AUGUST/RESIT EXAMINATIONS 2021/2022

MODULE: CA314 - OO Analysis and Design

PROGRAMME(S):
CASE   BSc in Computer Applications (Soft.Eng.)
ECSAO   Study Abroad (Engineering & Computing)
ECSA   Study Abroad (Engineering & Computing)

YEAR OF STUDY: 3,O,X

EXAMINER(S):

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TIME ALLOWED: 2 Hours

INSTRUCTIONS: **Answer all questions.**

PLEASE DO NOT TURN OVER THIS PAGE UNTIL YOU ARE INSTRUCTED TO DO SO.
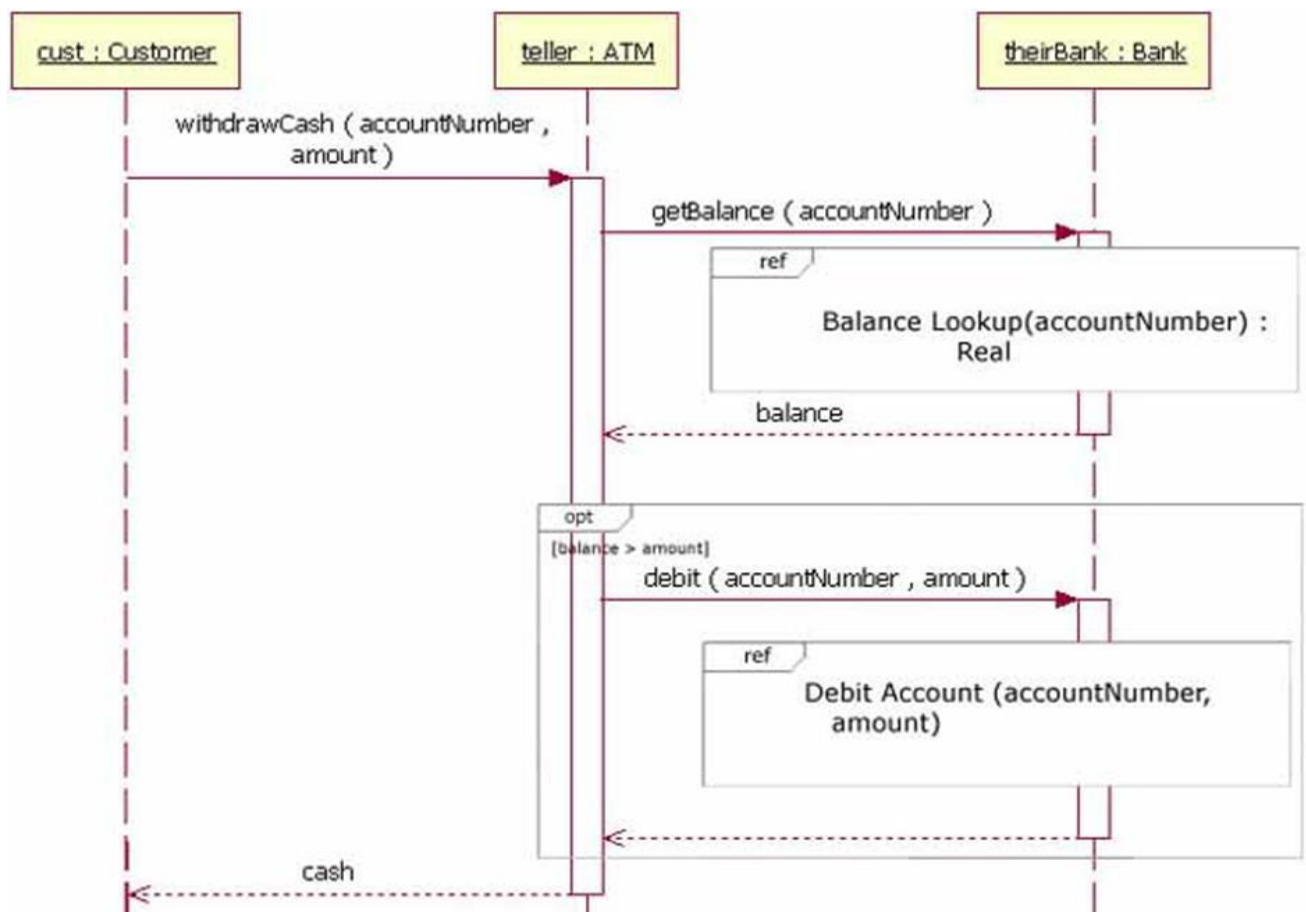The use of programmable or text storing calculators is expressly forbidden.

There are no additional requirements for this paper.

QUESTION 1   *[TOTAL MARKS: 20]*

Q 1(a)   **[12 Marks]**

The SOLID principles emphasise good software design practice. Pick three of these principles and explain their purpose and advantage.

Q 1(b)   **[8 Marks]**

Take each of the principles that you have chosen in **1(a)** and give a short software example to illustrate them.

