

Level: Bachelor

Semester - Spring

Year : 2004

Programme: BE

Full Marks : 100

Course: OOAD Through UML

Time : 3 hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What is Object Oriented Analysis and Design? Illustrate with an example. 5
- b) "UML is a language for Visualizing, Specifying, Constructing and Documenting software systems". Explain. 5
- c) "Object Oriented Development Process is iterative in nature". Explain. 5
2. a) What is the significance of Use Case in system modelling? Explain the different formats of use cases. 5
- b) Differentiate between Real Use Cases and an Essential Use Cases considering the example of an ATM system? Also write down the typical course of events for both the use cases. 10
3. a) What is a conceptual model? What does it shows? 5
- b) What are High priority associations? Illustrate "Multiplicity" with an example. 5
- c) Explain Non-primitive Attribute types. 5
4. a) "In system sequence diagram we consider the system as black box?" Explain and draw a system sequence diagram for Buy Item use case. 5
- b) What is the role of a Contract in devising a collaboration diagram? Show the relationship of a contract with the other artifacts of the system with the help of an example. 10

OR

- b) What is a contract? Write down a contract for enteritem system event explaining the significance of post conditions? 5
- a) What do you understand by Visibility? How many kinds of visibility are there? 5

b) Show the relationship between the Class definitions and Design Class Diagram with and example. 10

6. Read the following problem statement. 15

You are to develop software for a Soda machine. The machine delivers a can of Soda to the customer after the customer inserts 2 Rs. Coin in the Soda Machine and selects a particular brand of sodas. Consider that Machine has all the brands of soda available.

1. Do as directed:-

- Identify all the Use cases and Actors and draw a use case diagram for the above scenario.
- Identify some of the concepts and model them into a Design Class Diagram.
- Write down all the course of events for any one Identified Use cases with a contract.

7. Write down short notes on any two. 5x2

- Abstraction
- GRASP patterns
- Inheritance

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II SEMESTER
POKHARA UNIVERSITY

Level: Bachelor	Semester – Fall	Year : 2005
Programme: BE		Full Marks: 100
Course: Object Oriented Design and Modeling through UML		Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What is object oriented analysis and design? Illustrate with an example. 1 (COOA) 7
- b) What do you mean by object oriented development cycle? Explain with an example. 2 (I.EA) 8
2. a) What is a Use Case? What is the basic difference between Real Use Cases and Essential Use Cases? 6 (UC) 8
- b) What are the different components that make-up a conceptual models. 7 (CDM) 7
3. a) Explain system sequence diagrams with suitable example. 10 (SSD) 5
- b) What is a contract? Explain different parts of the contract with suitable example. How do the contracts help in devising collaboration diagram? 11 (CD) 10
4. a) What is visibility? Explain its types. 19 (VIS) 8
- b) What are Primitive attributes? How are they different from Non-primitive attributes? 4 (CDM) & 16 (DCD). 7
5. a) When does mapping design to code changes occur? Explain. 20 (MC) 7
- b) What do you mean by programming and development process? Define the construct phase. l 8
6. a) Explain how Class Definitions can be derived from Design Class Diagram with an example. 20 (MC) 8
- b) What is the updating of class definition? Explain with an example. 7 7
7. Write short notes on: 2x5
 - a) GRASP patterns. 77 (GRASP P)
 - b) Iterative development process. 2 (I.EA).

FUKHARA UNIVERSITY

Level: Bachelor Semester – Spring Year : 2005
 Programme: BE Full Marks: 100
 Course: Object Oriented Design and Modeling
 through UML Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Why is Object oriented analysis and design important? List its difference from the function oriented analysis and design. 5+5
- b) Why requirements are essential for any system development? 2 5
2. a) What are the methods of identifying Use Cases? With relevant examples differentiate essential and real Use Cases. 3 (UC) 8
- b) Differentiate between adding association and attributes. DM (4) 7
3. a) How do you make a system sequence diagram? Illustrate. S (SSD) 7
- b) What are the different sections of a contract? 6 (CON) 8
4. a) What is visibility? Explain its types. (a VIS) 6
- b) What is the use of an interaction diagram? Write about the basic collaboration diagram notations with suitable example. Int (IS) 9
5. a) What do you understand by three-tier architecture? How this architecture can be deployed in various configurations? What are its advantages? 3+2+4
- b) When mapping design to code, changes occur. Justify. 20 (MC) 6
6. Case Study: PU course Registration Problem: 5+10

At the beginning of each semester, students may request a course catalog containing a list of each course offerings for the semester. Information about each course, such as professor, department, and prerequisites will be included to help students for prompt decisions.

The system will allow students to select four courses that are going to be offered for the coming semester. In addition, each student will indicate two alternative choices in case a course offering becomes filled or cancelled. No

11 AT&T

11 AT&T

course offerings will have more than ten students or fewer than three students. A course offering with fewer than three students will be cancelled. Once the registration process is completed for a student, the registration system sends information to the billing system so the student can be billed for the semester.

Professors must be able to access the online system to indicate which courses they will be teaching, and to see which students signed up for their course offerings.

Write the expanded use case for the course registration process

Make conceptual model of the system.

Take short notes on (Any Two):

2x5

Exceptions and error handling MC(20)

GRASP patterns 17C GRASP

X Rational studio 2000 →

Design Class Diagrams. 16(D1D) DR

POKHARA UNIVERSITY

Level: Bachelor

Semester – Fall

Year : 2006

Programme: BE

Full Marks: 100

Course: Object Oriented Design and Modeling
through UML

Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) How is Object Oriented Analysis and Design paradigm different from other paradigms? Write down the advantages of object oriented approach. 7
- b) What are different diagrams used in UML? Illustrate any two. 8
2. a) What do you understand by System Event and System Operation? Draw a System Sequence diagram for Buy Item Use case. 7
- b) What is a contract? Write down a contract for enterItem system event explaining the significance of post conditions? 8
3. a) How do you make a conceptual model? Illustrate. 7
- b) Explain mutually exclusive conditional path in collaboration diagram. 8
4. a) What do you understand by the term association? Explain multiplicity with an example. 7
- b) Write an essay on GRASP patterns. 8
5. a) Explain how Class Definitions can be derived from Design Class Diagram with an example. 8
- b) What do you mean by programming and development process? Define the construct phase. 7
6. Case Study : Automatic Teller Machine (ATM) 15

Requirements:

This system shall provide automatic cash withdrawal to the customers of the ABC Bank Pvt. Ltd. The Bank provides a ATM card to each of the interested customer. The customer is verified by the PIN (Personal Identification Number).

The system verifies:

➤ The Customer

➤ Amount withdrawn is always not more than Rs. 30000

The system shall also print the receipt for the current transaction that includes the amount withdrawn in this transaction, and the balance amount in his account.

Now answer the following questions:

- a) Identify all the Use-cases and Actors and draw the Use-Case diagram for the above scenario.
- b) Draw the conceptual model for this system.
- c) Draw the collaboration diagram for the primary transaction of the machine.

