



SLIATE

SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION

(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

Higher National Diploma in Information Technology

Second year, first Semester Examination – 2017

HNDIT2313 Object Oriented Analysis and Design

Model Answers

Question 01

- (i) What is meant by UML and what are the two types of diagrams available in UML?

The **Unified Modeling Language (UML)** is a general-purpose, developmental, modeling language in the field of software engineering, that is intended to provide a standard way to visualize the design of a system. (2 Marks)

Structure and Behavior Diagrams (2 Marks)

- (ii) Give examples for the two types of diagrams mentioned in above (i). (04 marks)

Structural UML diagrams

- Class diagram
- Package diagram
- Object diagram
- Component diagram
- Composite structure diagram
- Deployment diagram

Behavioral UML diagrams

- Activity diagram
- Sequence diagram
- Use case diagram
- State diagram
- Communication diagram
- Interaction overview diagram
- Timing diagram

- (iii) Briefly describe what is an object in the context of object oriented programming

(04 marks)

Object is an instance of a class with attributes, behaviors and states

(iv) Mention two object oriented programming languages (02 marks)
C++, Java, C#, visual Basic, visual FoxPro

(v) Mention three advantages in using object oriented analysis and design in system development (06 marks)
Customers get better system at better cost; projects are done on time, lower maintenance cost, faster maintenance.

(Total 20 marks)

Question 02

(i) What is meant by Access Specifies in object oriented software development? (02 marks)

Keywords which specifies access rights that the class members following,

(ii) Name and explain two access specifies used in C++ (04 marks)

Private - data members are accessible only from objects of the same class or from their friends

Protected - data members are accessible only from objects of the same class, from their friends or derived sub classes

Public - data members are accessible only from any other objects

(iii) Briefly explain, what is a parameterized constructor in C++ programming (04 marks)

A **special member** functions of any class, which are **invoked at the moment of an instance of the class is created that receives arguments/parameters**

(iv) Write the C++ code to implement the constructor of **Tyre** class which initializes the following private data members. (06 marks)

- a. **Radius**
- b. **Brand Name**

```
Tyre::Tyre(int r)
{
    Radius = r;
}
```

(v) What is meant by Destructor in C++ programming (02 marks)

Special member function with the same name as the class and invoked Before system reclaims object's memory

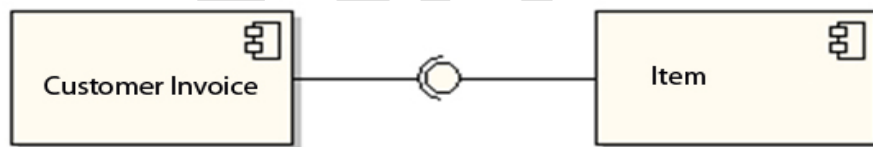
(vi) Mention how C++ implement data abstraction (02 marks)
By declaring data members as private or friend (specially as private)

(Total 20 marks)

Question 03

(i) Give the object oriented terminology for each of the following object oriented features. (05 marks)

- a. This is a class
 - b. This is an Object
 - c. Method
 - d. Instance Variable
 - e. Class Variable
- (ii) Explain the difference between static modeling and dynamic modeling (02 marks)
- Static modeling - do not explain the time dependent changes of the system
- Dynamic modeling - Explain the time dependent changes of the system
- (iii) Briefly explain what is a component diagram (04 marks)
- Diagram shows the dependencies among software components, including the classification of components
- (iv) What is the difference between provided interface and required interface in component diagrams (02 marks)
- Provided interface - provide data to another component
- Required interface - receive data from another component
- (v) Draw a component diagram to illustrate the following requirement (07 marks)
- In a point of sales system, the software module **Customer Invoice** requires the **Item details** from the software module **Item**.



