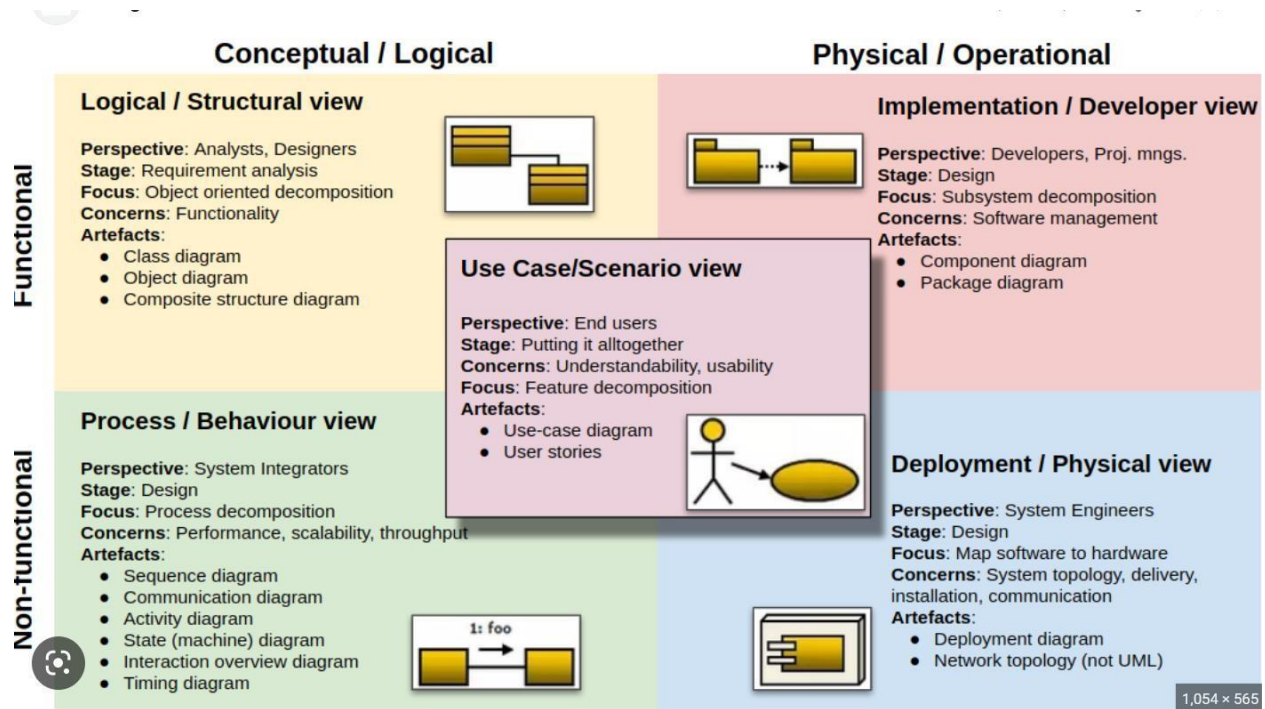CPT203 Software Engineering 1

Tutorial: Software design

Suggested answers

Q1. Draw diagrams showing a conceptual view and a process view of the architectures of the following systems:

Conceptual / Logical

Physical / Operational

Functional

Logical / Structural view

Perspective: Analysts, Designers
Stage: Requirement analysis
Focus: Object oriented decomposition
Concerns: Functionality
Artefacts:
- Class diagram
- Object diagram
- Composite structure diagram

Implementation / Developer view

Perspective: Developers, Proj. mngs.
Stage: Design
Focus: Subsystem decomposition
Concerns: Software management
Artefacts:
- Component diagram
- Package diagram

Use Case/Scenario view

Perspective: End users
Stage: Putting it alltogether
Concerns: Understandability, usability
Focus: Feature decomposition
Artefacts:
- Use-case diagram
- User stories

Non-functional

Process / Behaviour view

Perspective: System Integrators
Stage: Design
Focus: Process decomposition
Concerns: Performance, scalability, throughput
Artefacts:
- Sequence diagram
- Communication diagram
- Activity diagram
- State (machine) diagram
- Interaction overview diagram
- Timing diagram

