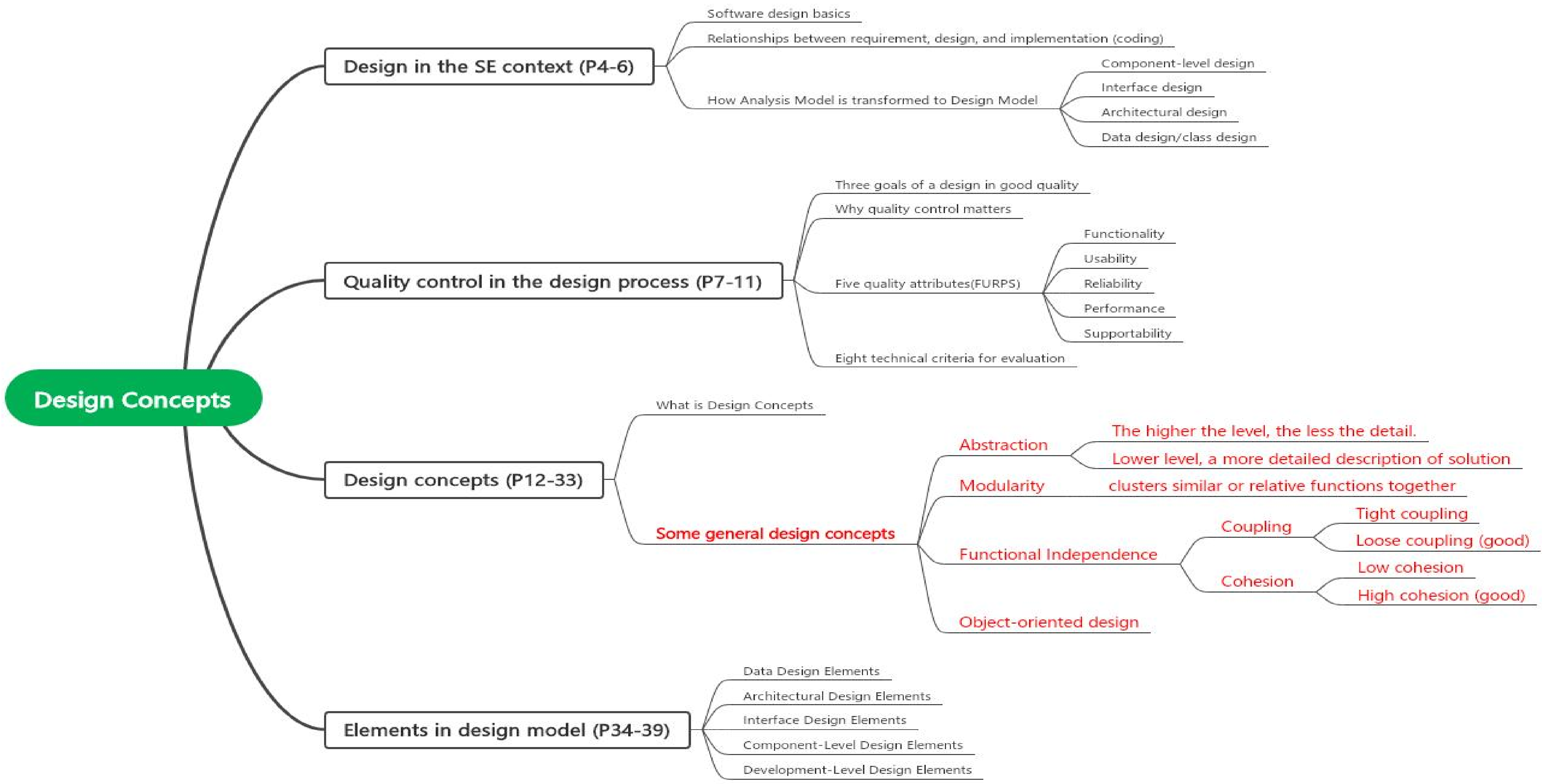
# Revision Week 8-12

CPT 203 Software Engineering

AY 24/25

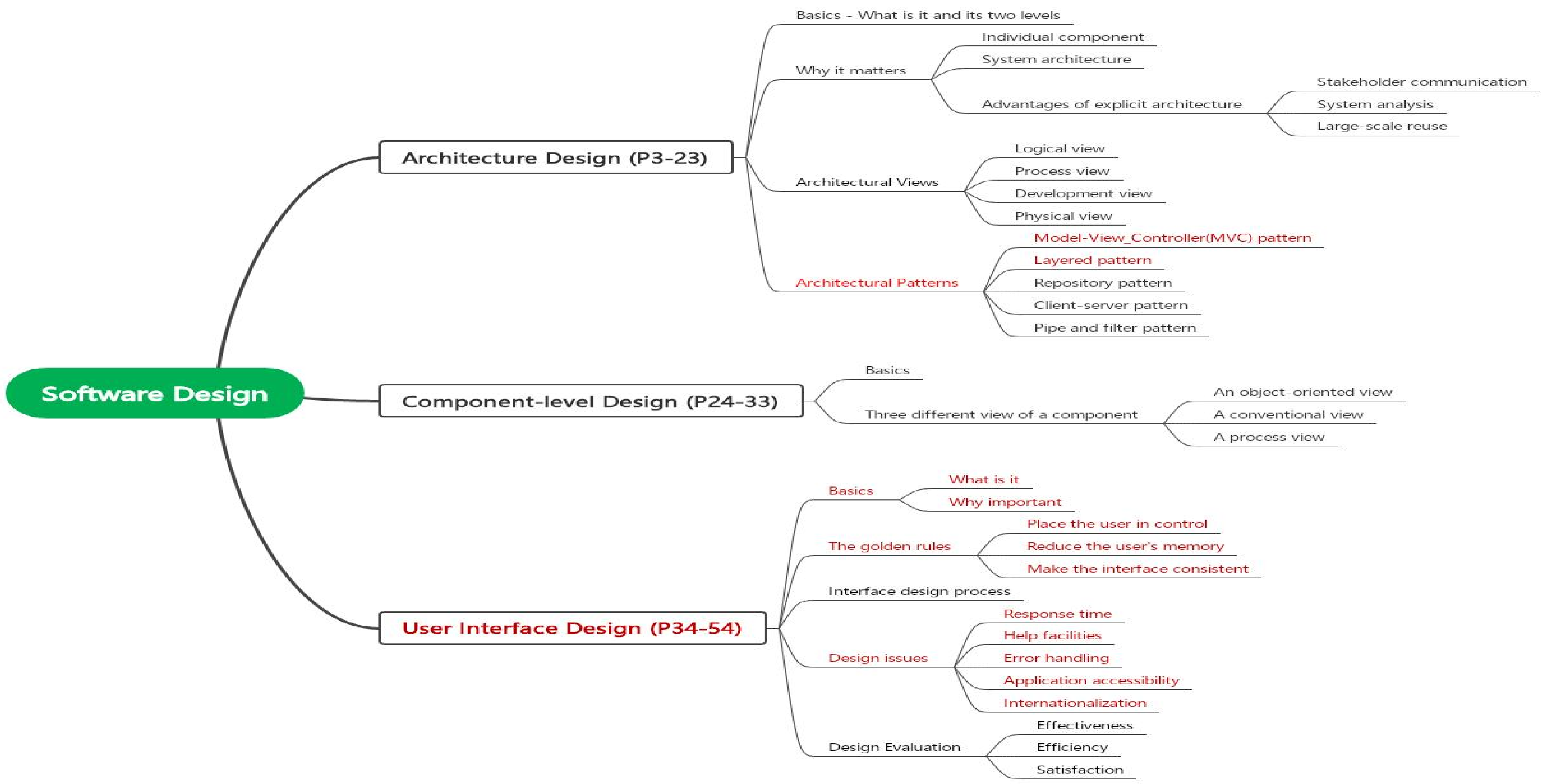
# Week 8 Structure


Design Concepts
Design in the SE context (P4-6)
Software design basics
Relationships between requirement, design, and implementation (coding)
How Analysis Model is transformed to Design Model
Component-level design
Interface design
Architectural design
Data design/class design
Quality control in the design process (P7-11)
Three goals of a design in good quality
Why quality control matters
Five quality attributes(FURPS)
Functionality
Usability
Reliability
Performance
Supportability
Eight technical criteria for evaluation
Design concepts (P12-33)
What is Design Concepts
Some general design concepts
Abstraction
The higher the level, the less the detail.
Lower level, a more detailed description of solution
Modularity
clusters similar or relative functions together
Functional Independence
Coupling
Tight coupling
Loose coupling (good)
Cohesion
Low cohesion
High cohesion (good)
Object-oriented design
Elements in design model (P34-39)
Data Design Elements
Architectural Design Elements
Interface Design Elements
Component-Level Design Elements
Development-Level Design Elements

## Week 8 Try-to-do

- Understand the definition of the each design concepts
- Understand the examples provided in the lecture
- Practice all the Week 8 TTL questions again and CW2 Q2
- Understand the importance of each design concepts (why we shall use them, what advantages, etc. You may rely more on the textbook --- *Software Engineering A Practitioners Approach 8the Edition, chapter 12*)

