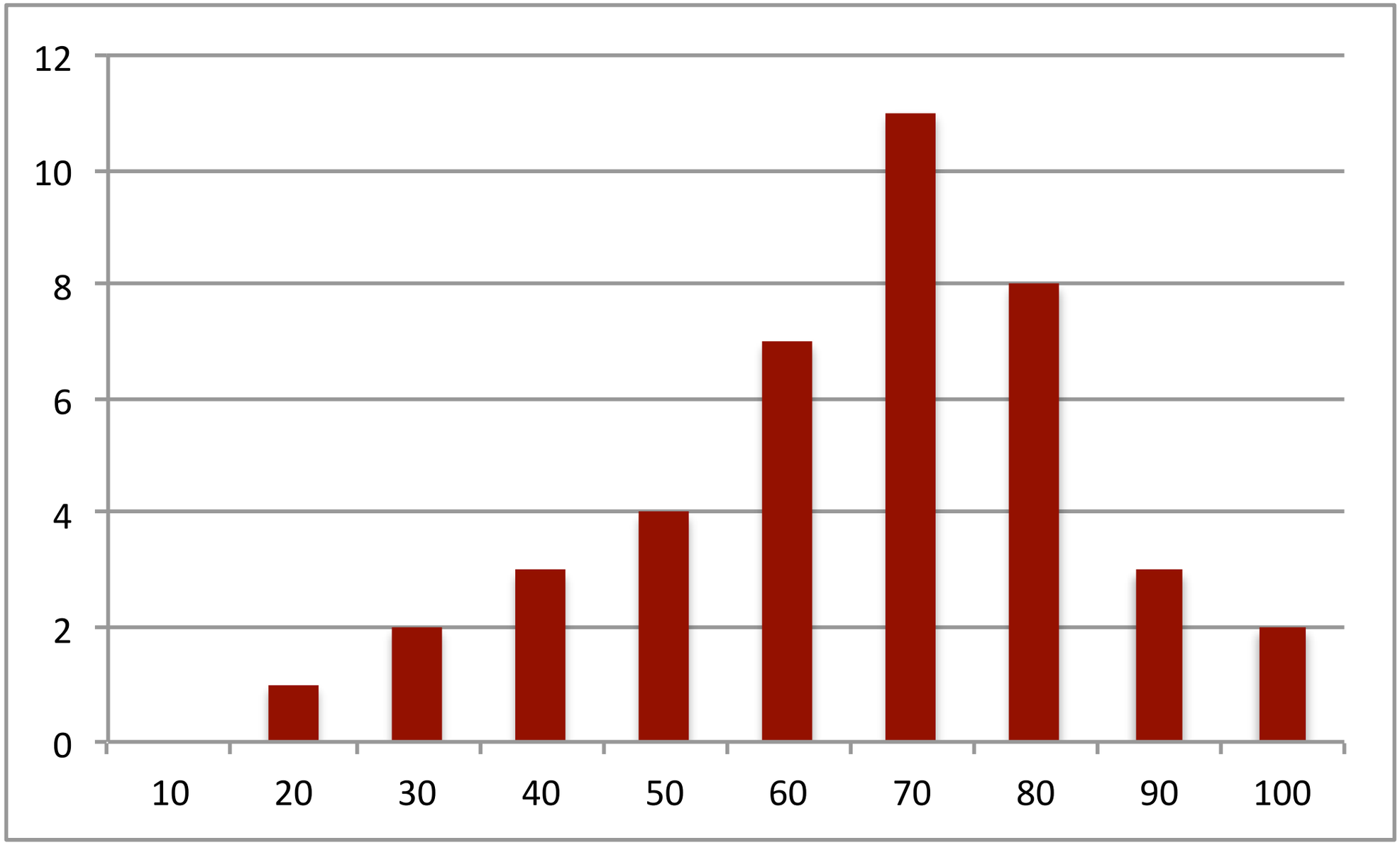
