is doing but not how the work is being done.
    i.   Inheritance
    ⓘⓘ   Abstraction
    iii. Persistence   /
    iv.   Polymorphism
    v.   Multiple inheritance

2. Photocopy is inheriting both printer and scanner, is an example of
    ⓘ   Multiple Inheritance
    ii.   Multi-level Inheritance
    iii. Polymorphism   /
    iv.   Hybird inheritance
    v.   Composition

3. _____ is the ability of any data to be processed in more than one form
    i.   Abstraction
    ii.   Static binding
    iii. Multi-level inheritance
    ⓘⱽ   Polymorphism   /
    v.   Association

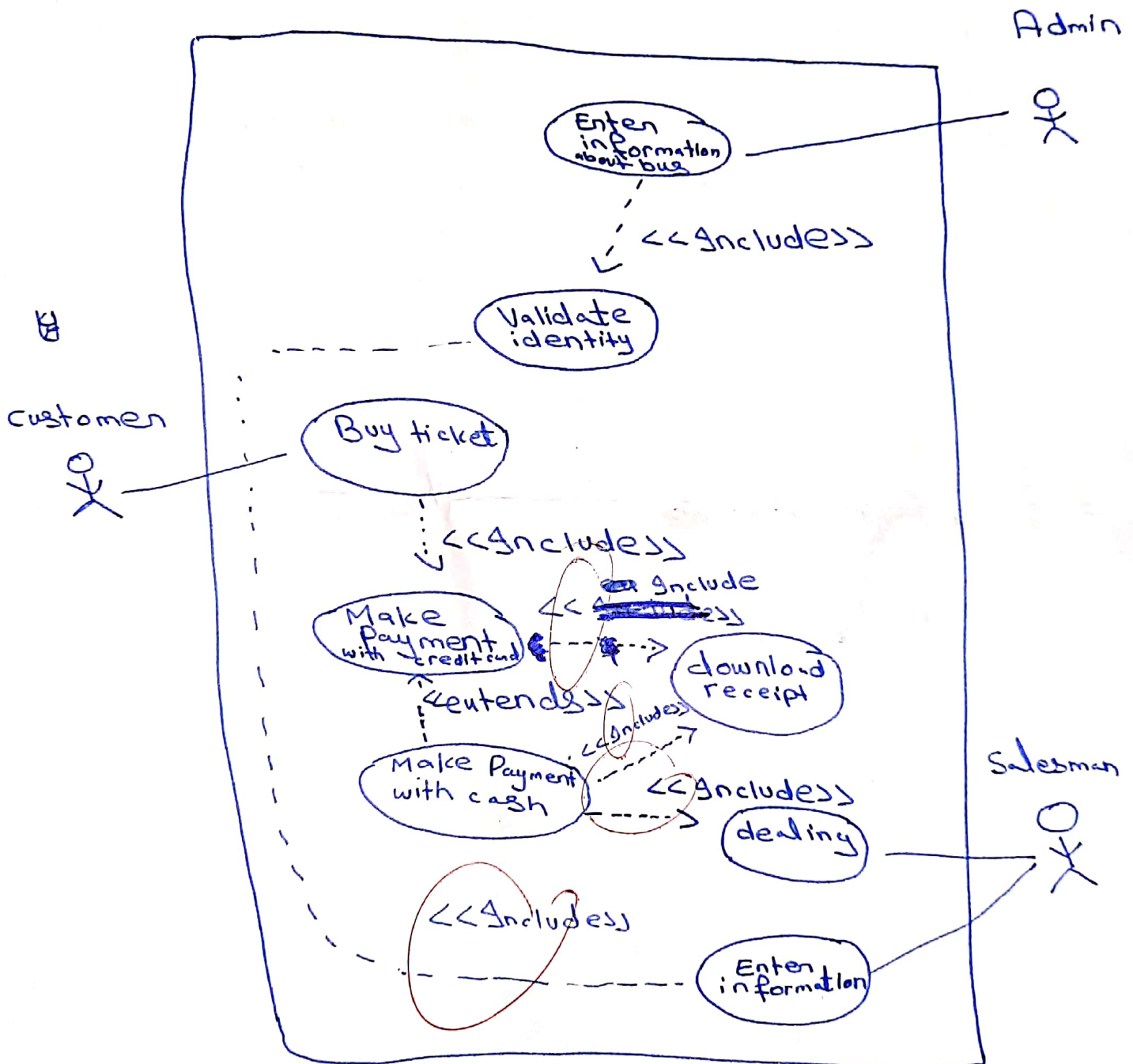4. In library management system, relationship between Book and BookCatalogue should be
    i.   Association
    ⓘⓘ   Aggregation
    iii. Composition   /
    iv.   Inheritance
    vi.   Polymorphism

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2. [10 marks] Develop a use case
An admin enters inf
can buy ticke
can visi

5. A _____ is a behavior diagram and visualizes the observable interactions between actors
system under development.

    (i.)   use case diagram
    ii.   Analysis Class Diagram
    iii.   System Diagram
    iv.   Architecture diagram
    v.   State diagram

6. It is compulsory to verify the identity before withdrawing amount from the bank."Withdraw Money" should
_____ "verify identity" usecase.

    i.   Extends
    ii.   Inherit
    iii.   Provide abstraction to
    (iv.)   Include
    v.   Implements