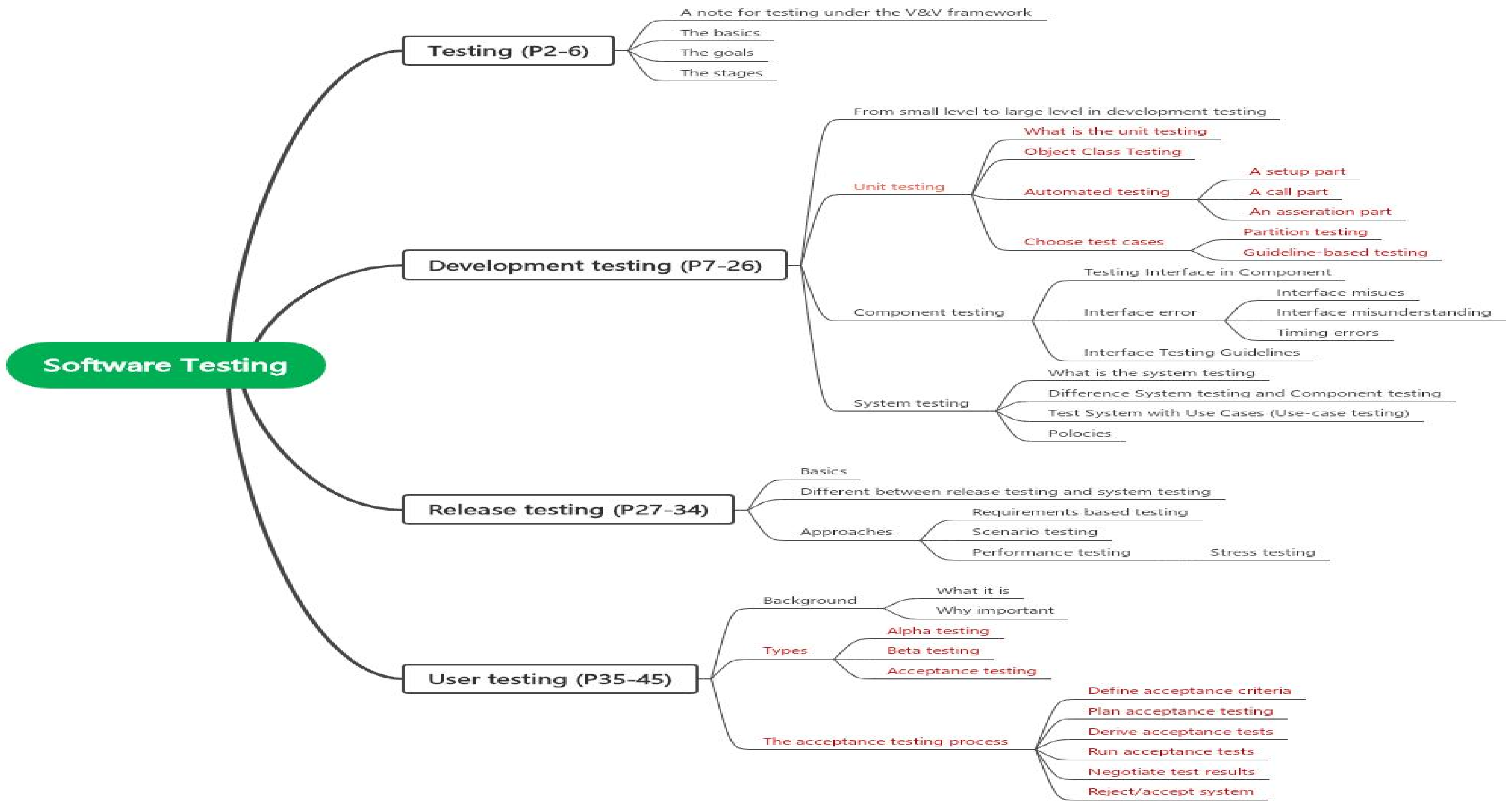
# Week 9 Structure



## Week 9 Try-to-do

- Understand the architecture design patterns covered in the lecture (MVC, layered pattern) and tutorial (the rest 3) - how they work, suitable to which type of software, etc
- Understand 3 general UI design rules (principles) and the related sub-rules involved
- Understand the definition of the issues involved in the UI design
- Practice Week 9 TTL Q3, CW2 Q4
- No figures needed, but should be able to describe the rules and why you use them (benefits)