7. Write short notes on (Any Two):

2×5

- a) Exceptions and Error Handling
- b) Mapping design to codes
- c) Inheritance

POKHARA UNIVERSITY

Level: Bachelor

Semester – Spring

Year : 2007

Programme: BE

Full Marks: 100

Course: Object Oriented Design & Modeling
through UML

Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What do you mean by Object Oriented Analysis and Design? Write down the merits of using UML. 8
- b) Why do we need to develop use case models for a system under development? Illustrate and define all the necessary components of a Use Case diagram with a system boundary with an example. 7
2. a) What are concepts? How they are different from classes? With suitable example list the steps to make a Conceptual Model. 10
- b) Distinguish between Primary, Secondary and Optional Use Cases. 5
3. a) Illustrate the use of mutually exclusive conditional path in collaboration diagram. 5
- b) Illustrate the role of a Contract in devising a collaboration diagram? Show the details of a contract with all its necessary sections taking an example into consideration? 10
4. a) What are the GRASP (General Responsibility Assignment Software Pattern) pattern? Explain with suitable example, how you can apply the Expert Pattern during design stage. 7
- b) Define visibility. List its types. Illustrate parameter visibility with an example (in both the collaboration diagram and code). 8
5. a) What is mapping Design to Code? Illustrate creating of class definition from a design class diagram with an example. 7
- b) What is collaboration diagram? Illustrate how methods are created from collaboration diagram taking an example into consideration. 8
6. a) Case study: 10

Consider the following scenario for patient's service in a hospital.

The patient's details (patient ID, appointment date, doctor name) are entered in the system by the hospital clerk. The doctor checks the patient

and enters the findings of each check-up in the system and recommends medicines for the patients. The patient gets the medicine and pays for it.

Now answer the following questions:

- i) Identify all the Use - Cases and actors and draw Use - Case diagrams for the above scenario.
- ii) Write the expanded format Use Case for any one of the Use Case
- iii) Explain a system sequence diagram with an example.

5

7. Write short notes on (*Any Two*):

2×5

- a) Three Tier Architecture
- b) Real and Essential Use Cases
- c) System Functions
- d) Exception and error handling

POKHARA UNIVERSITY

Level: Bachelor Semester – Spring Year : 2008
Programme: BE Full Marks: 100
Course: Object Oriented Design and Modeling Time : 3hrs.
through UML

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What is Object oriented analysis and design? List its difference from the function oriented analysis and design. 8
- b) What are the important components of a use case model? Illustrate the importance use case diagram for a system under development? 7
2. a) What is a Use Case? What are the different methods of identifying use cases? List the difference between essential and real use cases with suitable examples. 10
- b) Define multiplicity. 5
3. a) What is the importance of a Contract in devising a collaboration diagram? Show all the necessary sections of a contract taking an example into consideration? 9
- b) How do you make a system sequence diagram? Illustrate with suitable example. 6
4. a) Define the role of visibility in object oriented system analysis and design? Explain which types of visibilities are permanent in nature with an example. 8
- b) What do you understand by GRAS patterns? Explain "Information Expert" with an example. 7
5. a) What are the basic steps involved in the process of "Mapping Designs to Codes"? Give an example of mapping attributes i.e. simple and reference attributes. 10
- b) What do you understand by the term three tier architecture? What are its advantage? 5
6. a) **Case Study: Vending Machine** 10

Requirements: You are asked to develop software for a Drinks Vending Machine. The machine delivers a Can of Soda after inserting the Rs.5 coin in the machine and selects a particular brand of soda. Consider that machine has different brands of soda available.

Now answer the following questions

- i. Identify all the Use-cases and Actors and draw the Use-Case diagram for the above scenario.
 - ii. Identify the important concepts and model them into a conceptual (Domain) model.
 - b) Explain a Design class diagram with an example. 5
7. Write short notes on *(Any Two)* 2×5
- a) Exceptions and Error Handling
 - b) Basic collaboration diagram notations.
 - c) System functions

POKHARA UNIVERSITY

Level: Bachelor

Semester – Fall

Year : 2009

Programme: B.E.

Full Marks : 100

Course: Object Oriented Design and Modeling
through UML

Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

- | | | |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 1. a) | What do you mean by Object Oriented Analysis and Design? What is the need of UML during objects oriented analysis and design? | 8 |
| b) | "Iterative method focuses on adaptive software development". Justify. | 7 |
| 2. a) | Why is use case model used during analysis? Explain the different formats of use cases. | 8 |
| b) | When is it necessary to prepare contracts? State the guidelines for preparing a contract? | 7 |
| 3. a) | What is behavioural modelling? Explain importance of system behaviours in system development. | 8 |
| b) | What are the GRASP patterns? Explain with an example how you apply the Expert pattern during object design. | 7 |
| 4. a) | What is the significant of using interaction diagram during design? Compare and contrast sequence diagram and collaboration diagram in terms of their strengths and weakness. | 8 |
| b) | "Classes collaborate with each other to fulfil their responsibilities." Defend your answer. | 7 |
| 5. a) | How do you utilize the information given by interaction diagram during mapping design to code. | 8 |
| b) | What do you mean by fault, error and failure? How are expectations addressed by UML? | 7 |
| 6. | Case Study: Flush Game
Consider an online flush game in which minimum of two players and maximum of fifteen players can play at a time. The decks and colours are as usual.
a) Identify the classes and draw the class diagram in the scenario.
b) Use the above class diagram to create the general definition of the classes for coding.
c) Discuss the general problem that might occur while mapping the class design into the code. | 5x3 |
| 7. | Write short notes on: (Any Two)
a) Visibility Scopes between Objects
b) Elaboration of Use Cases
c) Connecting the UI layer to Domain layer. | 5x2 |

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE

Semester – Spring

Year : 2009

Full Marks: 100

Pass Marks : 45

Time : 3hrs.

Course: Object Oriented Design and Modeling
Through UML

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What do you mean by object oriented analysis and design? Explain it with example. 7
- b) Explain all the phases of iterative and incremental development with their benefits. 8
2. a) Explain different formats of use cases with example. 8
- b) What are Contracts? Explain with its format. 7
3. a) State the guidelines for preparing domain model. 7
- b) Explain the principles of object orientation. 8
4. a) Explain the basic collaboration diagram notations with necessary diagrams. 9
- b) What do you mean by GRASP pattern? Explain low coupling and high cohesion pattern with their advantages and disadvantages. 6
5. a) What is visibility? Explain its types. 7
- b) With suitable example, illustrate how the class definition can be derived from a design class diagram. 8
6. a) i.) Identify all the relevant actors and use cases and draw them into a use case diagram. 10
 ii.) Develop the design class diagram for the above scenario.
- b) Describe the importance Exception Handling in the efficiency of any software. 5
7. Write short notes on (Any Two): 5×2
 - a) Multiplicity
 - b) UML diagrams
 - c) Reverse Engineering

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE

Semester – Fall

Year : 2010

Full Marks : 100

Pass Mark : 45

Course: Object Oriented Design and Modeling
through UML

Time : 3 hrs

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a. Explain each step of iterative and incremental development. 7
b. Define use-cases? Why use cases model is important during analysis? Explain real and essential use-cases? 8
2. a. Explain all the steps while designing domain model? 7
b. Why do you prepare contract? State the guidelines for preparing contract. 8
3. a. Compare and contrast sequence diagram and collaboration diagram in terms of their strength and weakness. 7
b. Name the GRASP pattern. Explain one of them with suitable example. 8
4. a. Discuss the method name issues while creating Design class Diagram. 9
b. How are the exceptions addressed by the UML? 6
5. a. Generate code for the following design. 9