(Total 20 marks)

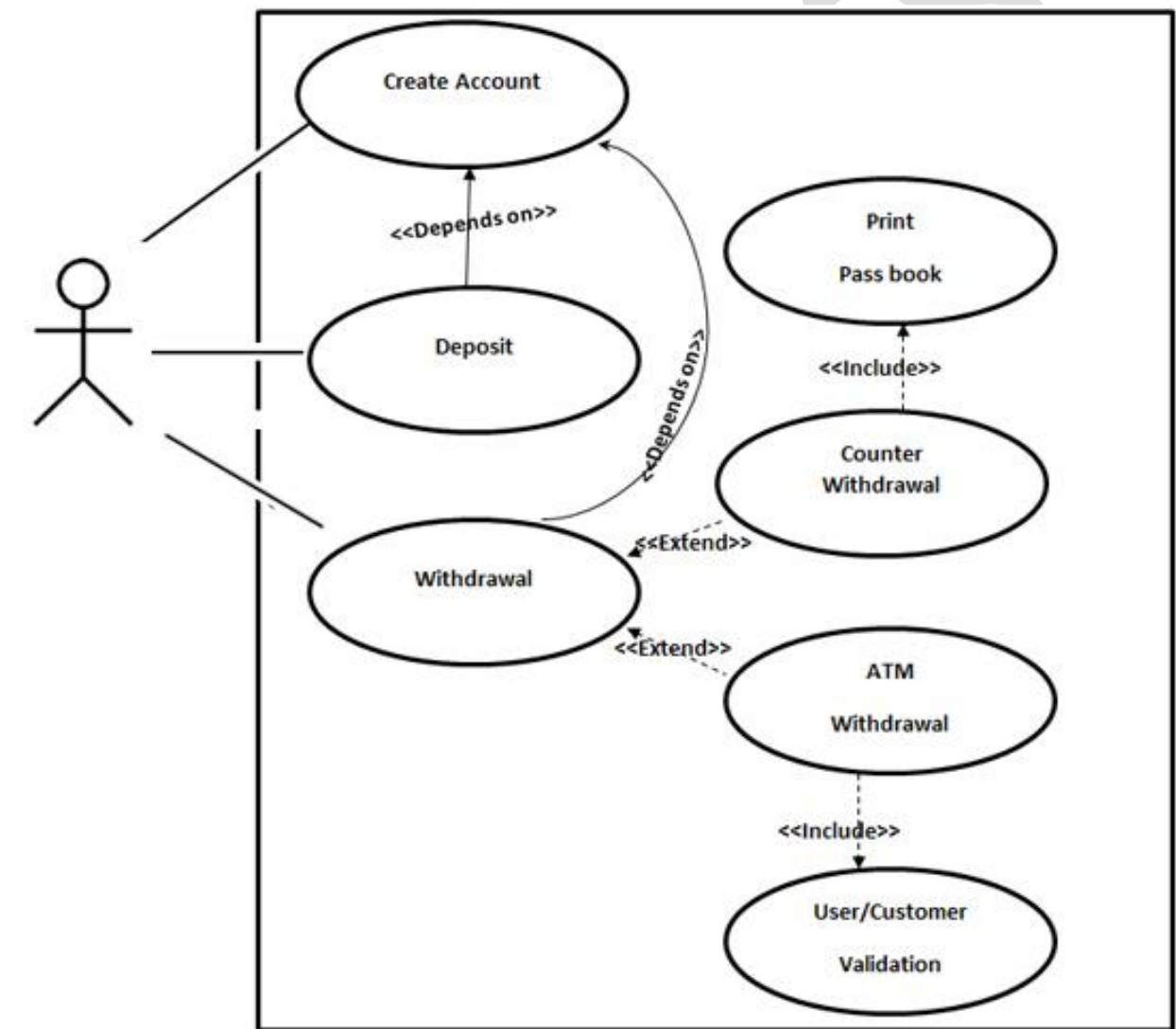
Question 04

- (i) Briefly explain what is a use case diagram in UML? (02 marks)
- A graphic depiction of the interactions among the elements of a system and system users
- (ii) Briefly explain followings in a use case diagram (03 marks)
- a. Use case - oval shape symbol to depict system activities
 - b. Boundary - rectangle around the use cases to depict the system scope
 - c. Extend - additional use case attached to original use case to depict optional behavior of original use case
- (iii) What is the difference between Primary actor and Secondary actor in a use case diagram
- Primary actor - Main actor who use or benefit from system
- Secondary actor - Actors who derived indirect benefits (02 marks)

(iv) Draw the use case diagram for the following scenario (13 marks)

- a. A bank performs create account, deposit and withdrawal as the main transactions with its customers. Performing deposit and withdrawal is not possible without a created account. Withdrawal can be performed in either in a counter or ATM machine. While a withdrawal is performing in counter the pass book is definitely updated. While a withdrawal is performing in an ATM, the user is definitely validated.