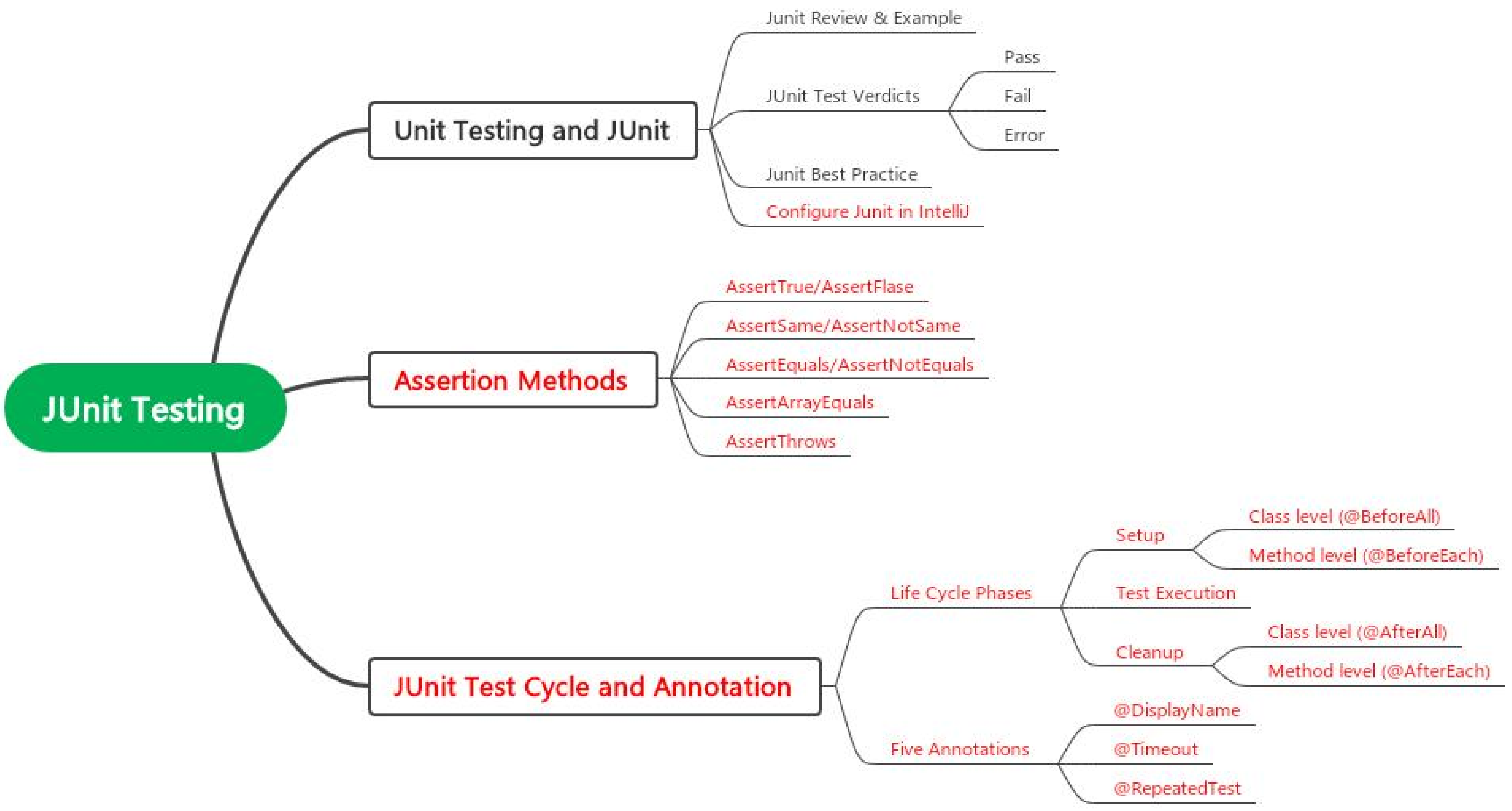
# Week 10 Structure



## Week 10 Try-to-do

- Understand the testing stages (i.e., development, release, user testing) and the involved sub-stages.
- Prioritize Unit testing, focusing on the process we do for an object class (testing attributes, methods, and states) and the strategies we can use (Partitioning)
- Understand the user testing stages
- Practice Week 10 TTL Q1 Q4, CW2 Q7 (partially)