Sales Line item	DescribedBy PS	ProductSpecification
Quantity : integer		Description : text
Get Subtotal():many	*	Price : many
	1	ItemsID: itemID

b. Explain Multiplicity? 6
6. a. Draw use-case model for a basic ATM-Teller machine 5
b. Draw a domain model for the ATM system. 5
c. Mapping designs to code changes occur. Do you agree? Justify your opinion. 5
7. Write short notes on (Any Two): 2x5
 - a. Requirements
 - b. System sequence diagram
 - c. Visibility

POKHARA UNIVERSITY

Level: Bachelor

Semester – Spring

Year : 2010

Programme: BE

Full Marks: 100

Course: Object Oriented Design and Modeling
through UML

Pass Marks: 45

Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. / a) Explain different format of use cases. 7
- b) What is object oriented analysis and design? How does object orientation emphasizes on representation of object. Describe with example. 8

OR

What are the important components of a use case model? Illustrate the importance of use case diagram for a system being developed. 8

2. / a) Explain a Design Class Diagram with an example. 10
- b) Case Study: Course Registration System:

At the beginning of each semester, students may request a course catalog containing a list of course offerings for the semester. Information about each course, such as professor, department, and prerequisites will be included to help students for prompt decisions.

The system will allow students to select four courses that are going to be offered for the coming semester. In addition, each student will indicate two alternative choices in case a course offering becomes filled or cancelled. No course offerings will have more than ten students or fewer than three students. A course offering with fewer than three students will be cancelled. Once the registration process is completed for a student, the registration system sends information to the billing system so the student can be billed for the semester.

Professors must be able to access the online system to indicate which courses they will be teaching and to see which students signed up for their course offerings.

- i. Develop the system sequence diagram for any one of the primary use cases.

ii) Write the contract for any one of the system operations you identify.

3. a) What is the main objective of constructing Conceptual Model? Describe primitive data type and non primitive data type with an example. Describe construction of sequential diagram with suitable example. 7

b) When is it necessary to create contracts? State the guidelines for preparing contract. 8

4. a) What is visibility? Describe its type. 7

b) Define pattern and list out different types of GRASP pattern. How Expert pattern differs from Creator pattern, explain with suitable examples? 8

5. a) Explain briefly in which sort of prior artefacts, does the creation of interaction diagrams depend on? 'Well designed interaction diagrams are valuable in object oriented analysis and design'. Justify your answer. 8

b) Explain how code can be generated from design class diagram. 7

6. a) What is exception and error handling? Explain. 5

b) How methods are created from interaction diagram? Explain it with example. 10

7. Write short notes on any two: 2×5

a) Iterative development.

b) Association

c) Programming and development process

POKHARA UNIVERSITY

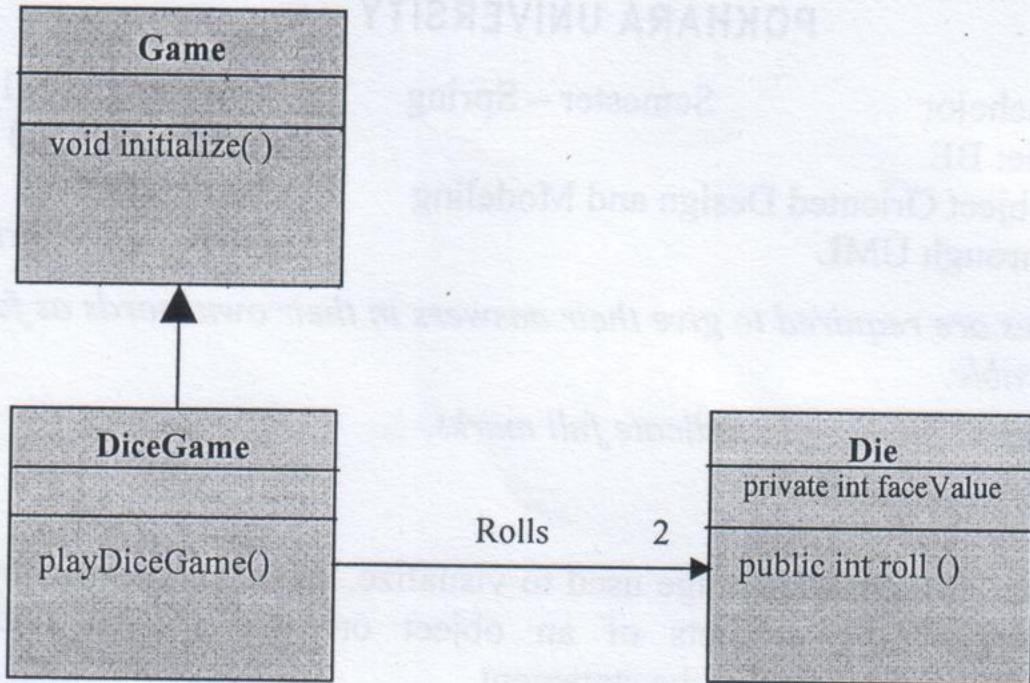
Level: Bachelor	Semester – Spring	Year : 2011
Programme: BE		Full Marks: 100
Course: Object Oriented Design and Modeling through UML		Pass Marks: 45
		Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a. “The UML is a language used to visualize, specify, construct and document the artifacts of an object oriented system under development.” Justify the statement. 7
- b. Define iterative and incremental process with its advantages. 8
2. a. Explain formats of writing use cases. 7
- b. What are operation contracts how are they different from use cases? Explain with an example. 8
3. a. Draw a use case model for ATM. 5
- b. Draw a domain model for ATM. 5
- c. Explain multiplicity. 5
4. a. How can design patterns be used to assign responsibility to various collaborating objects? Explain with their types. 8
- b. Explain different types of visibility between objects. 7
5. a. How the followings are represented in sequence diagram. 10
 - i. message to self or this
 - ii. mutually exclusive conditional path
 - iii. object lifelines and destruction
 - iv. creation of instances
 - v. iteration for a single message
- b. How exceptions are addressed by UML? 5
6. a. Map the following design to code in any programming language that supports Object Oriented Paradigm. 8



b. Explain programming and development process. 7

7. Write short notes on **any two**: 2×5

- a. Creating methods from interaction diagram
- b. Strength and weakness of sequence and collaboration diagram
- c. Mapping designs into code

POKHARA UNIVERSITY

Level: Bachelor Semester – Fall Year : 2012
Programme: BE Full Marks: 100
Course: Object Oriented Design and Modelling Pass Marks: 45
through UML Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What are various notations provided by the UML for capturing the static and dynamic aspects of a software system? Explain with figures. 7
- b) Explain how the change in requirements is handled on an iterative development. List out the advantage of an iterative and incremental process of software development over waterfall development process. 8
2. a) What is the basic procedure to find out the use cases? List benefits of writing use cases during software development process? 5
- b) Explain when the changes occur in mapping design to code. 5
- c) How do we assign responsibilities to objects? Explain with a suitable example. 5
3. a) What are various relationships that might exist between different domain elements? Explain using a Patient billing system as an example. 8
- b) What are the important contents of a Post condition of an operation contract? How is mapping of these operation contracts done during Object Oriented design phase? 7

OR

Define role of multiplicity and non primitive types with suitable examples. 7

4. a) What is the significance of using interaction diagram during design? Compare and contrast system sequence diagram and collaboration diagram in terms of its weakness and strength. 8
- b) When is it desirable to use Controller pattern instead of using Information expert pattern when assigning responsibility to objects? 7
5. a) What are the conditions for preparing a contract? Does writing 7

contracts leads to domain model updates, defend your answer.