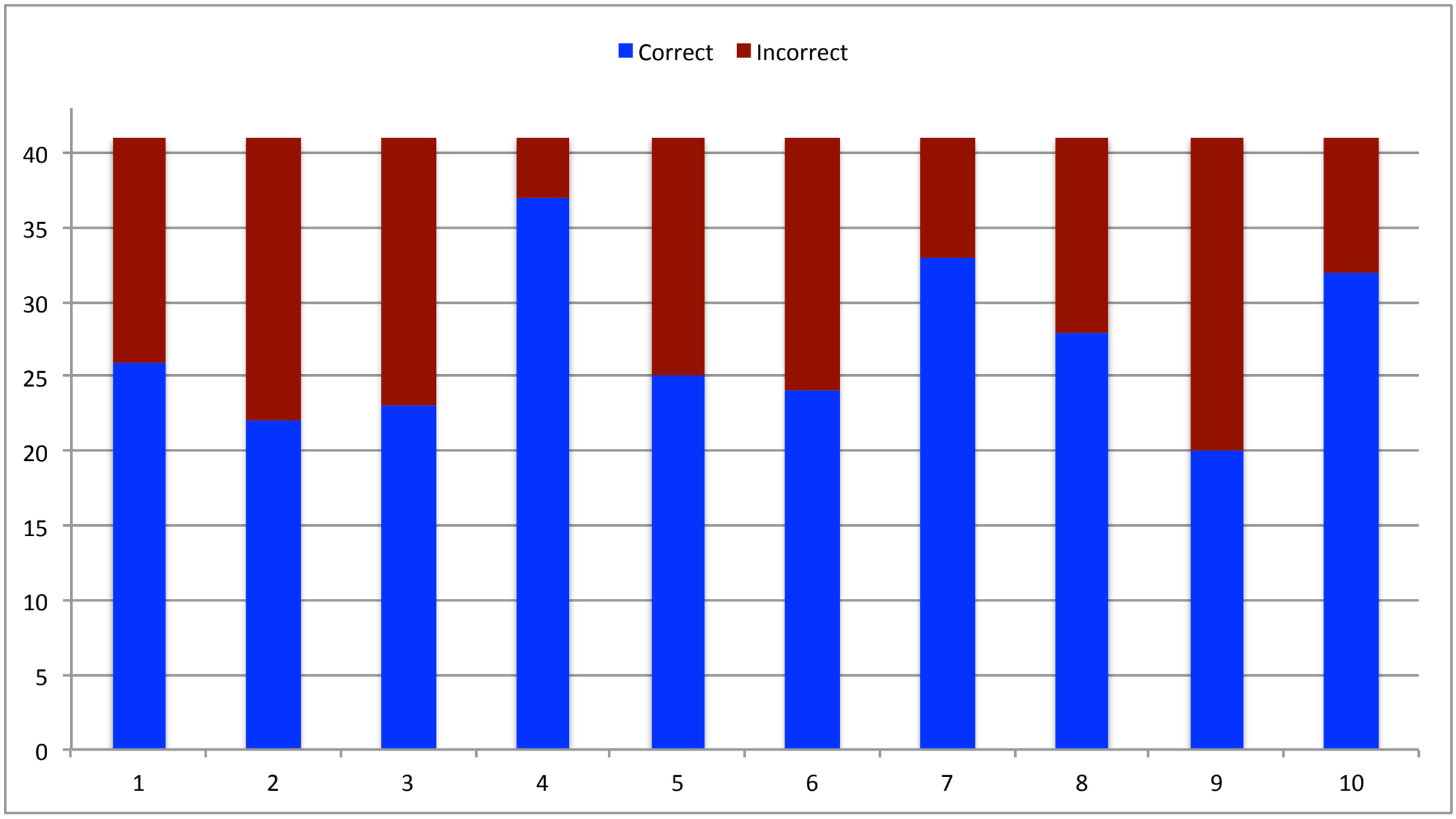
Quiz 2