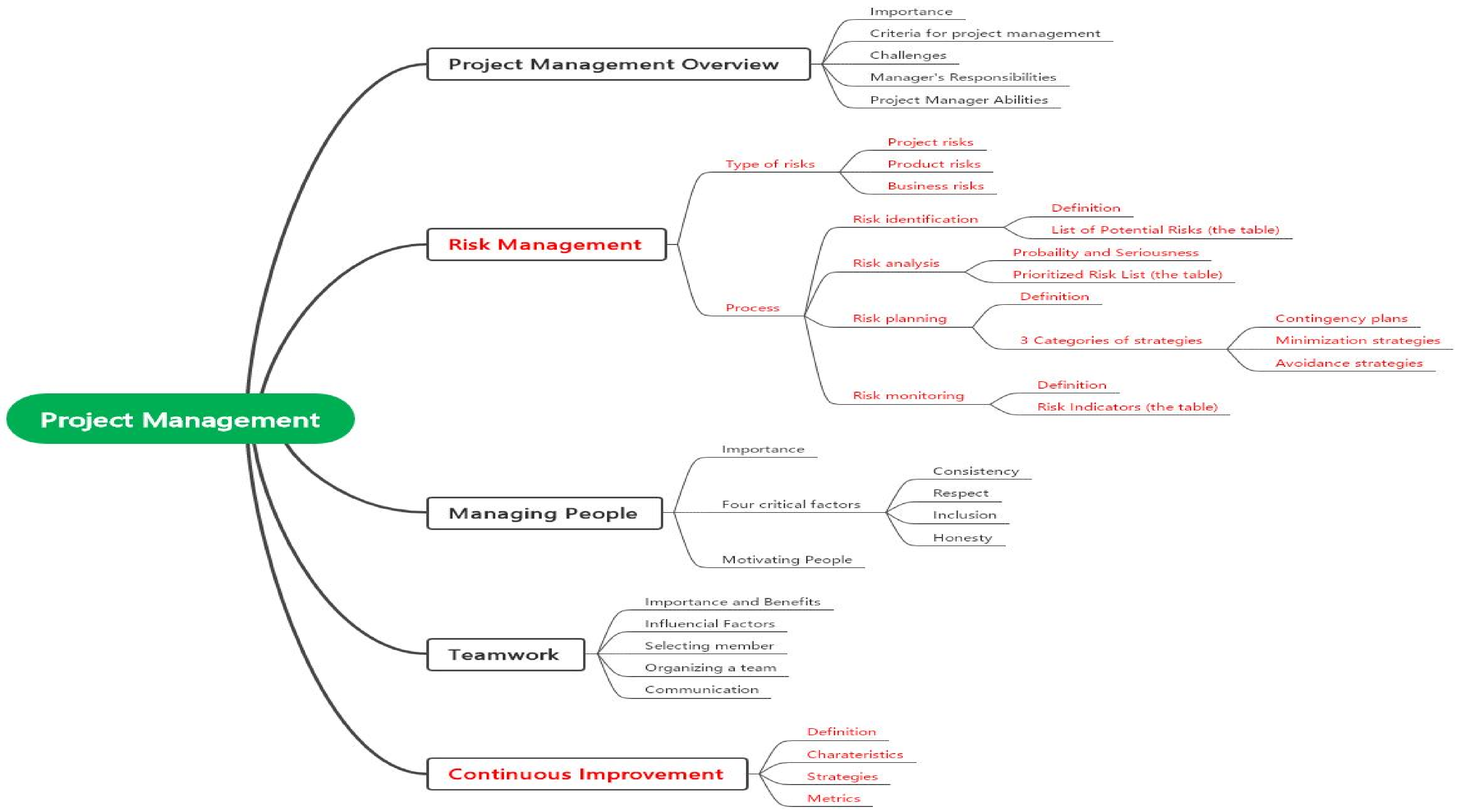
# Week 11 Structure



## Week 11 Try-to-do

- Do try the codes uploaded on LMO
- Understand all the assertion method covered in the lecture
- Understand the annotations, especially the basic ones (e.g., @BeforeAll, @BeforeEach, @Test)
  - @Test -> 2 marks
  - @test/@TEST/@Tests -> 0 mark
- Practice Week 11 TTL Q2 Q2, CW2 Q6 (the assertThrows())

# Week 12 Structure

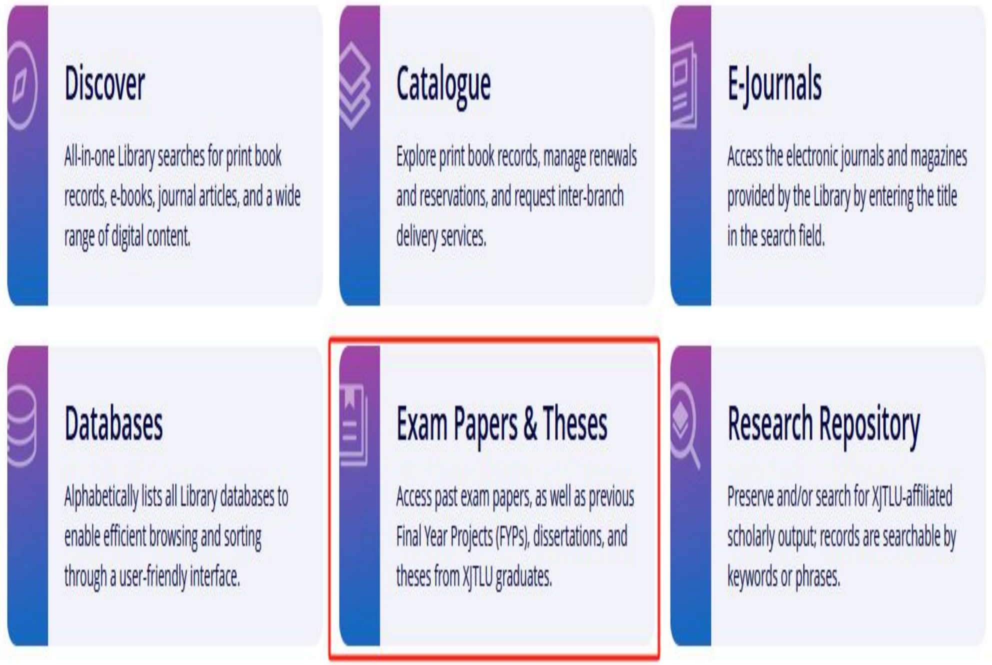


# Week 12 Try-to-do

- Understand all stages involved in risk management
- Undestand the definition, charateristics, strategies, and metrics involved in continuous improvement
- Practices Week 12 TTL Q1, CW2 Q7
- A term: Quality management systems (QMS)
  - Refers to a wide range of coordinated policies, processes, and practices that are designed to ensure the software products meet a certain level of quality and consistently satisfy customer requirements
  - It covers the quality control process throughout the entire software engineering process of a project, from requirement collection to project future iteration
  - For this class, you should at least understand the quality management system from 4 perspectives:
    - Why software design is important in sofware quality
    - Why software testing is important in sofware quality
    - Why risk management is important in sofware quality
    - Why continuous improvement is important in sofware quality