- b) Why is it desirable to expect and plan for change and deviation from the design even during programming phase? Explain 8

6. Case Study: Online Hotel Reservation System

When making a reservation a customer must register his /her personal information. To speed up the process details of previous customers will be stored and made available later. By this system the customer can make reservation and cancel it. When making a reservation the customer can choose the number of rooms, the type of room, services (laundry, meal, transportation etc). The reservation is confirmed when customer pay 10% of the total charges. After the reservation, the customer will get an e-mail of the details of the reservation.

Within a hotel there is a reservation administrator who is responsible for controlling reservations at the hotel. He is also responsible for processing no-shows (When the reservation at the hotel doesn't show up at reserved date) and makes a reservation for a customer.

Now answer the following questions:

- a) Identify all the use cases and actors and draw a use case diagram. Also write all the course of events for one use case. 8
- b) Draw class diagram for the above scenario. 7

7. Write short notes on **any two:**

- a) Visibility
- b) Relationship between GRASP and UML
- c) High cohesion and low coupling

2×5

POKHARA UNIVERSITY

Level: Bachelor

Semester: Spring

Year : 2012

Programme: BE

Full Marks: 100

Course: Object Oriented Design and Modelling

Pass Marks: 45

Through UML

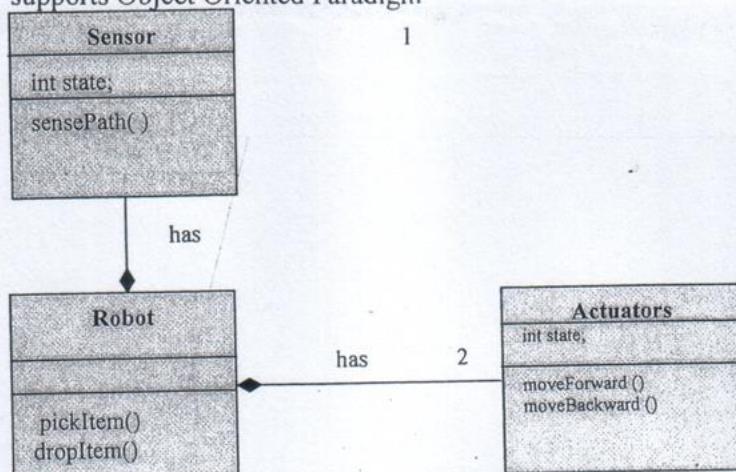
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Differentiate between state transition diagram and activity diagram, component diagram and deployment diagram with appropriate examples. 8
b) Describe the importance of Unified Process in OOAD. List out and describe briefly all the phases of Unified Process. 7
2. a) Define Use Cases. How Use Cases benefits the software development process explain with an example. 7
b) Describe the importance of Contract in OOAD. Explain contract in detail for at least one system operation for any kind of example of your own. 8
3. a) What are the activities performed during the domain modeling process? How can potential domain elements for a particular scenario be identified? 8
b) 'Well designed interaction diagram are valuable in object oriented analysis and designed', Justify your answer. Describe the mutually exclusive condition of UML Collaboration diagram. 7
4. a) Show with an example how can conditional messages be portrayed in a Collaboration diagram and a Sequence diagram. 7
b) What is the difference between knowing and doing responsibilities? How does making use of Design Patterns help in correctly assigning responsibilities to objects? 8
5. a) How cohesion and coupling affect good design, explain with a suitable example? 7
b) Map the following design to code in any programming language that supports Object Oriented Paradigm 8



6. a) Explain how code can be generated from collaboration diagram and design class diagram. Explain with a suitable example. 8
b) What do you mean by fault, error and failure? How are exceptions addressed by UML? 7
7. Write short notes on: (Any two) 2×5
 - a) Code reuse .
 - b) Real Use Cases .
 - c) Requirements Capture .

POKHARA UNIVERSITY

Level: Bachelor Programme: BE	Semester: Fall	Year : 2013 Full Marks: 100 Pass Marks: 45 Time : 3hrs.
Course: Object Oriented Design and Modeling Through UML		

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) "Good and Precise Requirements leads to good design", justify it. State Expanded Use case with suitable example describing main flow and alternative flow. 8
- b) How are objects perceived in design phase? Explain with suitable example. Distinguish between OOAD and Structural Analysis and Design. 7
2. a) Why do you make a system sequence diagram? Explain all the steps while designing domain model with example? 7
- b) Describe the importance of contract in OOAD. Design is initiated by contract, justify your answer with suitable example. 8
3. a) Define the term visibility and explain different types of visibility between objects? Illustrate with an example. 8
- b) Explain the importance of pattern in design. How do cohesion and coupling effect design? Explain. 7
4. a) Distinguish between class and object, what are the major factors for designing Design Class Diagram (DCD), explain with suitable logic. 8
- b) How does design traces and adjusts the change of requirement during design phase and coding phase? Explain with suitable example and reasoning? 7

5: Library Management System

System Description:

This system is a Library management system which controls and grants access to different types of users such as system administrator, head librarian, librarian and members. This system should be able to manage books, loans, late fees, searching of books, should be able to keep members

1

in a queue for loans. It should be able to generate automatic email and SMS message before expiry of book loan.

Add qualitative requirements according to the need of the scenario.

- a) Draw complete use case diagram. 8
- b) Draw behavioral model of this case. 7
6. a) Explain how can code be generated from collaboration diagram. Explain taking suitable examples. 8
- b) State the importance of development process in design. What do you understand by updating of class definitions? Illustrate with an example. 7
7. Write short notes on: (Any two) 2×5
 - a) Error and Exception handling.
 - b) Unified Process.
 - c) Activity Diagram.

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE

Semester – Spring

Year : 2013

Full Marks : 100

Pass Mark : 45

Time : 3 hrs

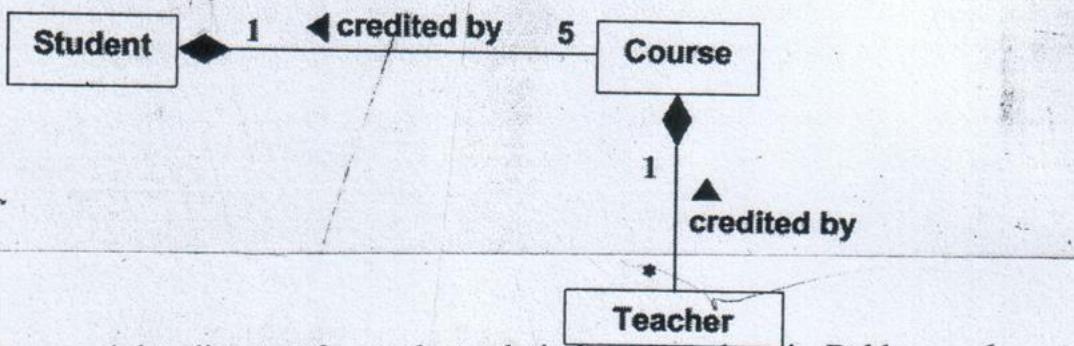
Course: Object Oriented Design and Modelling through UML