[End of Question 1]

QUESTION 2   *[TOTAL MARKS: 20]*
Q 2(a)   **[12 Marks]**

Explain each of the UML features illustrated in the Sequence Diagram above.
Q 2(b)   **[8 Marks]**
Draw a Communication (Collaboration) Diagram to fully represent the Sequence Diagram in **2(a).**

[End of Question 2]

QUESTION 3   *[TOTAL MARKS: 20]*

Q 3(a)   **[12 Marks]**
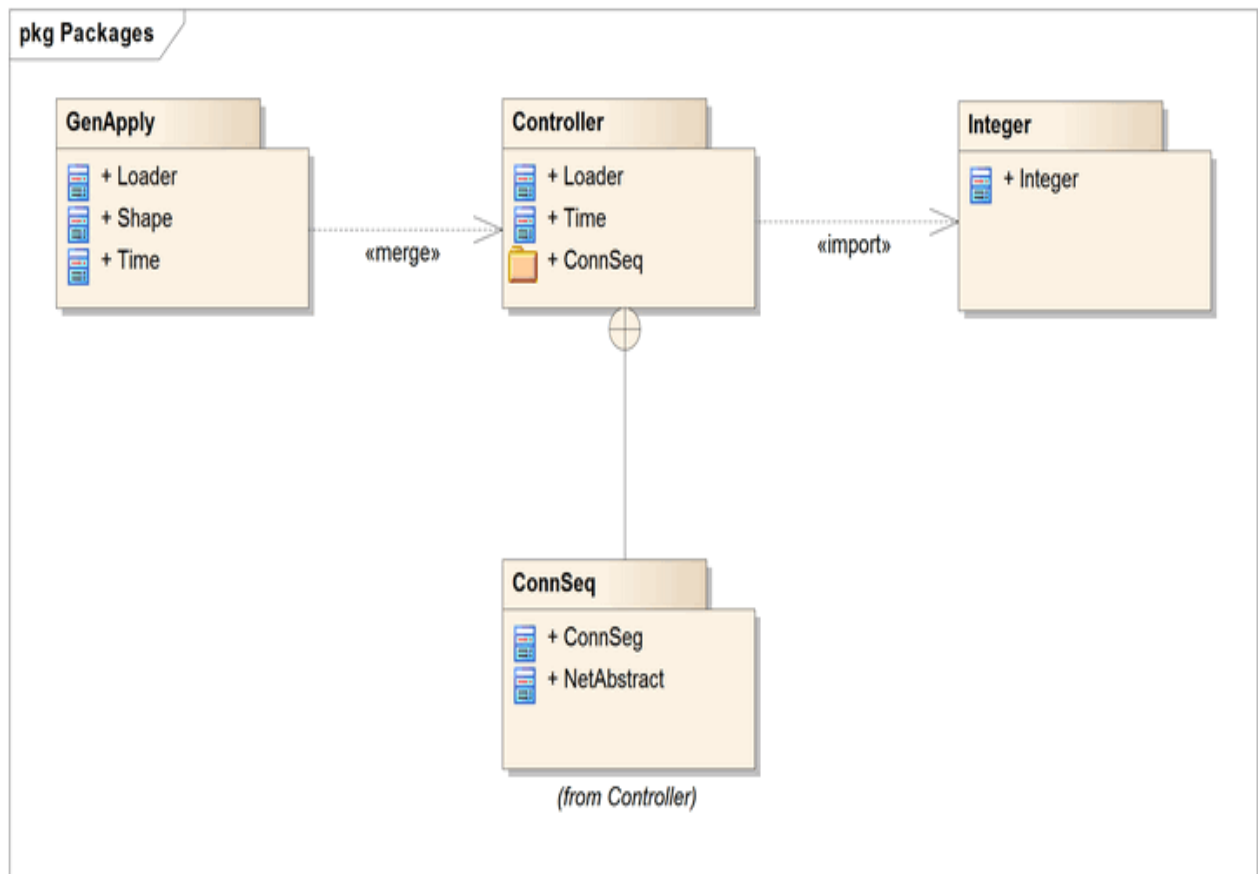
Explain each of the UML features in the following Package diagram.

Q 3(b)   **[8 Marks]**

Explain how packages enforce scope and visibility of names in a UML context.

[End of Question 3]

QUESTION 4   *[TOTAL MARKS: 20]*

Q 4(a)   **[10 Marks]**

Draw a UML state diagram for the Object **Reservation** corresponding to the description in the Appendix.

Q 4(b)   **[5 Marks]**

Show how super and sub states and parallelism are indicated on State Diagrams.

Q 4(c) [5 Marks]

Draw a Class Diagram to represent the important classes of the car-hire company in the Appendix. Make sure that you label all of the elements of the diagram.

[End of Question 4]

QUESTION 5 *[TOTAL MARKS: 20]*

Q 5(a) [8 Marks]

What were your own tasks within the group project in CA314? How did you find he division of work?

Q 5(b) [4 Marks]

Which Object-Oriented diagrams and methods were of most benefit during your development? Why?

Q 5(c) [8 Marks]

Explain the benefits and drawbacks of using Agile and UML together for a project.

[End of Question 5]

Appendix

A software system has been developed to support the operations of a specialised car-hire company. One software class within the system is called **Reservation** and the lifecycle of a **Reservation** object is described as follows.

"When a Member reserves a CarModel over the Internet, the **Reservation** is initially Waiting to be processed by an Assistant (this is so the Customer can make a **Reservation** without the intervention of an Assistant). The **Reservation** becomes Notifiable if, some time later, an Assistant finds a suitable unreserved Car in the display area of the car park, or if one is returned by a Customer. In this case, the Car is moved to the reserved area.

If no car becomes available for a particular **Reservation** within a week, the **Reservation** becomes NeedingRenewal: the Member must be contacted, by phone or in person, so that they can cancel the **Reservation**, or ask for it to be renewed for another week. If the Member cancels or cannot be contacted within five days, the **Reservation** is concluded.

Once a **Reservation** is Notifiable, the Member must be notified by an Assistant, in person or by phone, within three days; if the Customer can be reached, the **Reservation** is Collectable otherwise it becomes Displayable (a Car that was moved to the reserved area must be returned to the display area).

Once a **Reservation** is Collectable, the Member must collect the Car within three days; if they do collect, the **Reservation** is Concluded; otherwise, the **Reservation** becomes Displayable.

Once a Displayable reservation's Car has been put back in the display area, the **Reservation** is Concluded.

At any time, the Member may cancel the **Reservation** over the Internet, by phone or in person."

[END OF EXAM]