Assignment 2 – Group Project

Due date: 1 November 2021

Expected Learning Outcomes of the Assignment

- describe the essential concepts of object-oriented technology and carry out the object-oriented approach for programming;
- design object-oriented programs using object-oriented modelling techniques;
- create software applications with an object-oriented programming language to solve computer problems;
- apply object-oriented approach to build computer systems in groups and develop group work;
- cooperate with team members in problem solving responsibly, effectively, and appropriately as an individual and as part of group efforts.

1. Statement of Work

You are working as a maintenance team for a bank to maintain a prototype of an ATM system. An initial prototype has been developed in Java and the source files are given as:

`Account.java`	`Deposit.java`
`ATM.java`	`DepositSlot.java`
`ATMCaseStudy.java`	`Keypad.java`
`BalanceInquiry.java`	`Screen.java`
`BankDatabase.java`	`Transaction.java`
`CashDispenser.java`	`Withdrawal.java`

As a maintenance team (**5 to 6 students in each team**), you are required to perform the following tasks.

1.1 Part I (Reverse engineering)

Based on the original source codes, construct a Class Diagram to model the classes and their relationships for the initial prototype of the ATM system.

1.2 Part II (Re-engineering)

Suppose that the bank would like to enhance the prototype with the following new features:

(A)	The prototype was originally designed for the use in USA. Adjust the selection of options for *cash withdrawal* to fit in the situation in HK (only the multiples of HKD100, HKD500, or HKD1000 are allowed).
(B)	Introduce two specific types of bank accounts as subclasses – *saving account* and *cheque account*: **Saving Account** has a specific attribute – ***interest rate*** (with default value of 0.1% per annum); for **Cheque Account**, there is a specific attribute – ***limit per cheque*** (with default value HK$10,000).
(C)	Remove the deposit function from the existing system
(D)	Add a new function – ***transfer*** (for transferring fund from one bank account to another bank account)

With reference to the above proposed enhancements, your team is responsible to reconstruct the **Class Diagram** that models the modified version of the prototype and then implement it in Java.

2. Submission Requirements

Your project team is required to prepare a ***well documented report*** that contains:

2.1. For Part I:

- a ***Class Diagram*** for modeling the initial ATM prototype based on the original source codes (clearly specify the attributes and operations of each class and the relationships among the classes);
- any assumptions that you have made in constructing the Class Diagram.

2.2. For Part II:

- a ***modified version of Class Diagram*** of the ATM prototype that could support the required new features (with clear indication of the modified parts of the Class Diagram);
- any assumptions that you have made in modifying the Class Diagram;
- a ***complete listing of source codes*** (with clear indication of modified parts of the source codes);
- ***explanations of the key program statements***;
- appropriate set of ***test cases*** and the corresponding testing results (that can be screenshots of the executions with testing cases).

2.3. In Appendix – Description of teamwork

- The division of job duties.
- Timeline of the work done.
- Group learning experience: e.g. describe the problems that have been encountered a maintenance team by working online, and how you would resolve the problems.

Note:

- The **cover page of the report** should be stated with Subject Code, Subject Title, Assignment Title, and Student ID and Student Names of all team members.

- The **Group Leader** should submit the following files to Moodle:

  - **source code** (zipped file) with filename:
    SEHH2242_A2_source_*Student Name of Group Leader*.zip

  - **written report** (pdf format) with filename:
    SEHH2242_A2_report_*Student Name of Group Leader*.pdf

- The **Peer Evaluation Form** should be submitted through the **Moodle** e-learning system by **individual students**.

- Deadline for submission: **1 November 2021, 11:59pm.**

- Each group will be invited to do **demonstration of the test cases** during the tutorial sessions.

3. Grading Aspects

Your assignment will be graded according to the following criteria:

Group basis (90%)	
Modeling: Class Diagram (Part I) *correct modeling with UML notations*	15%
Modeling: modified Class Diagram (Part II) *correct modeling that fulfill the new enhancements; clear indication clear indication of the modified parts*	15%
Implementation: (with reference to the modified Class Diagram) *correct logic and output; checking of invalid inputs; conformance to Java code conventions; program readability; clear explanations*	30%
Test cases design: (for the modified version of the ATM prototype) *documentation of appropriate set of test cases for demonstrating the correctness of the program*	25%
Teamwork: (timeline of the work done; division of job duties; group learning experience)	5%
Individual basis (10%)	
Self-reflection	5%
Peer Rating	5%

4. Important Points

- **Plagiarism will be penalized severely**. Marks will be deducted for assignments that are plagiarized in whole or in part.
- **Late submission** is liable to a penalty of 10 marks for each day delayed.