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a. What is Rational Unified Process? Explain each phases of iterative and incremental development. 7
- b. What are Use cases? What do they depict in a software development? How use cases of Analysis phase are different from Design phase? Illustrate with relevant example? 8
2. a. Why do you make a SSD? Explain system event and system response with respect to SSD? 7
- b. Are contract important in OODM? What are the specific reasons to make contracts? Explain different section of contract with an example. 8
3. a. Explain the role of visibility and multiplicity? Explain which types of visibility are permanent in nature with example. 7
- b. Name the GRASP pattern. Explain Expert pattern with an example. 8
4. a. What are the difference between conceptual class and Design class? How Design classes help in the process of "Mapping Design to Codes". 8
- b. When mapping design to code changes occur. Justify. 7
5. a. Generate code for the following design. 9



- b. Draw activity diagram for student admission procedure in Pokhara University? 6
6. a. Draw collaboration diagram for Renew a Book in Library Automation System. 5
- b. Identify actor and use case for Library Automation System. 5
- c. Illustrate how methods are created from collaboration diagram with an example. 5
7. Write short notes on (*Any Two*): 2x5
 - a. Object Diagram
 - b. Reverse Engineering
 - c. Error and Exception handling

POKHARA UNIVERSITY

Level: Bachelor	Semester: Fall	Year : 2014
Programme: BE		Full Marks: 100
Course: Object Oriented Design and Modelling through UML		Pass Marks: 45
		Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) How is Object Oriented Analysis and Design paradigm different from other paradigms? Write down the advantages of object oriented approach. 7
- b) What are the important components of a use case model? Illustrate the importance of use case diagram for a system being developed. 8
2. a) What do you mean by System Event and System Operation? Draw a System Sequence diagram for return book use case of a Library system. 8
- b) What is a contract? Write down a contract for enterItem system event explaining the significance of post conditions? 7
3. a) What is a Domain Model? How do you construct the Domain Model? Explain with example. 7
- b) Define associations and attributes. Taking a system into consideration, draw the necessary classes of the system and represent the association and attributes of these classes. (*You are free to choose any system of your choice like POS, Library System*) 8
4. a) Define pattern and list out different types of GRASP pattern. How Expert pattern differs from Creator pattern, explain with suitable examples? 8
- b) How do you make a conceptual model? Illustrate. 7
5. a) Why is interaction diagrams used? Compare and contrast the different types of interaction diagrams. 8
- b) Explain how code can be generated from collaboration diagram 7

1

- and design class diagram. Justify with necessary examples.
6. **Case Study** 15
In hospital a patient goes to registration machine he press the on button then the screen opens. He enters patient id number. He books for the doctor for his checkup. He checks the category of disease from given list, then he chooses doctor's name from given doctors name list, he enters time he wants to meet with doctor. For this registration he need to enters the amount, if the amount digit is ok it accepts the registration and prints the registration slip, otherwise it will give a signal of alarm of insufficient amount.
Now draw a use case model(no description required), Domain model, interaction diagrams and design class diagram from these information.
 7. Write short notes on: (Any two) 2×5
 - a) Exceptions and Error Handling
 - b) Programming and development process
 - c) Representation of System behavior

POKHARA UNIVERSITY

Level: Bachelor

Semester – Spring

Year : 2014

Programme: BE

Full Marks : 100

Course: Object Oriented Design and Modelling
through UML

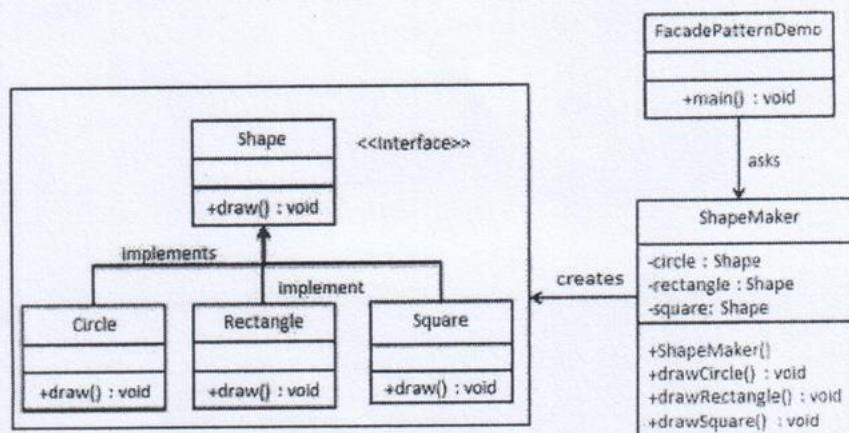
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable:

The figures in the margin indicate full marks.

Attempt all the questions.

- | | | |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 1. a) | Explain different phases and disciplines of Rational Unified Process? | 6 |
| b) | What are the important components of a use case model? Illustrate the importance of use case diagram for a system being developed. | 9 |
| 2. a) | What are the different methods of identifying use cases? List the difference between essential and real use cases with suitable examples | 8 |
| b) | Associations and attributes are essential components of a conceptual model. Do you agree or disagree? Justify your opinion. | 7 |
| 3. a) | What is a collaboration diagram? How do we represent mutually exclusive conditions in a collaboration diagram? Justify with an example. | 7 |
| b) | What do you mean by system behaviour? List its types. Explain the guidelines for preparing a contract. | 8 |
| 4. a) | What are the GRASP patterns? Explain with an example how you apply the creator pattern during object design. | 8 |
| b) | Why is class diagram important? Explain the structure of a class diagram with a necessary figure. Also list the difference of a Class diagram during analysis phase and design phase. | 7 |
| 5. a) | What is a Contract? How do you derive a contract? What are the essential parts of a contract? Explain its role taking an example. | 8 |
| b) | What do you understand by updating of class definitions? Illustrate with an example. | 7 |
| 6. a) | Convert the given Design Class Diagram into an equivalent code. (you can choose any language like Java, C++, etc) | 10 |



- b) What do you understand by three tier architecture? How this architecture can be deployed in various configurations?
7. Write short notes on (*Any Two*) 5x2
- a) Visibility
- b) Domain Analysis

② Exceptions and error handling.