- Participation: 41/44
- Average: 65.85
- Median: 70
- Standard Deviation: 18.34
- Min: 20
- Max: 100

Quiz 2



Quiz 2



Quiz 2 - Q1

- The sequence diagram describes the static structure of a program

UML: Introduction

- UML is a set of modeling notations, which include 13 diagrams
  - Static structure of the system

    Class diagram

    Object diagram

    … …
  - Dynamic behavior of the system

    Use-case diagram

    Sequence diagram

    … …

Sequence Diagram

- Class Diagram describe the static structure of a software
- Need to know how objects will interact with each other
- Sequence Diagram describes how objects talk with each other dynamically
- Sequence diagram emphasizes the time-ordered sequence of messages sent and received

Quiz 2 - Q2

- The model part of the MVC Pattern addresses the external representation of the system

Model-View-Controller (MVC) Pattern

- Solution
  - MVC pattern separates application functionality into three kinds of components

Model – internal state of the application

View – external representation of the model

Controller – coordinates updates of the view in response to user input or model changes

Quiz 2 - Q3

- In class diagram, a class has two compartments: the name and the operations of the class.

UML Class Diagram Syntax

- Elements of class diagram:
  - Class represented as a box containing three compartments
    - Name
    - Attributes
    - Operations
  - Relation represented as a line between two classes
    - Association
    - Generalization
    - Aggregation and composition

Quiz 2 - Q4

- In general, there should be at least one sequence diagram for each use case in the design.

"Obvious" Design Rules?

- Emphasis in this class on class and sequence diagrams.
  - need both static and dynamic views of the design
- There should be (at least one) sequence diagram for each use case.
- Every class defined should occur in a dynamic (sequence) diagram – it should DO something.
- Every communicating object in a dynamic (sequence) diagram should have been defined in the class diagram.

Quiz 2 - Q5

- It is a good idea to move back and forth between the static and dynamic views of the design.

A Good Design Practice

- Recommendation: move back and forth between the static and dynamic views of the design.
- For example, work on the class diagram some, then work on the sequence diagram, back to the class diagram, return to the sequence diagram, etc.
- Note that you will typically have a sequence diagram for each use case.
  - you may have multiple class and sequence diagrams at different levels of abstraction…

Quiz 2 - Q6

- In which of the following options, the relationship between two classes is composition?
  - A. Courses and Students
  - B. Committees and People
  - C. Animals and Dogs
  - D. Universities and Departments

Composition

- Composition also describe "has a" relationship
- Component classes are physically part of the compound class
- The component class dies if the compound class dies
- Syntax: filled diamond at the compound class end of the association
- Example:
  - Car : Engine

Composition vs. Aggregation

- Examples:
  - University: Department
  - Class: Student

Quiz 2 - Q7

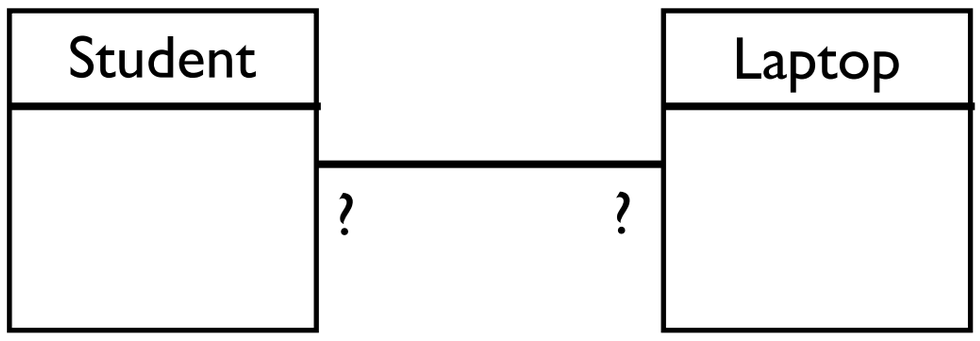
- If you are asked to design an operating system for a new mobile device, what architectural style should you consider first?
  - A. Pipe and Filter Architecture
  - B. Layered Architecture
  - C. Repository Architecture
  - D. None of the above

Layered Style: Examples

- Operating Systems
  - Unix
  - Windows
  - Android
  - …(almost any)
- Distributed Information Systems

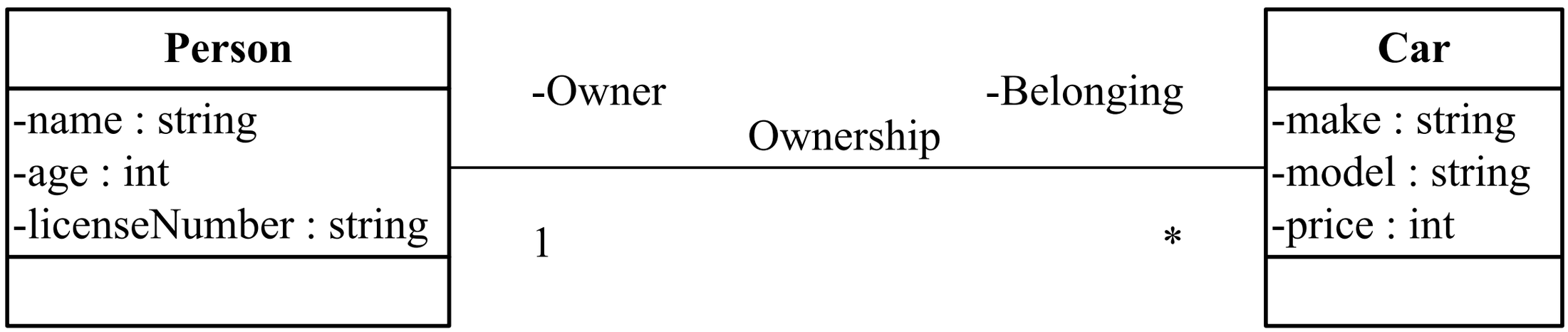
Quiz 2 - Q8

- Complete the association between Student and Laptop in a class diagram (each student can own >=0 laptops and each laptop can only be owned by one student).
  - A. *, 1
  - B. 0, 1
  - C. 1, *
  - D. 1, 0



