# Must-know Knowledge of “Software Engineering and Management”

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# Fundamental to SEM

1. List at least five principles of seven Engineering Principles. 列出七項工程原則中的至少五項原則。

**原則一：建立標準作業程序**

作業程序及步驟要定義的很明確與可行，並依照所制訂的程序來執行，並持續檢討與優化SOP。

**原則二：分解**

將一個複雜的大需求或問題分解成階層式的小需求或小問題，方能找出其處理方法。

**原則三：模組化**

將上述小問題的解決方案於以模組化，以利未來的重複使用，以達提昇生產力目標。

**原則四：遞增法**

將上述階層式的分解結構圖依其重要性先完成較重要的部分，在確認沒問題後逐步遞增完成大系統的建置。

**原則五：預視改變**

在處理目前的問題時，需要想到未來問題與環境等是否會變動，亦即要有風險/不確定的意識，並能及時作好規劃。

**原則六：焦點分離**

將一個複雜的問題分為不同的層次或構面來處理，而不同的層次或構面需要專注與聚焦在各自要處理的問題上。

**原則七：通用性**

將一個特定問題的解決方法於以通用性，使其能適用在一 般性問題的解決，達到再使用與擴大其效益。

1. What are the four natures/essences for a software development project. 軟體開發專案的四種性質/本質是什麼。

軟體開發的本質

從「問題」到「答案」 從「程式」到「系統」

從「人腦」到「電腦」 從「個人」到「團隊」

1. How to define a good quality application software? 如何定義一個優質的應用軟體？

**Functional requirement / 功能性需求**

Accuracy / 正確

Completeness / 完整

Etc.

**Non-Functional Requirements / 非功能性需求**

Performance / 效能

Ease of Use / 易用性

Reliability / 可靠性

Maintainability / 維護性

Security / 安全性

Portability / 可移植性

1. What is the theory of triple constraint in project management? 專案管理中的三重約束理論是什麼？
2. What is scope creep and ripple effect in software engineering? 什麼是軟體工程中的範圍蠕變和漣漪效應？
3. List at least 6 knowledge areas (KA) in “Guide to SWEBOK”. 在“SWEBOK 指南”中列出至少 6 個知識領域 （KA）。
4. Software Requirement軟體要求
5. Software Design軟體設計
6. Software Construction軟體構建
7. Software Testing軟體測試
8. Software Maintenance軟體維護
9. Software Configuration Management 軟體配置管理
10. Software Engineering Management 軟體工程管理
11. Software Engineering Process軟體工程流程
12. Software Engineering Models and Methods軟體工程模型和方法
13. Software Quality軟體品質
14. Software Engineering Professional Practices軟體工程專業實踐
15. Software Engineering Economic軟體工程經濟
16. Computing Foundations計算基礎
17. Mathematical Foundations數學基礎
18. Engineering Foundations工程基礎

# Software Process

1. List three generic software development process models?
2. What are four fundamental activities that are common to all software processes?
3. List the common components in the definition of process description.
4. What is “V model” in software engineering?
5. List two often used approaches coping with software changes due to its inevitable nature.
6. List principal factors affecting the choice of plan-based or agile software development.

# Agile Software Developemnt

1. What’s Manifesto for Agile Software Development?
2. List at least five principles of agile methods.
3. List at least six practices or techniques that were introduced in extreme programming (XP)?
4. Why has the Scrum agile method been widely adopted in the practice of software development industry?
5. For what types of system particularly are agile development approaches likely to be successful?
6. List four practical problems with agile software development.
7. List three questions that should be asked when deciding whether or not to adopt an agile method of software development.
8. Drawing the SCRUM workflow to illustrate three roles, three artifacts, and three ceremonies.
9. Why is ScrumBan widely adopted in APP development?

# Capability Maturity Model Integration (CMMI)

1. What are the three models of SEI Capability Maturity Model Integration (CMMI) V1.3?
2. List five Maturity Levels (ML) in the CMMI V1.3 model.
3. List four Capability Levels (CL) in the CMMI V1.3 model.
4. List four categories of process areas in the CMMI-DEV V1.3 model.
5. List at least five process areas at ML2 in the CMMI-DEV V1.3 model.
6. List at least five process areas at ML3 in the CMMI-DEV V1.3 model.
7. List at least six generic practices within Generic Goal 2.
8. List two generic practices within Generic Goal 3. (2%)
9. What’s the distinction between stage and continuous representations in the SEI’s CMMI model?
10. What’s the definition of “Defined Process” in the CMMI model?
11. What are the practices to be done for REQM PA to certify CL 1?
12. What’s the distinction between the generic goal and specific goal in the SEI’s CMMI model?
13. What is the meaning of “Process Institutionalization” in the CMMI model?
14. Explain the following English abbreviations “SCAMPI, IDEAL, PAL, PIID”. What are they used for?