POKHARA UNIVERSITY

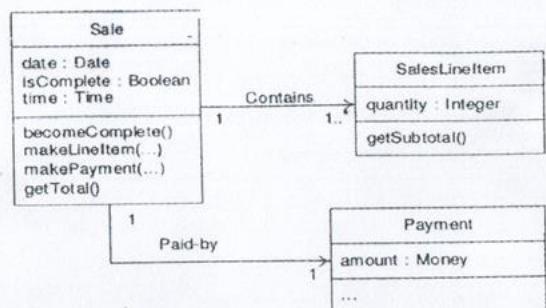
Level: Bachelor Semester: Spring Year : 2015
 Programme: BE Full Marks: 100
 Course: Object Oriented Design and Modeling
 through UML Pass Marks: 45
 Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Iterative process is designed to be adaptive and incremental. Do you agree with this statement? Explain. 8
- b) Why use case is considered a better tool for requirement gathering. Differentiate between real use case and essential use case. 7
2. a) Why are SSD important? Assume the scenario of borrowing books in a library and draw a SSD for it. 8
- b) Discuss about the strategies to identify Conceptual Classes. Provide relevant example as well. 7
3. a) Differentiate between operation contract and use case. Discuss about the guidelines to consider while preparing contract. 7
- b) Differentiate between Collaboration and Sequence diagram. Why is interaction diagram considered as a valuable document during OOD? 8
4. a) Differentiate between Creator and Information Expert pattern. Provide a necessary example to depict the above. 8
- b) List out the benefits that a design with high cohesion and low coupling possesses. Illustrate with an example. 7
5. a) Discuss about the order of implementation for the class diagram given below. Also, develop the skeleton class definition for it. 8



- 7
 b) How is the mapping of attributes from the design to the code accomplished in different languages? Provide an example. 15

6. **Case Study**

Online Hotel reservation system is used by a customer to search hotel as per their criteria. If the system shows a hotel as per their search then the customer makes a reservation by paying for it via credit card. Reservations can only be made by registered customers. Also, the system facilitates the customer by allowing them to cancel reservation. The hotel Admin monitors the reservations and cancellations and updates the hotel reservation information.

Now draw a use case model (no description required), Domain model, interaction diagrams and design class diagram from these information. 2x5

7. Write short notes on: (Any two)
 a) Reverse Engineering
 b) Exception handling
 c) Association in Conceptual classes

POKHARA UNIVERSITY

Level: Bachelor Semester: Fall Year : 2016
 Programme: BE Full Marks: 100
 Course: Object Oriented programming and Design
 through UML Pass Marks: 45
 Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. You are developing a system to handle checkout duties at a book and video store. Sales boy may checkout books and videos from the store. The system must keep track of which books and videos have been sold out.

Each category of book and video has a unique item number that is used by the system to index that specific book or video, a sales boy may check the status of a book (in stock or not) by supplying the item number. He may also check either on a book by supplying the title and author or on a video by supplying only the title.

For the above case study:

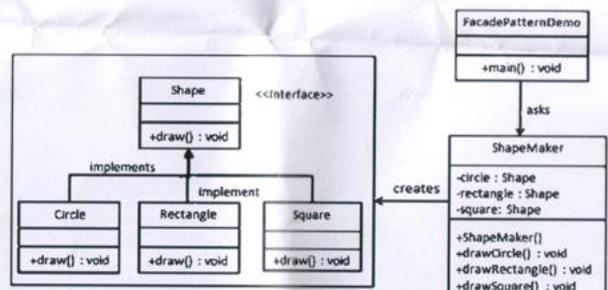
- a) List use cases and prepare use case diagram. 8
- b) Write down any one essential use case text from the above use case diagram. 7

2. Case Study

Consider an online travel agency system. A new user can create a new profile with a username and a password. This profile can be changed at any time if the user wants. The user logs to the system using his/her username and password. After logging into the system, the user inquires about different flights. The user can book, change or cancel a flight reservation. This includes choosing a payment method, and making a payment.

- a) Now draw a use case model (no description required), Domain model,

3. a) How are system event and system operation important. Assume the scenario of reserving a hotel room online and draw a SSD for it. 7
- b) Why are contracts essential? Assume the scenario of reserving a hotel room online and draw a contract for it. 8
4. a) What are interaction diagrams? What are its types? How is sequence diagram similar to collaboration diagram? 8
- b) What are the GRASP patterns? Explain with an example how you apply the creator pattern during object design. 7
5. a) What is visibility? Describe the use of visibility among classes while designing class diagram. 8
- b) How procedure Analysis and Design is different from OOAD, illustrate with examples? 7
6. a) Describe the importance of interaction diagrams for developing methods during coding. 5
- b)



For the given diagram, develop the equivalent code in any high level programming language.

7. Write short notes on: (Any two) 2×5
- a) OO Development Cycle
 - b) Associations and Attributes
 - c) Patterns

POKHARA UNIVERSITY

Level: Bachelor

Semester: Spring

Year : 2016

Programme: BE

Full Marks: 100

Course: Object Oriented Design and Modelling
through UML

Pass Marks: 45

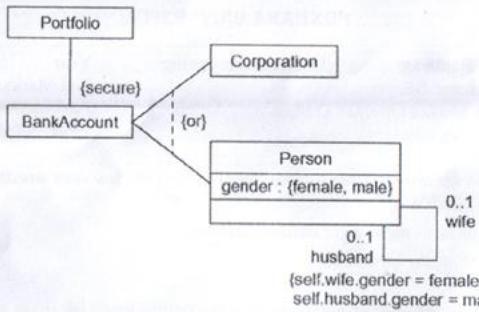
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

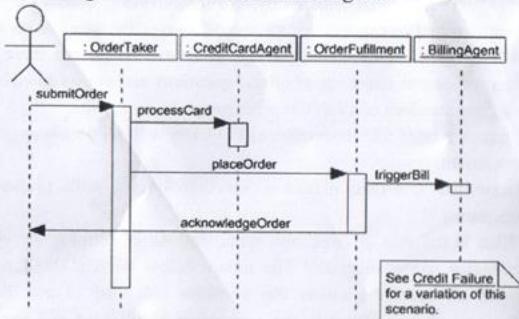
The figures in the margin indicate full marks.

Attempt all the questions.

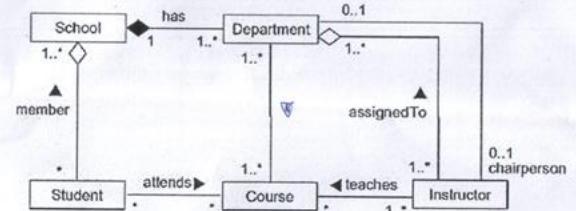
1. a) What is the role of notations in a modelling tool? Illustrate any five different notations used in UML with brief notes of each. 3+5
b) In OOAD, there are various types of models, like conceptual, structural, behavioural, etc. What is the significance of these many different types of model? Explain with illustrative examples. 3+4
2. Imagine you are hired as IT consultant for the task of building Pokhara University Exam Management System (PU-EMS), considering your four-year/8-semester exposure of the overall university board exam as well as college exams. As a domain study, you have found out there is the provision of double checking of all the questions and copies to ensure the integrity and standard of all of the processes. 8+7
 - a) Prepare a brief SRS document of PU-EMS with all details as per SRS document.
 - b) Draw the Use-case diagrams for this system with proper stick diagrams.
3. a) What is the role of constraint specifications in defining the systems behavior model diagram? The model below depicts about possible types of accounts within the portfolio sub-head in any banking business domain. Identify the constraints highlighted and explain in brief, what they mean. 2+5



4. a) List out all the possible association types, which exist in UML based Object Oriented design, with sample drawings of each type with clear labelling of association, attribute, naming, and adornments. 8
- The model depicts the online order processing system as illustrated in below diagram. Explain in detail of the diagram type with every symbols being used and semantics of this diagram. 2+5



- b) Present the mapping process for the above model using object-oriented based pseudo-codes for capturing all important aspects of the model diagram. 8
5. a) Prepare sample codes that should cover all of the classes, existing associations and other details depicted through following model diagram. 8