7. A file is placed inside the folder. If one deletes the folder, then the file associated with that given folder is also
deleted. In uml the given relationship is

    i.   Reflexive association
    ii.   Many-Many Association
    iii.   Self-Association
    iv.   Aggregation
    (v.)   Composition

8. A car needs a wheel, but it doesn't always require the same wheel. A car can function adequately with
another wheel as well. In uml the given relationship is

    i.   Reflexive association
    ii.   Many-Many Association
    iii.   Self-Association
    (iv.)   Aggregation
    v.   Composition

9. The relationship between doctor and patient is

    i.   Reflexive association
    (ii.)   Many-Many Association
    iii.   Self-Association
    iv.   Aggregation
    v.   Composition

10. If there is an abstract method in a class then, _____
    (i)   Class must be abstract class
    ii)   Class may or may not be abstract class
    iii)   Class is generic
    iv)   Class must be public
    v)   It should be interface

Develop a use case diagram for an online ticket reservation system for an inter-city bus service. An admin enters information about buses, departure and arrival destinations and timings. A customer can buy tickets, make payments and download receipts. If a customer does not have any credit card, he can visit a company office to buy tickets by making cash payments. The company salesmen deal with the customers and enter information into the system.

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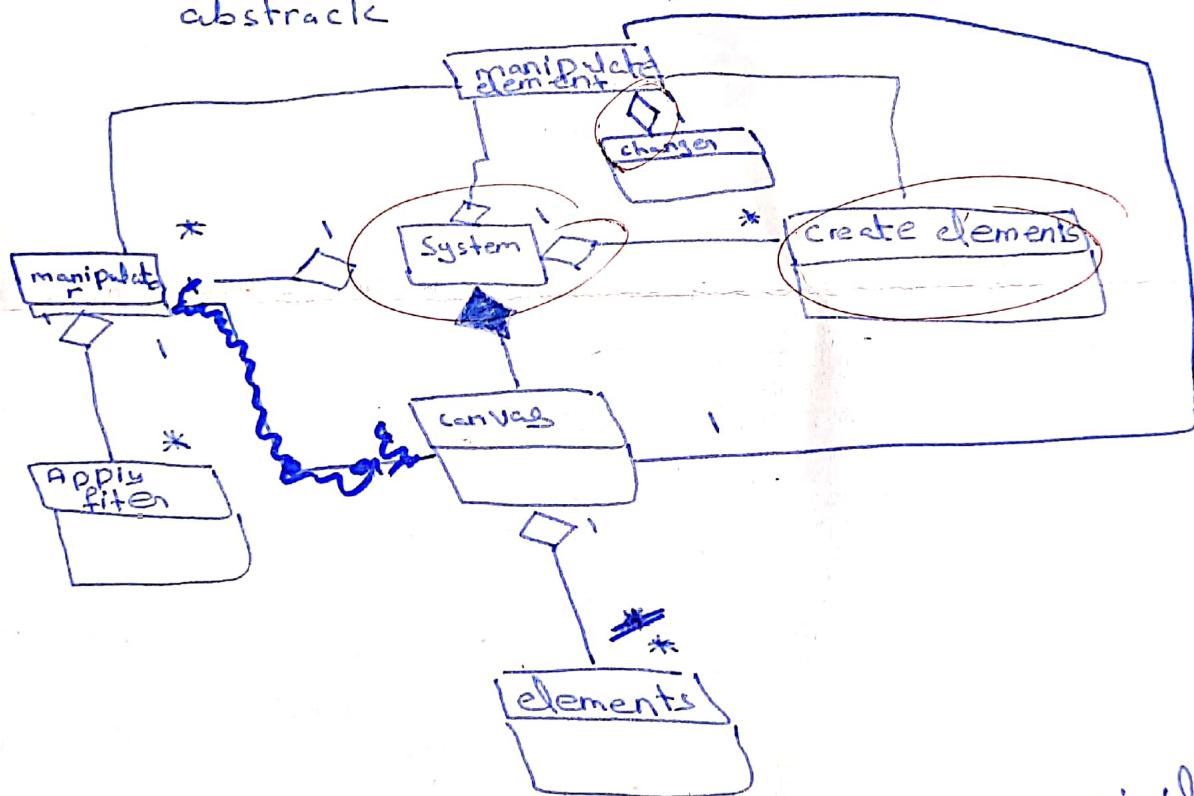- Admin enters information which requires him to confirm his identity

- Customer can make payment by card and then he's given a receipt or he makes payment in an office
- Salesman deals and enters information

Q3. [10 marks] You are designing a graphics processing package that includes the following functionality.

The system can create and or manipulate different types of elements such as text, geometric shapes, images, etc. It allows the user to apply different filters (e.g. contrast, brightness, etc.) to the images. It also allows the user to change the shape, size, and color of the elements. More than one element can be grouped together to form a composite element. The manipulator controls various elements and manipulates them. It also applies filters to images. There is a canvas that contains all the elements inside it.

Prepare a UML class diagram to capture the design after identifying appropriate abstractions that are required to implement the system. Represent correct relationships between abstractions and also provide numerosity where applicable. Note: there is no need to write attributes and functions within classes.

Create element may have its own functionality
of manipulation and manipulator may have
its own so we make manipulate elements
abstrack

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. System can create many elements, similarly sam
manipulate many elements
• Manipulat elements is associated with
canvas
• Manipulator and creator have their
own definition of different functions

• Canvas has all elements new, previous
So it must be composite