Multiplicity

- Multiplicities give lower and upper bounds on the number of instances of the local class that can be linked to one instance of the remote class
- Multiplicities indicate the number of instances at runtime (i.e., objects)



Multiplicity

- Syntax: 1, *, etc. at the association end
- Examples:
  - * (zero or more)

    Person : Car
  - 1 .. * (one or more)

    Person : Address
  - 5 .. 40 (5 to 40)

    Students : Course
  - 10 (exactly 10)

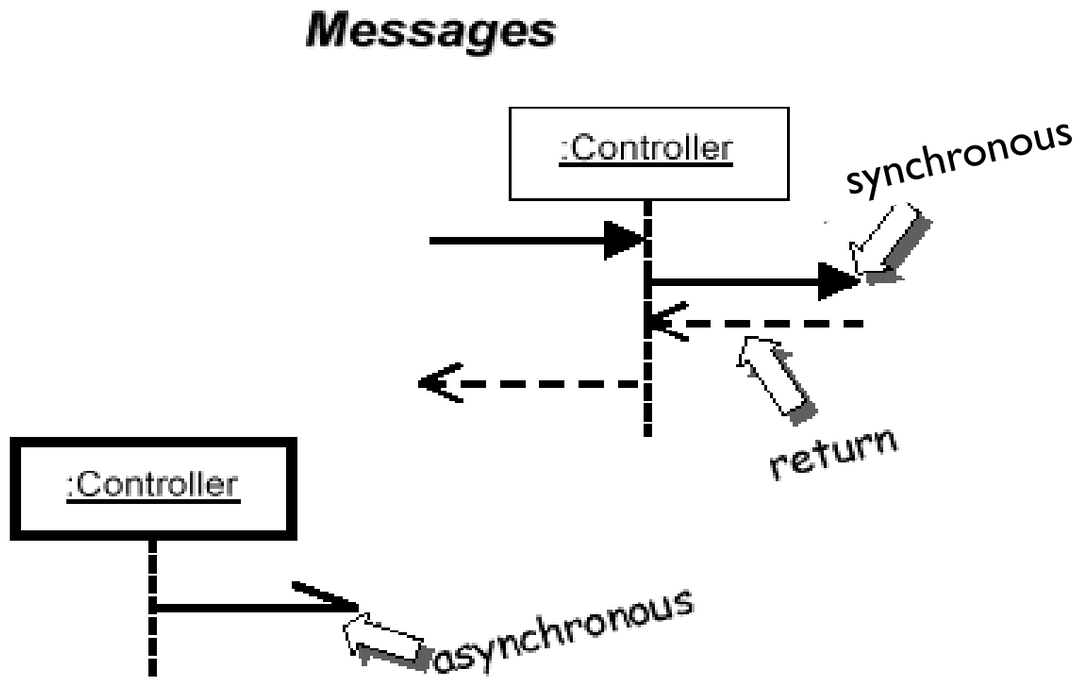
    Referee: Basketball Player
  - If no multiplicity is specified, the default is 1

Quiz 2 - Q9

- Which of the following can be represented by ⟶ in sequence diagram?
  - A. Asynchronous message
  - B. Synchronous message
  - C. Return message
  - D. General message

Different Message Types

- Types of messages
  - Different arrowheads for normal / concurrent (asynchronous) methods
  - Dashed arrow back indicates return (can be optional)



Quiz 2 - Q10

- If you are asked to build a compiler system for a new language, which software architecture should you consider first?
  - A. Pipe and filter
  - B. Layered architecture
  - C. Repository architecture
  - D. None of the above

Pipe and Filter Examples

- Unix shell scripts: provides a notation for connecting Unix processes via pipes.
  - e.g., cat file | grep err | wc
- Compilers: the phases in the pipeline include:
  - Lexical analysis
  - Parsing
  - Semantic analysis
  - Code generation