- b) Prepare the class diagram for the SRS and Use case diagrams that you have already developed for Question No. 2 system. 7
6. Compare the followings: 3x5
- X-axis (Left-right) versus Y-axis (top-down) Information ordering in Sequence (Interaction) diagram
 - Forking versus Joining in Activity diagram
 - Structural versus behavioral patterns in design reuse
7. Write short notes on: (Any two) 2x5
- Reverse Engineering in OOD
 - Analysis using CRC
 - Exception handling through UML

POKHARA UNIVERSITY

Level: Bachelor

Programme: BE

Course: Object Oriented Design and Modeling
through UML

Semester: Fall

Year : 2017

Full Marks: 100

Pass Marks: 45

Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

- | | |
|-------------------------------------------------------------------------------------------------------------------|----|
| 1. a) Explain the difference between Object Oriented Analysis and Object Oriented Design with an example? | 7 |
| b) Explain the role of UML model in software design? Explain types of use cases with examples. | 8 |
| 2. a) Explain difference between incremental and iterative software development model. | 7 |
| b) Explain system event and system response? Explain the purpose of SSD with an example. | 8 |
| 3. a) Explain the guidelines for preparing a contract with its purpose. | 7 |
| b) What is Global visibility how it is different from parameter visibility, explain with example. | 8 |
| 4. a) Define conceptual class. Explain the role of domain modeling with an example. | 8 |
| b) Explain the use of state chart diagram? Show mutual exclusive condition in Collaboration diagram with example. | 7 |
| 5. a) How DCD is different from Domain models? Explain method name issues in DCD. | 7 |
| b) Define GRASP. Explain the purpose of Controller pattern with an example? | 8 |
| 6. CASE STUDY: Draw equivalent use case, sequence diagram and class diagram for the given scenario below. | 15 |

A customer wants to draw money from his bank account. He enters his card into an ATM (automated teller machine). The ATM machine prompts "Enter PIN". The customer enters his PIN. The ATM (internally) retrieves the bank account number from the card. The ATM encrypts the PIN and

the account number and sends it over to the bank. The bank verifies the encrypted Account and PIN number. If the PIN number is correct, the ATM displays "Enter amount", draws money from the bank account and pays out the amount.

7. Write short notes on: **(Any two)**

- a) Object diagram
- b) Creator pattern
- c) UML multiple perspectives

2×5

On the basis of above Use case:

- | | |
|------------------------------------------------------------------------------------------------------------------------|--------------|
| a) Develop the system sequence diagram for Withdraw Money and Deposit functions. | 7 |
| b) Write the contract for any one of the system operations you identify. | 8 |
| 3. a) What is conceptual Model used for? How system behaviour can achieve data abstraction and Encapsulation? Explain. | 7 |
| b) When contracts are used? Explain in context of an example by using the standard guidelines. | 8 |
| 4. a) What does visibility controls in Object oriented programming? Describe different types of it with example. | 7 |
| b) What are the roles of objects and patterns in OODM? Describe the different patterns used. | 8 |
| 5. a) How domain model can be built from use case? Illustrate the steps used. | 8 |
| b) What are the important things to be handled during mapping design to code? Illustrate with an example. | 7 |
| 6. a) Why exception and error handling is important in OOAD? Explain. | 7 |
| b) What are descriptor classes in GRASP? How does it achieve singleton functionality? | 8 |
| 7. Write short notes on: (Any two) | 2×5 |
| a) Use Case Model | |
| b) MVC Pattern | |
| c) Creating methods from collaboration diagram | |

POKHARA UNIVERSITY

Level: Bachelor

Semester: Spring

Year : 2017

Programme: BE

Full Marks: 100

Course: Object Oriented Design and Modeling
through UML

Pass Marks: 45

Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What is UML? How agile is applied to software development process?
- b) What is object oriented analysis and design? Describe the most used software development life cycle used nowadays?
2. Case Study: Bank Transaction System:

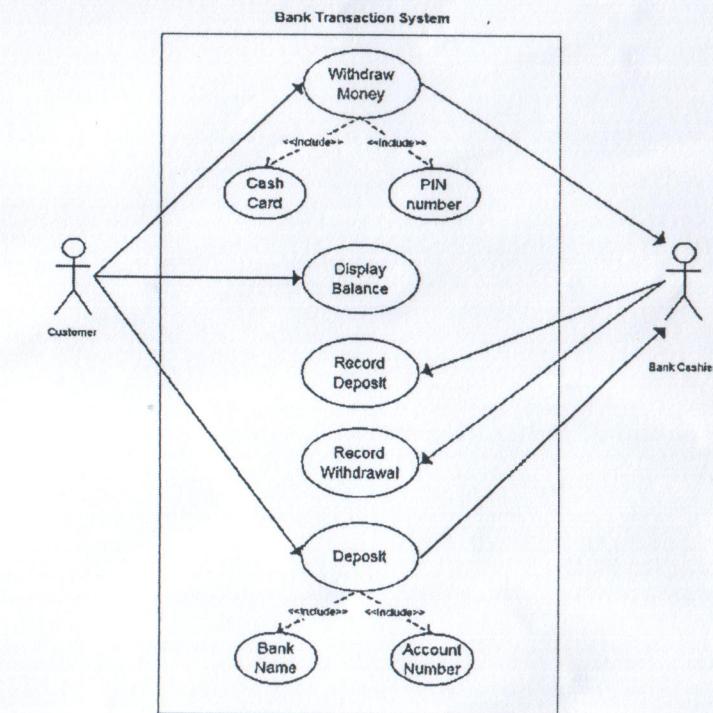


Fig: use case of Bank Transaction System

POKHARA UNIVERSITY

Level: Bachelor Semester: Fall
 Programme: BE
 Course: Object Oriented Design and Modeling
 Through UML

Year : 2018
 Full Marks: 100
 Pass Marks: 45
 Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Explain data and behavioral abstraction with suitable examples? How is the responsibilities assigned to objects different from the behavior that they exhibit? 8
 - b) Explain the process of performing requirements elicitation and specifying those requirements using a visual modeling tool? 7
 2. a) What are use cases and how can they be used for identifying and recording system requirements? How would you differentiate between include and extend relationship between use cases? 8
 - b) What are the different relationships that may exist between Domain concept elements? Construct a domain model for a patient care system making necessary assumptions. 7
 3. a) How are system events identified? 9
- Student Attendance Monitoring System:**
 In case of a Student Attendance Monitoring System, the system allows students to record their daily attendance through a Biometric Finger scan device. The system records the daily attendance of students and generates a report at the end of every month that shows the late arrival details, number of absentees etc. The system allows staff members to print the reports and configure the system as per their need.
 Identify the potential use cases for scenarios and elaborate them further by coming up with individual sequence diagrams for identifying the system events belonging to the individual scenario. 6
- b) How can iterations and conditional messages be shown using a Collaboration diagram and a Sequence diagram? 8
4. a) **Cheque Payment:**
 A customer presents a cheque to the bank employee. The employee checks if the cheque and the signature are valid and that the

customer has enough amount of balance in the account. The maximum amount of withdrawal allowed is 100000 per cheque unless the customer is a Privileged Customer in which case the customer can make a withdrawal of 500000 per cheque. Upon successful verification, the system records the successful completion of the transaction and the cash is handed over to the customer.