(Total 20 marks)



Question 05

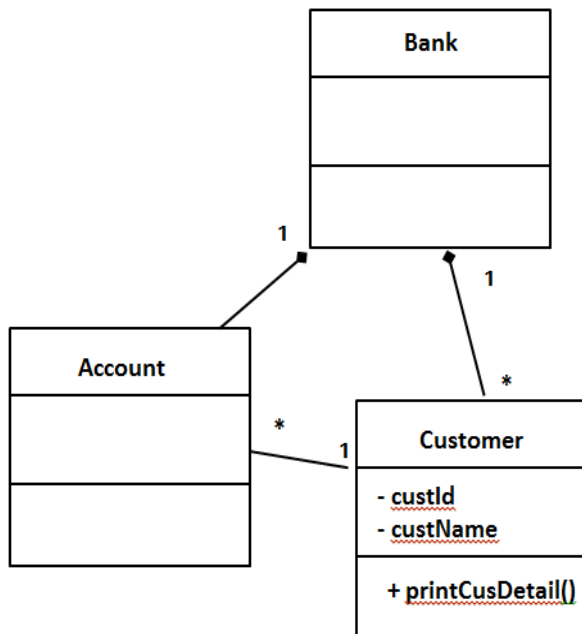
- (i) Briefly explain what class diagram in object oriented analysis is and design, and what are the information can be included in it. (02 marks)

Description of a group of objects with common properties (attributes) common behavior (operations), common relationships to other objects, and common semantics.

- (ii) Study the given scenario for a bank and answer the given questions.

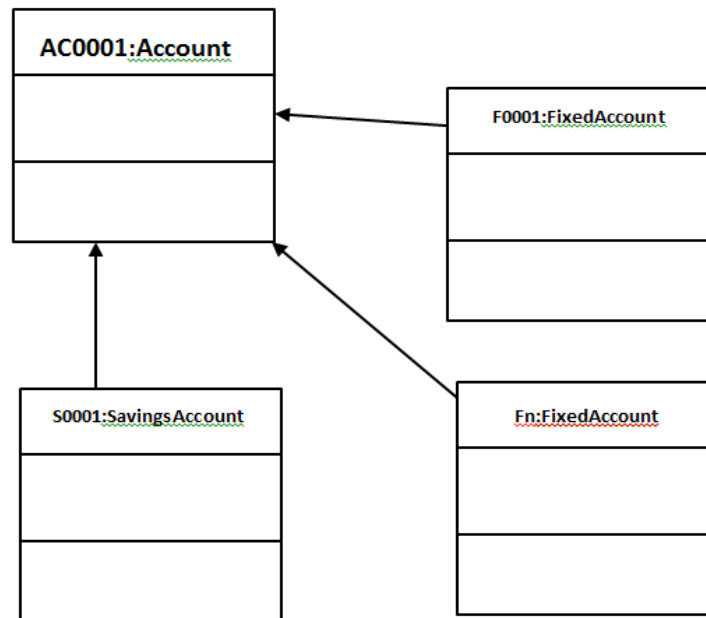
Bank has large number of accounts and customers. Customer can have any number of accounts

- a. Assume **custId**, **custName** are private data of the customer and **PrintCusDetail** is a public method of the customer. Draw the class diagram to illustrate design specifications for the bank. (09 marks)



- b. Assume the accounts can be divided in to two groups, as saving account and fixed account. Each savings account is created with a serial number starting 's' , and Each Fixed account is created with a serial number starting 'F' Draw an object diagram to illustrate the above given specifications for the bank.

(05 mark)



- c. Write the C++ code to create savings account class, which is a sub class of account class

```

class SavingsAccount:Account
{
}
  
```

(04 marks)

(Total 20 marks)

Question 06

- (i) Briefly explain what is an activity diagram is in UML (03 marks)
Diagram type which illustrates the dynamic nature of a system, by modeling the flow of control from activity to activity among objects.
- (ii) Mention three symbols used in activity diagrams (03 marks)
Entry, exit, decision point, split, join, action
- (iii) Briefly describe what is swim lane in activity diagrams (02 marks)
A type of activity diagram which activities are grouped to deferent lanes based on the object, which the activity is performed.
- (iv) Draw an activity diagram for the following scenario related to cash withdrawal in a bank.
Customer fill the double slip voucher and produce to bank assistant with his identity card and pass book. Is customer failed to produce all the documents bank assistant refuse the transaction.