# Finding the Past Exam Paper

- https://lib.xjtlu.edu.cn/



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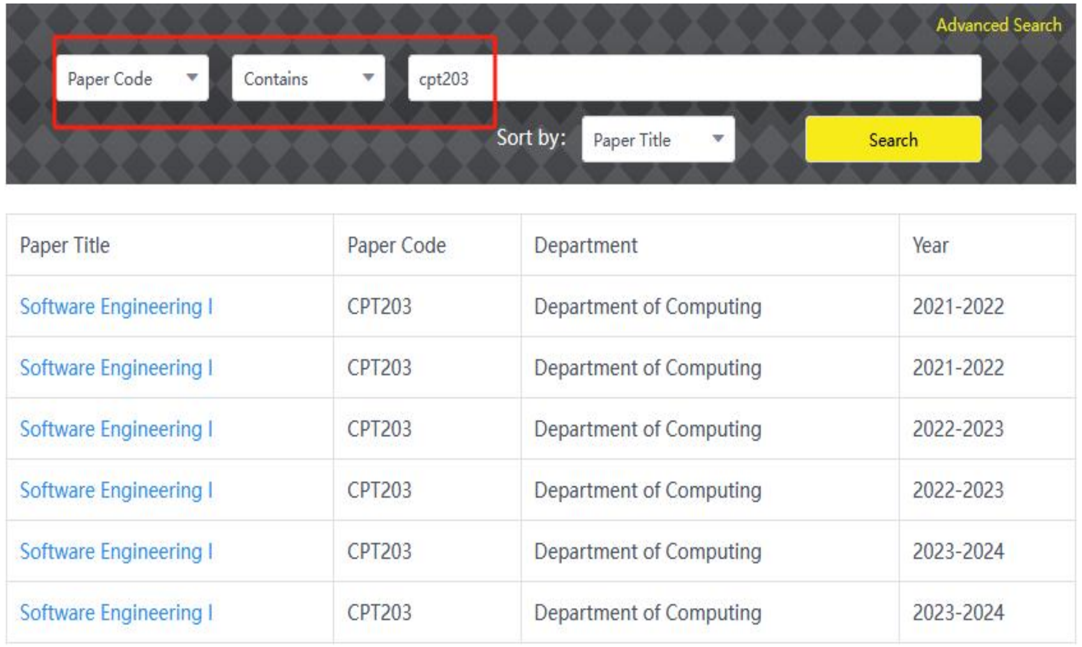
Access the electronic journals and magazines provided by the Library by entering the title in the search field.

**Databases**
Alphabetically lists all Library databases to enable efficient browsing and sorting through a user-friendly interface.

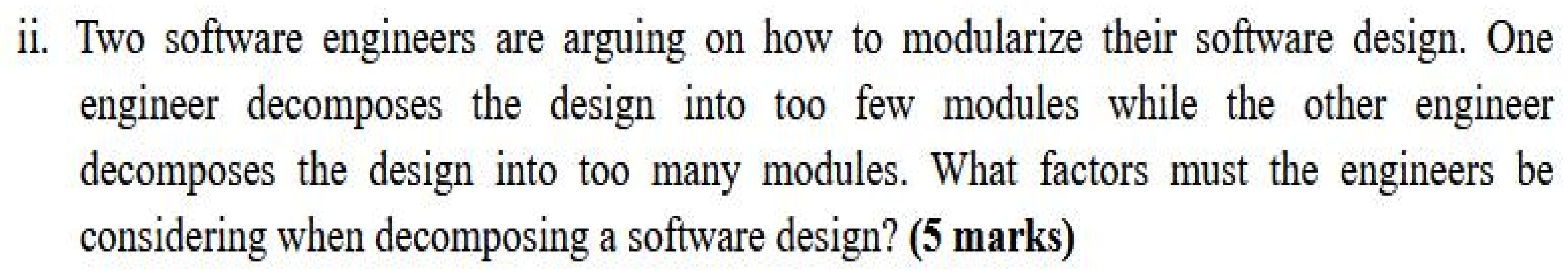
**Exam Papers & Theses**
Access past exam papers, as well as previous Final Year Projects (FYPs), dissertations, and theses from XJTLU graduates.

**Research Repository**
Preserve and/or search for XJTLU-affiliated scholarly output; records are searchable by keywords or phrases.



| Paper Title | Paper Code | Department | Year |
|---|---|---|---|
| Software Engineering I | CPT203 | Department of Computing | 2021-2022 |
| Software Engineering I | CPT203 | Department of Computing | 2021-2022 |
| Software Engineering I | CPT203 | Department of Computing | 2022-2023 |
| Software Engineering I | CPT203 | Department of Computing | 2022-2023 |
| Software Engineering I | CPT203 | Department of Computing | 2023-2024 |
| Software Engineering I | CPT203 | Department of Computing | 2023-2024 |