- i. Perform domain modeling of the above scenario.
- ii. Draw the sequence diagram for the events that occur in the scenario.
- b) What is the difference between coupling and cohesion? How can you make use of the Information Expert Pattern rather than the Controller pattern for delegating responsibilities to objects while designing a system? 7
5. a) In the UML, how can error generated and exceptions thrown by operations be illustrated in a Sequence diagram? Explain with the necessary figure. 7
- b) **ATM:**
 A customer having a Savings account in a Bank swipes a card in an ATM machine and types in the PIN number using the keyboard of the ATM. The System checks if the PIN matches the card. If the PIN does not match, the system rejects the card and display the rejection message in the ATM display. If the PIN is found to be a valid one, the customer types in the amount to be withdrawn. The system checks if the customer has enough amount of balance in that account. If he does, the system debits the account and dispatches cash thru the dispenser of the ATM and a receipt gets printed and issued to the customer.
 Come up with a design class diagram for the scenario above and then map those classes to code in any programming language that supports Object Oriented Paradigm. 8
- a) What are the artefacts created during the Object Oriented Analysis phase of software development and how do those artefacts get converted into concrete design during the Object Oriented Design phase thru elaboration? 7
- b) Why should one expect and plan for change and deviation from the design even during programming? Explain. 7
7. Write short notes on: **(Any two)** 2×5
 - a) Activity Diagrams
 - b) Iterative Process
 - c) Local and Global Visibility

Level: Bachelor

Programme: BE

Course: Object Oriented Design and Modeling
Through UML

Semester: Spring

Year : 2018

Full Marks: 100

Pass Marks: 45

Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

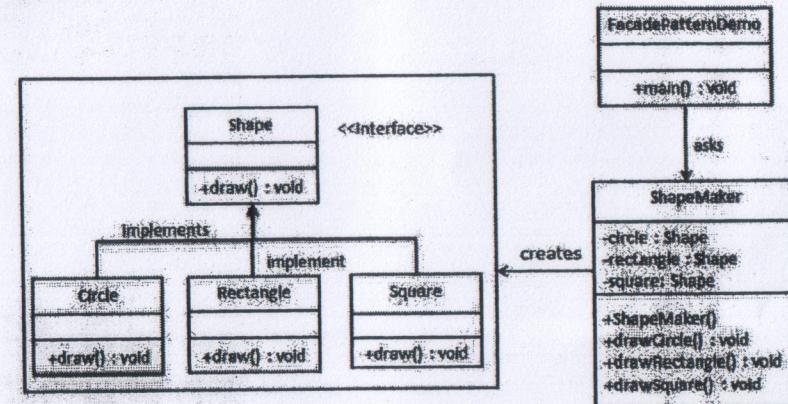
The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Why is it necessary to form abstractions? Explain the process of forming data and behavioural abstraction with suitable examples? 8
- b) Explain the difference between requirements specification and requirements elicitation? How are they performed? 7
2. a) Differentiate static and dynamic model used in software development life cycle with a concise diagram of each. 7
- b) **Yummy Online Food Ordering:** 8
In case of an Online Food Ordering System, the system allows customer to order food online. The system records the orders placed by the customers and generates a report at the end of every month that shows the order details. The system notes the customers who place orders more frequently and provides discount as per the published discount scheme. It also allows the system administrator to configure the system and print reports.
For the above mentioned scenario, come up with the potential use cases and elaborate them further by coming up with individual sequence diagrams for identifying the system events belonging to the individual scenario.
3. a) How do you come up with the Domain concept elements from the requirements specified by the customer? Your college is wanting to automate the manual tasks being conducted in the Exam section, come up with a domain model for this scenario by making the necessary assumptions. 7
- b) Explain system response, event and operation. Explain the purpose of SSD with an example. 8
4. a) How do the artifacts created during the Object Oriented Analysis 7

phase of software development get converted into concrete design during the Object Oriented Design phase? Explain with an example.

- b) Differentiate between coupling and cohesion by drawing class diagrams of interconnected classes? When would you rather make use of the Information Expert Pattern than the Creator pattern for responsibility delegation to objects while designing an Object Oriented system? 8
5. a) Differentiate between sequence and communication diagrams with regards to their strength and weakness. Draw a diagram for mutually exclusive conditional path. 7
- b) What is class diagram? How class diagram can be drawn? Explain step by step methodology along with the notations used to create them. 8
6. a) On the basis of given figure, convert it to code using a complete source code. 8



- b) Differentiate between errors and exceptions. What features are provided by the UML for modeling exception handling? 7
7. Write short notes on: (Any two)
 - a) Steps to create a domain model.
 - b) Visibility of objects.
 - c) Creating class definitions from DCD's.

Level: Bachelor
Semester: Fall
Programme: BE
Course: Object Oriented Design and Modeling
through UML

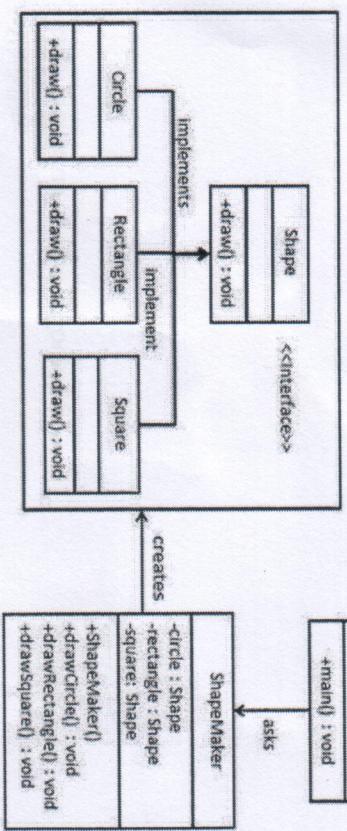
Year : 2019
Full Marks: 100
Pass Marks: 45
Time : 3 hrs.

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

Attempt all the questions.

1. a) "Unified Modeling Language (UML) is a language for specifying, visualizing, constructing, and documenting the artifacts of software systems". Justify this statement explaining the significance of UML in OOA/D.
What are the various formats to represent a Use case? Explain Fully-Dressed format with an example. 2+5
2. a) How System Behaviour can be represented in UML?
b) What is conceptual Model? How can one build a conceptual model? Explain the steps involved. 8
3. a) Describe the significance of GRASP. Explain Information Expert Pattern with an example.
b) How do you denote mutually exclusive conditional paths in Interaction Diagram? What are the DO-ing and KNOW-ing responsibilities of an object? 7
4. a) What is a collaboration diagram? How do we represent mutually exclusive conditions in a collaboration diagram? Justify with a complete block example.
b) What do you mean by system operation, events and behaviour? Draw a SSD for makePayment() function. 8

5. a) Convert the given Design Class Diagram into an equivalent code. (you can choose any language like Java, C++, etc)



- b) What do you mean by Exception in OOA/D? How are Exceptions addressed by UML? 6

6. a) How object oriented is used in SDLC?
b) "Contracts in UML provides a more detailed description of system behavior when use cases are insufficient". Explain this statement with an example. 8
7. Write short notes on: (Any two)
a) System event and system operation illustrating un UML
b) Visibility
c) High Cohesion and Low Coupling 2×5