



الفصل:

إسم الطالب:

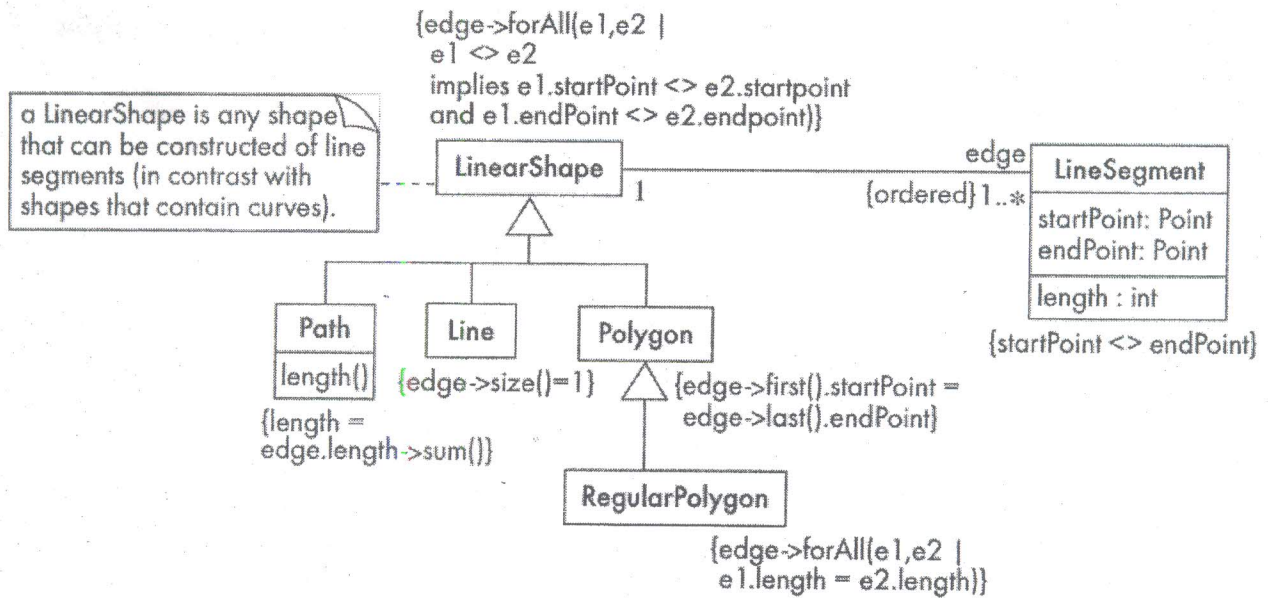
Answer all the following questions

First Question:

(5 Marks)

Look at **following figure** and then answer the following questions.

- i) **What** is the type of this diagram?
- ii) **What** is meant by the concept of OCL?
- iii) **Find** at least three OCL statements from the following figure. **Describe** the meaning of each one of these OCL statements.



Tick the suitable pattern from the given patterns which should be suitable for each one of the following contexts? And then give and describe an example for each context and draw its equivalent UML class diagram for such each example according to the chosen pattern.

Abstraction–Occurrence pattern , Player–Role pattern , Observer Pattern , Proxy pattern , General Hierarchy Pattern , Delegation Pattern , Singleton pattern , Adapter pattern , Façade pattern , Read-Only Interface pattern , Immutable Pattern , Factory pattern ,

- 1- You need an operation in a class and you realize that another class already has an implementation of the operation. (.....)
- 2- It is very common to find classes for which you want only one instance to exist (.....)
- 3- You are building an inheritance hierarchy and you want to incorporate into it a class written by somebody else – that is, you want to reuse an existing unrelated class. Typically, the methods of the reused class do not have the same name or argument types as the methods in the hierarchy you are creating. The reused class is also often already part of its own inheritance hierarchy. (.....)
- 4- You sometimes want certain privileged classes to be able to modify attributes of objects that are otherwise immutable. (.....)
- 5- You often find a set of objects that have a naturally hierarchical relationship Each object in such a hierarchy can have zero or more objects above them in the hierarchy, and zero or more objects below them. (.....)

(with my best wishes Dr. Mokhtar A. A. Mohamed)