1: foo

Deployment / Physical view

Perspective: System Engineers
Stage: Design
Focus: Map software to hardware
Concerns: System topology, delivery, installation, communication
Artefacts:
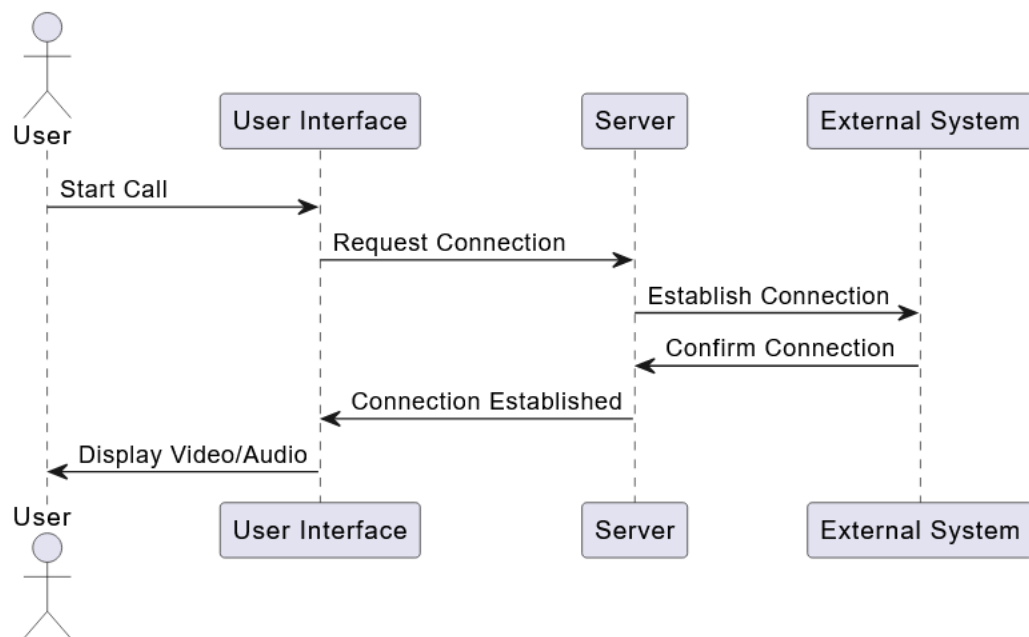- Deployment diagram
- Network topology (not UML)

1,054 × 565

1. A computer-controlled video conferencing system that allows video, audio, and computer data to be visible to several participants at the same time.

**Example answers**

conceptual view

Video Conference System

Audio System | Video System | Data Sharing Module | Participant | Network Interface | User Interface

Process View

User

User Interface | Server | External System

Start Call

Request Connection

Establish Connection

Confirm Connection

Connection Established

Display Video/Audio

User

User Interface | Server | External System

2. A robot floor cleaner that is intended to clean relatively clear spaces such as corridors. The cleaner must be able to sense walls and other obstructions

Example answers:

conceptual view
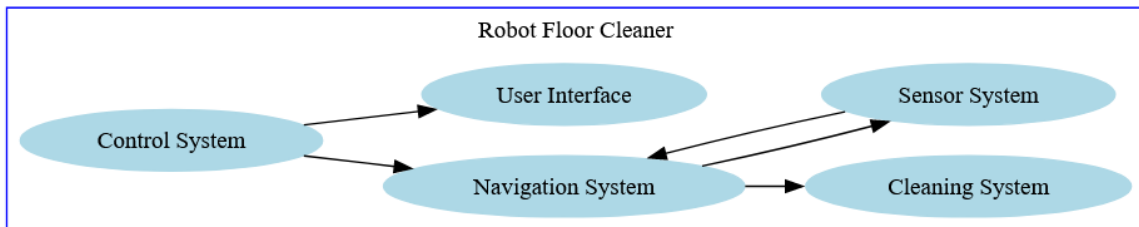
Process View
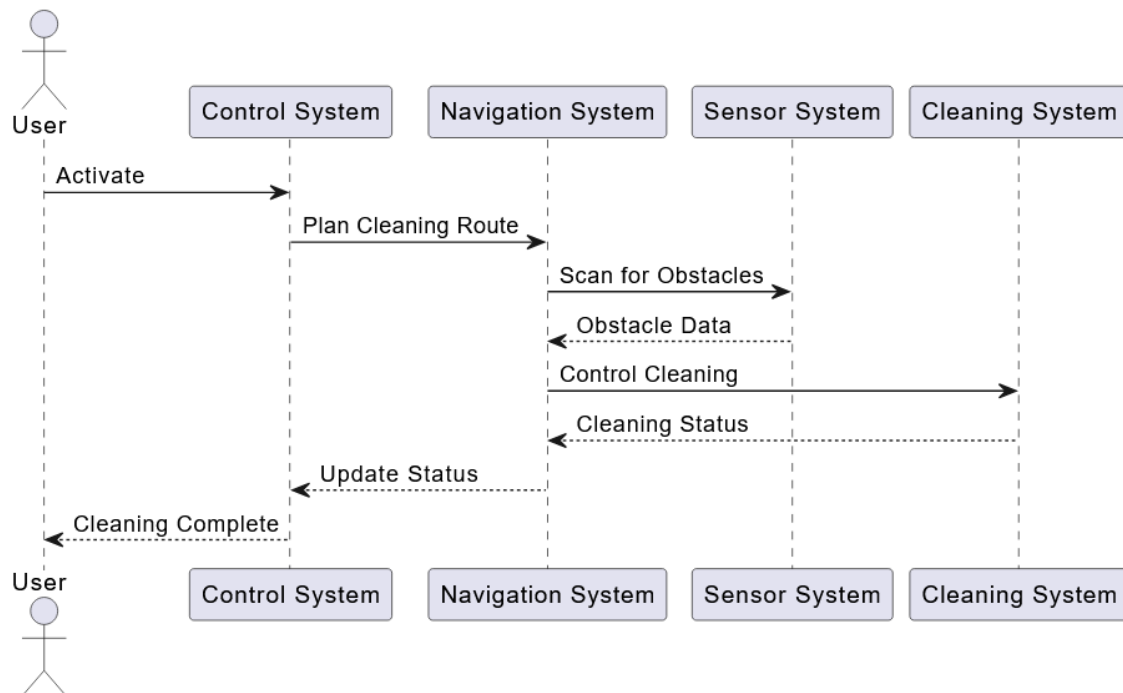
Q2. For each of the following architectural patterns described in the textbook, describe a real-world or example application system which should be designed using the pattern.
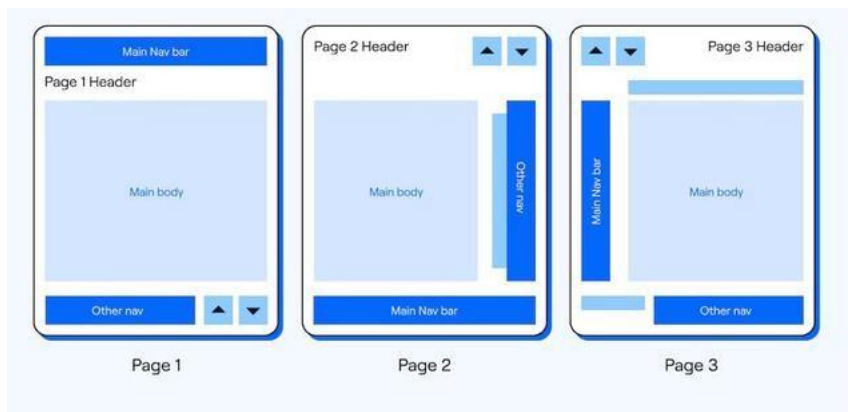
· MVC
· Layered
· Repository
· Client-server
· Pipe and filter

Suggestions:

The students can various answers. When students prepare their answers, please review the lecture note from page 12 to page 23, focusing on the description and advantages of each pattern.

Q3. Identify the issues in the following interface design and describe how the issues can be fixed.

Design 1

Design 2

Design 3

Example answers:

Design 1 – There is a consistency issue (lecture note page 45). Students can add a short description on it.

Design 2 – The problem include that it has the user in-control issue (lecture note page 36-41). Firstly, there is no close button so that a user can close down the unwanted content; secondly; the advertisement is likely a pop-up that is undesired and unexpected by the users.

Design 3 – This design has user in-control issues (lecture note page 36-41). The design cannot adapt to the given resolution and to different device sizes. In this case, the web is correctly displayed on a PC yet it may not be correctly displayed on a cell phone with a smaller screen.