**Advanced Object Oriented Programming**

**Mini Assignment 1**

**(10%)**

**Average Time to complete: 2 and a half hours**

**Time given: 1 Week and 3 days.**

**Due:** Friday 30th September at 11:30 pm

**Submission:** On Blackboard.

Format: Upload this completed document

This project must be done in a group. Group size: 2 to 4 people.

It consists of 4 parts.

|  |  |  |  |
| --- | --- | --- | --- |
| **Group member** | **First name** | **Last name** | **Student id number** |
| **1** | Heng | Zhou | 101304724 |
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| **3** |  |  |  |
| **4** |  |  |  |

**One member of the group is responsible for uploading the completed document.**

Question1:

What is aggregation with respect to OOP? – (1 mark) In your explanation you must:

- Differentiate between the two forms aggregation and composition. (1 mark each)

- Explain how they are shown in UML. – (0.5 marks each)

Total for question: [**4 marks**]

(Delete the lines after the question and insert your response)

Answer 1:

1. Aggregation is a specialized form of association between two or more objects, it presents whole/part or parent/child relationship with stronger coupling than Association. Aggregation refers to a type of association that is HAS-A. This is a weak type of association because the child object can exist without the parent object. A type of aggregation called composition that is part-of relation, This is a strong association because the child object cannot exist without the parent object.
2. Both aggregation and composition are specialized form of association. Aggregation describes two objects with a relationship, but composition is the most specific type of aggregation that implies ownership. About lifecycle, the Composition containing object will be affected when destroying the owning object, the aggregation one will not be affected.
3. UML doesn't explicitly define composition and aggregation, but these can be inferred by the way that association relationships are drawn. A hollow diamond is used to represent aggregation, while a filled diamond is used for composition.

Question2:

Clearly explain the difference between an object and a class (you may use examples or diagrams to assist).

Total for question [**3 marks**]

(Delete the lines after the question and insert your response)

Answer 2:

1. A class is a blueprint or template from which objects can be made. It describes a group of objects with the same behavior and attributes. An object is a concrete example of a class. An object is a concrete instance of a class. It has specific attributes and behavior.
2. Example:

图示

描述已自动生成

Color: Orange Blue Green

Brand: Toyota BMW Nissan

Question 3:

What is an access modifier and why is it important? -( 1 mark for its importance and usage)

In your explanation you must also indicate:

- The differences between public and private access modifiers. -(0.5 marks each)

* How are they shown in a UML diagram. –(0.5 marks each)

Total for question: [**3 marks**]

(Delete the lines after the question and insert your response)

Answer 3:

1. What is an access modifier and why is it important?

An access modifier is a keyword used to indicate the level of access a class, member or variable has. C# has four access modifiers: public, private, and protected. Access modifiers are crucial because they control visibility and accessibility of classes and members as well as variables.

1. What are the differences between private and public access modifiers ?

Public access modifier makes classes, members, and variables accessible to all classes regardless of whether they are part of the same assembly. Private access modifies makes a class member or variable accessible only within the class it is declared.

1. How are they shown in a UML diagram ?

Public members have a (+) sign in front of their faces, while private members have a (-) sign in front.

Question 4: [10 marks]

A company rents out planes to private pilots. Bookings are made when a client reserves a plane for a specified date. Planes are picked up and dropped off at specified airports. This is usually done on the telephone. Planes can be booked for one (1) day only and are booked for the whole day.

The company would like to computerize their system. The company clerk will be entering information into a computer while speaking to a client on the telephone. The clerk will need to retrieve information (e.g. plane details, airport details, or client details if the clerk is dealing with an existing client) and create new bookings using the system. The clerk must be able to add, delete and update information on planes and airports. The clerk must also be able to add new clients as well as record new bookings and checking the availability of planes for specific dates.

You must come up with **appropriate** state (3 to 4 state values are acceptable) information for all classes involved. All collections must be shown as arrays.

Carry out an initial object-oriented design for the above specification, in which you should identify and show in a UML diagram:

* Classes that you think will be required.
* Their attributes and behaviours
* Any aggregation relationships
* Any other relationships between your classes

The UML Diagram should show all the information of the classes up to and including the coordinator class.

**Please note that you must show or display competency in the techniques taught in the classes.**

**Proper usage of concepts such as manager classes, coordinator classes, aggregation and responsibility delegation must be displayed in your design.**

**The names and ID numbers of all group members must be in the diagram.**

**You can use the website “draw.io” to do your design and export the image. This was shown in the recorded class.**

Insert your UML diagram on the next page

**Insert your UML diagram after this line.**

The company would like to computerize their system. The company clerk will be entering information into a computer while speaking to a client on the telephone. The clerk will need to retrieve information (e.g. plane details, airport details, or client details if the clerk is dealing with an existing client) and create new bookings using the system. The clerk must be able to add, delete and update information on planes and airports. The clerk must also be able to add new clients as well as record new bookings and checking the availability of planes for specific dates.

CAREFUL NOTE:

- Please safeguard your own team’s work.

- You are to do this project with your group members only.

- Note: Mobi Help members are NOT supposed to do or help you with your assignment.