Unit 5: Understanding UML

What is UML?

The Universal modelling language is a tool for constructing and documenting software system artefacts. UML expresses OO Analysis and design using diagrams. UML is easy to modify and share with others.

Use cases

Use casts are used to document the function requirements from a user's perspective.

Class Diagrams

Class diagrams are used to document the objects that make up a system and the relationships between them. Class diagrams show the properties and behaviours of different objects. Class diagrams are a static description of a system.

Relation ships

Relations ships are shown as a line between classes.

Objects in class diagrams can have multiplicity relationships which look like 0..*. The multiplicity specifies how many of each object relates to the other I.e. a car has one driver.

Class diagrams can show inheritance hierarchies. This type of relationship is known as generalization. With the base parent being a generalized version of the specialized child.

Composition can be documented using a black square. Composition is a strong relationship where the child cannot exist without the parent. For example, a phone can't exist without its screen.

Aggregation is a weaker relationship than composition. In an aggregation relationship, the child can exist without the parent. For example, books can exist without a library.

Interactions Diagrams

Interaction diagrams are a set of UML diagrams that a used to show how objects (group of) interact.

Sequence Diagrams

Sequence diagrams are a type of interaction diagrams that captures a specific behavior of the system. A sequence diagram is a specific view of a system and as such does not need to contain all system objects in the diagram.

Sequence diagrams are composed of actors and objects. Each object will have a vertical lifeline. A rectangle on a lifeline shows that the object is doing something, this is called an activation. Activations at the top of the life line happen before those bellow them. An arrow that points from one lifeline to another show's communication between objects. The objects in a sequence diagram or instances of classes as this is a dynamic diagram.

State diagrams

A state diagram shows the states and transitions of objects. State diagrams model behavior.

Activity diagram

An Activity diagram is a type of state diagram, activity diagrams are similar to flow charts, but with extra notation for parallel activities.

Activity diagrams start with the entry point, a black circle. All actions are shown as boxes and decisions are shown as diamonds. A black bar with multiple parallel lines coming out of it can show multiple actions occurring simultaneously.