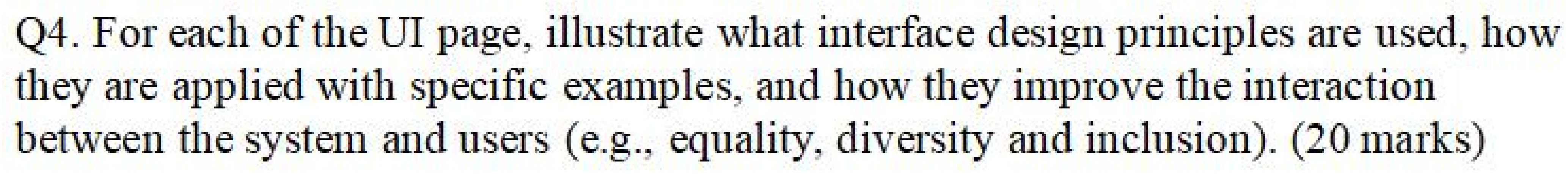
## Suggestion 1


ii. Two software engineers are arguing on how to modularize their software design. One engineer decomposes the design into too few modules while the other engineer decomposes the design into too many modules. What factors must the engineers be considering when decomposing a software design? **(5 marks)**

**Try to structure your answer based on the marks**

- Just answer the two correct factors - cost of effort (per module) and number of modules - not full marks
- So you do:
  - Name the correct factors
  - Explain that designers should balance the cost of each module and the number of modules based on the intersection point of the two curves (*point M, W8, page18*)

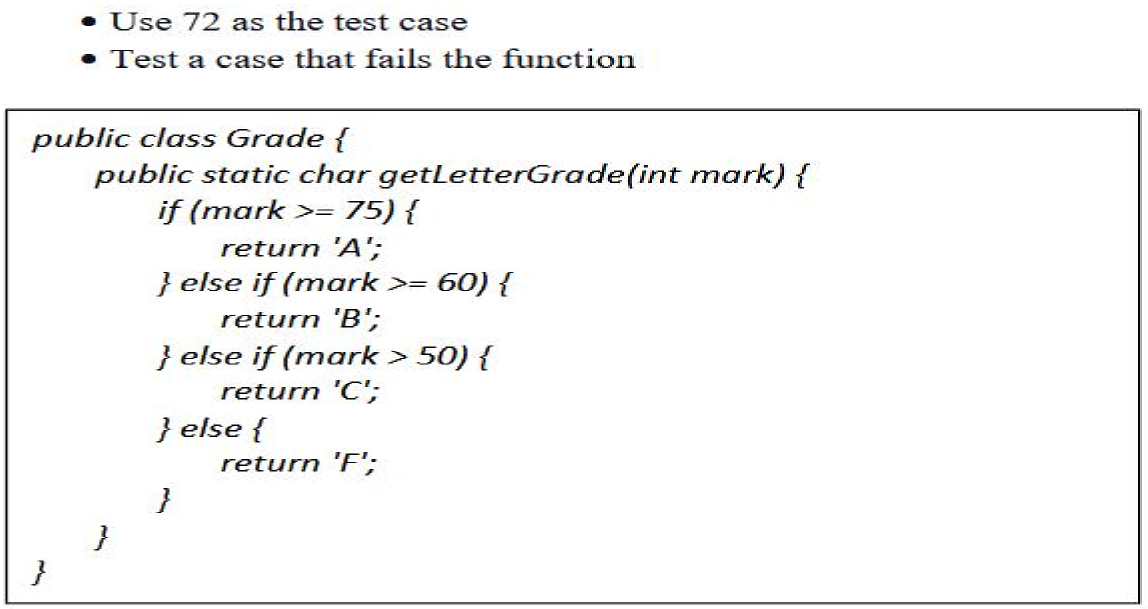
## Suggestion 2


Q4. For each of the UI page, illustrate what interface design principles are used, how they are applied with specific examples, and how they improve the interaction between the system and users (e.g., equality, diversity and inclusion). (20 marks)

**<u>Try to redo CW2 questions on your own</u>**

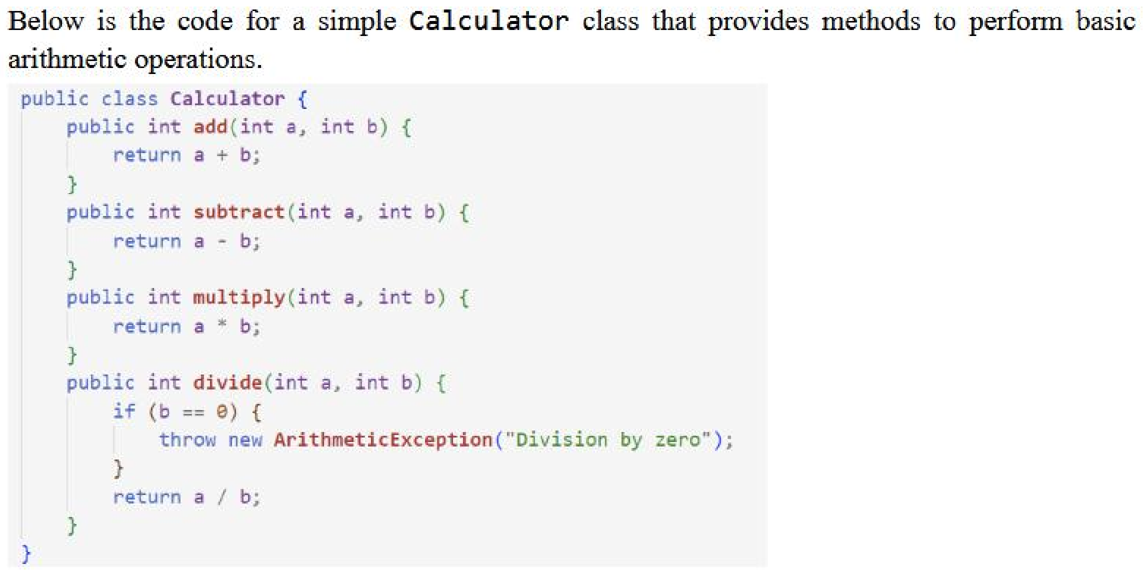
- Not only for this Q4 but also other questions
- Review these questions together with the teammembers might be a good idea

