**OOP Lab 7**

|  |  |
| --- | --- |
| Due Date: | October 19, 23 : 59 |

* Submit your assignment using the following file format:

LabNumber\_RoomNumber\_StudentName\_Student\_ID.zip

Example: Lab7\_328\_Hongkildong\_201620505.zip

* This zip file will contain two types of files, namely:

1. Report file with file format “Report\_Lab number” (eg. report\_7) to answer theory questions and to write the screen shot of your program.
2. Source code file that contains codes of classes to answer programming questions.

**Objectives**

1. Understanding the requirements of an application and learning how to write them as use cases.

2. Learning basic object-oriented analysis and design methods.

3. Developing the ability to draw UML diagrams.

4. Developing the ability to interpret and modify a code based on existing requirement document

**ATM Case Study, Part 1: Object-oriented-design using UML**

* Unified Modeling Language (UML) to design and implement an Object oriented-application.
* Case study: design and implementation of an object-oriented automated teller machine software system.
* Six types of UML diagrams are used to graphically represent the design of an Object-oriented Program, namely:

1. Use Case Diagram
2. Class Diagram
3. State diagram
4. Activity Diagram
5. Communication Diagram
6. Sequence Diagram

* Read the PPT to get detailed information.

**ATM Case Study, Part 2: Implementing an object-oriented design**

* Incorporate inheritance into the design of the ATM.
* Incorporate polymorphism into the design of the ATM.
* Fully implement in Java the UML-based object-oriented design of the ATM software.
* Study a detailed code walkthrough of the ATM software system
* Read the PPT and the code to get detailed information.

**Instruction**

* For each of the following questions, write the answers directly in your report.
* If you draw a UML diagram by hand, take a picture and include it in this report.
* Please zip the code of question **#4** into a file that has name: "ATMextended(optional)

**Part 4. Exercises (15 points)**

1. Analyze the “use case” scenario of Authenticate and Withdrawal, and then write the “use case” scenario for Transfer (5 points)
2. Analyze the “activity diagram” of Withdrawal, and write the “activity diagram” for Transfer. (5 points)
3. Write the “sequence diagram” for Transfer. (5 points)
4. Add the code for “Transfer” at the end of the given code(Optional)

**Note: In order to answer the above questions, read the PPT and the given code.**

**1. Analyze the “use case” scenario of Authenticate and Withdrawal, and then write the “use case” scenario for Transfer (5 points)**

Deposit

Authenticate

ATM

transaction

Balance check

Transfer

Withdrawal

**=>**

* **ATM must check whether the user is right person or not by authenticating the user. All of the ATM have a authenticating function(getting PIN number and account number). So the relationship between ATM transaction and Authenticate is include relationship.**
* **After the user complete the authenticating stage, the user can withdraw the money he wants. Withdrawal transaction asks the user to enter the amount of money to withdraw by keypad. Before completing withdrawal, if there is enough money than the user wants to withdraw, then transaction is completed. If not, the ATM screen shows appropriate messages and ask user to enter different amount to withdraw. The user can cancel this transaction if he does not want.**
* **Transfer transaction is sending user’s money to other accounts. This transaction asks the user to enter the amount of the money by keypad. Of course, if the user entered more money than he has in the account, ATM shows appropriate messages for user to enter different amount to transfer****. This transaction is also optional to user, so the user can cancel if he doesn’t want to do.**

**2. Analyze the “activity diagram” of Withdrawal, and write the “activity diagram” for Transfer. (5 points).**

1. **Withdrawal activity diagram**

**Firstly, to do the ATM transaction, the user should be authenticated by entering the account number and correct PIN number.**

**Second, the user will choose what task he wants to do. (such as withdrawing cash, deposit funds, transfer or etc…). But in this case the user will choose withdrawal transaction.**

**Third, the user enter the withdrawal amount.**

**Fourth, the atm database checks the user’s account if there is enough balance to withdraw. If there is enough money, the transaction go ahead. If not ATM shows appropriate messages for user to enter different amount to withdraw.**

**Fifth, complete transaction and balance of the account will be changed.**

**Finally the user get the amount he entered and choose to finish the task or do other tasks.**

**텍스트, 화이트보드이(가) 표시된 사진

자동 생성된 설명< Withdrawal activity diagram >**

1. **Transfer activity diagram**

**Firstly user enter the account number and correct PIN number to authenticate. ATM identifies the user’s information and process the transaction. If user entered incorrect account number of PIN number, ATM asks user to enter correct information.**

**Second, user chooses transfer transaction.**

**Third, user enters other account numbers and amount to transfer. Then ATM checks the database of the user’s account to see whether the account has enough money to transfer. If not, ATM asks the user to enter different amount less than the balance.**

**Fourth, if user entered correct amount and correct account, the amount (user entered to transfer) is withdrew from user’s account and deposit to the other account. And this change in two accounts recorded at bank database.**

**Finally, user complete the transfer transaction and choose finish the task or do other tasks.**

**텍스트, 화이트보드이(가) 표시된 사진

자동 생성된 설명**

**<Transfer activity diagram>**

**텍스트, 화이트보드이(가) 표시된 사진

자동 생성된 설명3. Write the “sequence diagram” for Transfer. (5 points)**