

EXAMINATIONS – 2014
TRIMESTER 1

SWEN 301
STRUCTURED METHODS

Time Allowed: Three Hours

Instructions:

- Closed Book.
- Answer all questions.
- Total marks are 180.
- Use the marks for each question as a guide as to how long to spend on it.
- No calculators are permitted.
- Paper dictionaries for translating between English and a foreign language are permitted.

Question	Topic	Marks
1.	General Knowledge and Software Life Cycles	30
2.	Software Requirements	20
3.	Design & Architecture	25
4.	Software Testing	35
5.	Software Deployment & Maintenance	40
6.	Free & Open Source Software	30
Total		180

Question 1. General Knowledge and Software Life Cycles

[30 marks]

(a) [5 marks]

What are the advantages of **pair programming** in Extreme Programming software development model?

(b) [5 marks]

Explain how **Extreme Programming (XP)** software development model deals with software structure degradation as a result of constant changes.

(c) [10 marks]

Describe the **Spiral** software development process model and explain how it handles changes during the software development process.

(d) [10 marks]

The company you work for is considering instituting a company wide software process modelling effort, and plans to set up a Software Engineering Process Group to take responsibility for this effort. *What advices would you give to this group to help ensure its success?*

Question 2. Software Requirements

[20 marks]

(a) [5 marks]

With examples, explain the differences between **functional** and **non-functional requirements**.

(b) [10 marks]

What are the purposes of software **requirements verification** and **requirements validation**? For each of them explain what techniques can be used.

(c) [5 marks]

Use case diagrams are typically created during requirement analysis. *Discuss why it is important to have a use case diagram for the system to be developed.*

Question 3. Design & Architecture

[25 marks]

(a) [5 marks]

Architecture models are typically created in the process of architecture design. *Discuss the key uses of architecture models in the process of software development.*

(b) [10 marks]

In the course we discussed several **tactics for improving modifiability** of software systems. *List and briefly explain them.*

(c) [10 marks]

Describe the **Layering** architecture style and discuss the advantages and disadvantages of using it. If scalability is your concern, would you use the layering architecture style? Explain.

Question 4. Software Testing

[35 marks]

(a) [5 marks]

Acceptance testing is one of the steps of system testing. *briefly describe who should be involved and what documents can be used in acceptance testing.*

(b) [10 marks]

What are the purposes of **regression testing**? Briefly describe the steps of conducting regression testing.

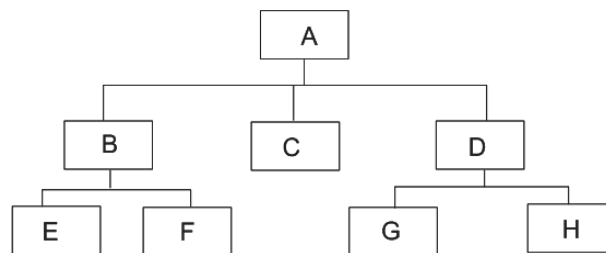
(c) [5 marks]

Explain the term **beta test**.

(d) [5 marks]

You claim your program is fault free at a 98% confidence level. Your test plan calls for you to test until you find all seeded faults. *How many faults must you seed the program before testing in order to substantiate your claim? Justify your answer.*

(e) [10 marks] The following figure illustrates the component hierarchy in a software system. **Top_Down** and **Bottom_Up** are two integration testing strategies. *Using each of the strategies describe the sequence of tests undertaken for integrating the components. Discuss the advantages and disadvantages of each of them.*



Question 5. Software Deployment & Maintenance

[40 marks]

(a) [6 marks]

Operator functions and **user functions** are two kinds of functions considered in training. *For each of kind of functions give a briefly description and two examples.*

(b) [12 marks]

Lehman categorises software systems into three types, **S-systems**, **P-systems** and **E-systems**. *For each of them, provide a brief description and explain those aspects of the system that may change. Give an example system for each type and justify why the example system belongs to that type.*

(c) [12 marks]

In the lectures we discussed four types of **software maintenance activities**. *List and briefly describe them. Give an example for each of them.*

(d) [10 marks]

Reengineering and **reverse engineering** are two types of software rejuvenation. *Compare and contrast the process of reengineering with reverse engineering.*

Question 6. Free & Open Source Software

[30 marks]

(a) [8 marks]

Compare and contrast the term **copyleft** with the term **copyright**.

(b) [4 marks]

Discuss the validity of the statement: "Software that can be downloaded and used for free" is a "Free software" as defined by Free software Foundation.

(c) [10 marks]

Recall that the **factory model** has been discussed in article "The Cathedral and the Bazaar" by Eric S. Raymond. *Describe the **factory model** and explain why its premises are not realistic.*

(d) [8 marks]

Widget and Give Away Recipe, Open Restaurant are two of popular **indirect sale-value models** discussed in the lectures. *briefly describe them. Give an example for each of them.*