# Suggestion 3



- Use 72 as the test case
- Test a case that fails the function

```
public class Grade {
    public static char getLetterGrade(int mark) {
        if (mark >= 75) {
            return 'A';
        } else if (mark >= 60) {
            return 'B';
        } else if (mark > 50) {
            return 'C';
        } else {
            return 'F';
        }
    }
}
```



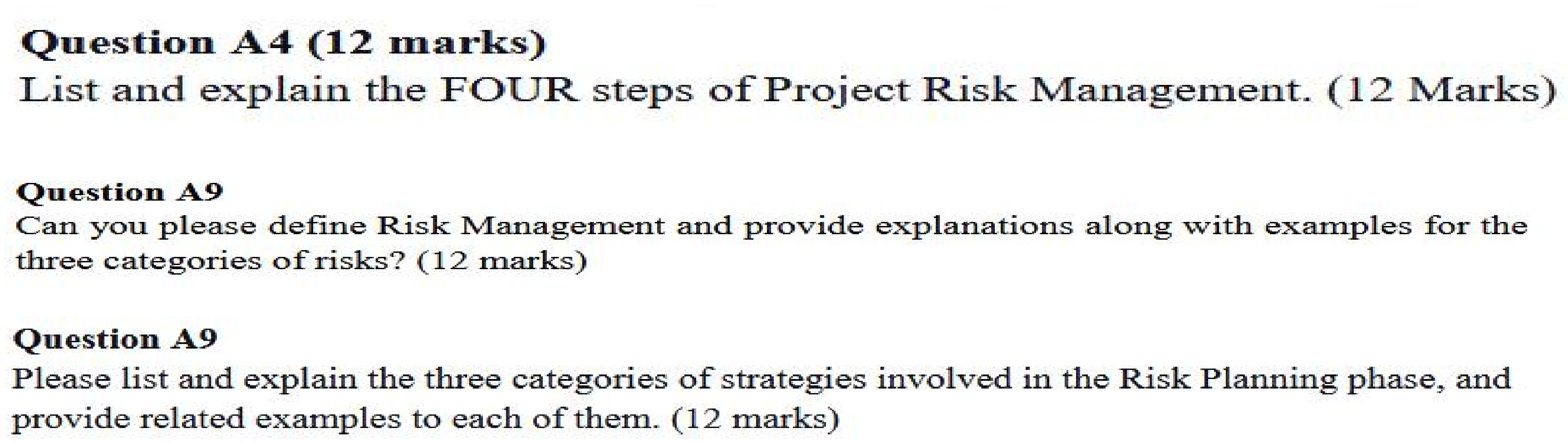
Below is the code for a simple `Calculator` class that provides methods to perform basic arithmetic operations.

```
public class Calculator {
    public int add(int a, int b) {
        return a + b;
    }
    public int subtract(int a, int b) {
        return a - b;
    }
    public int multiply(int a, int b) {
        return a * b;
    }
    public int divide(int a, int b) {
        if (b == 0) {
            throw new ArithmeticException("Division by zero");
        }
        return a / b;
    }
}
```

**<u>Do try the codes uploaded on LMO</u>**

- The Junit question typically has two cases for you to test (i.e., the working and non-working), do not miss any
- When you see Exception, you think assertThrows()
- Annotation matters, not only @Test

# Suggestion 4



**Question A4 (12 marks)**
List and explain the FOUR steps of Project Risk Management. (12 Marks)

**Question A9**
Can you please define Risk Management and provide explanations along with examples for the three categories of risks? (12 marks)

**Question A9**
Please list and explain the three categories of strategies involved in the Risk Planning phase, and provide related examples to each of them. (12 marks)

<u>**Do read the question and tell the difference between the concepts in question**</u>

- 4 risk management steps, 3 risk categories (types), 3 strategies
- Make sure you know what are they in details, not only the names
- Quality management system -> a comprehensive process -> why design, testing, risk management and continuous improvement are important in project quality

## Overall

- When reviewing W8-12, the highlighted parts here can be your **priority** (<u>but not necessarily the only</u>)
- Try the **TTL questions, CW2 questions, and Junit codes**
- Try **the past exams,** though solution to the past exam is not supposed to be provided, you can try the questions and come to SD423 during office hour for suggestion