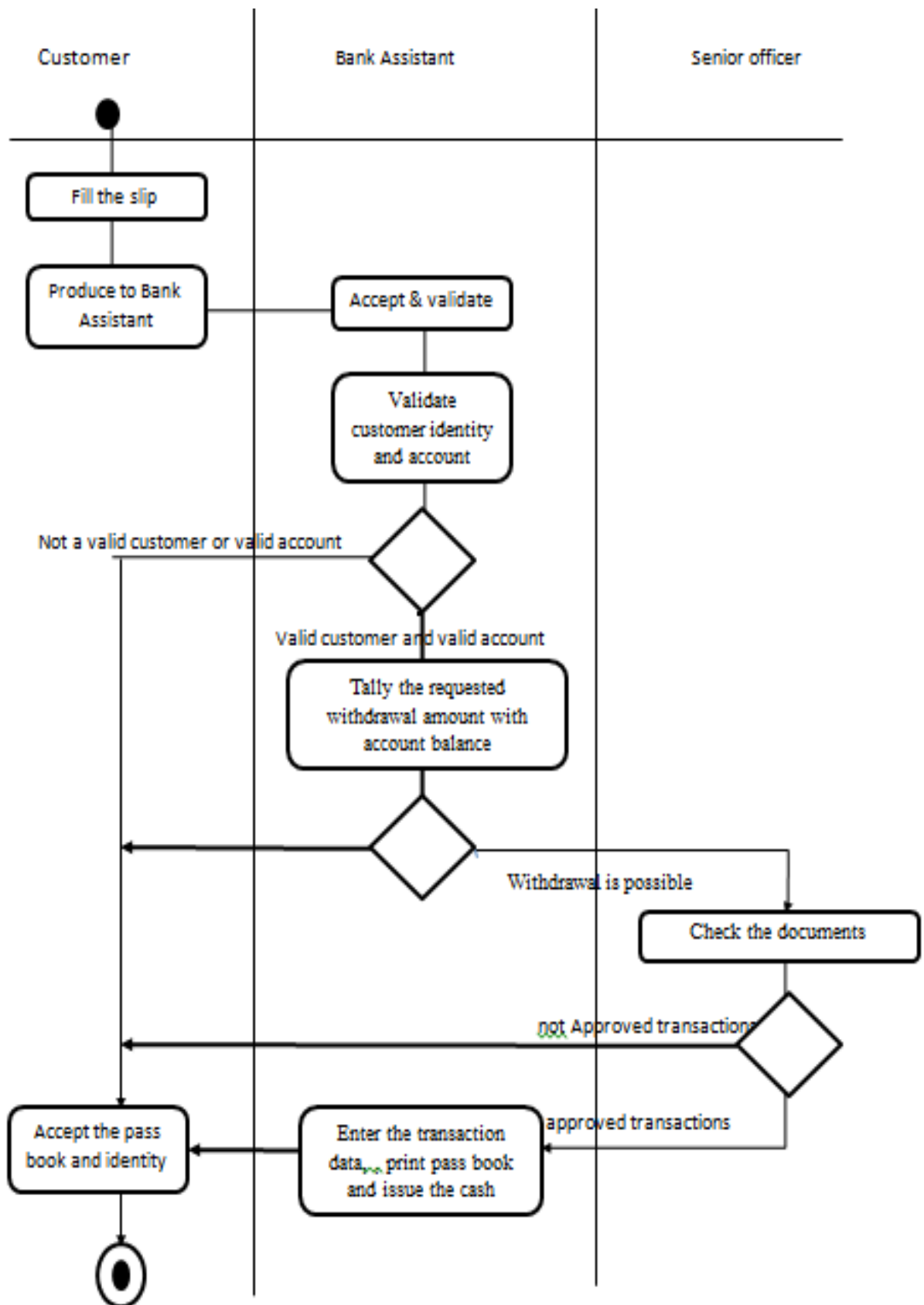
Bank assistant validate customer identity and account. Tally the requested withdrawal amount with account balance. If the withdrawal is possible the documents are produce to senior officer for approval.

Senior officer check the documents. If the documents are ok then payment is approved return the document to bank assistant. Else disapprove the withdrawal and return the document to bank assistant

If the transaction is approved bank assistant enter the transaction data to computer system, print pass book and issue the cash. Else return the documents to customer.

(12 marks)

Answers



(Total 20 marks)