

i Front page

IN5140 og INF5181 – Smart processes and agile methods in software engineering

Final exam

Monday 2 December 2019

Length: 14:30 – 18:30 (4 hours)

No examination support material is allowed.

This exam set is only available in English. You may answer in Norwegian or English.

Course teacher will come to the exam venue some time after the exam has begun.

In this exam, you are permitted to make drawings/use sketching for Task 3.1. You are to use the sketching paper handed to you in the exam room. You can use more than one sketching sheet per task. See link to instructions for filling out sketching sheets near the bottom of your screen.

You may NOT hand in sketching sheets for any other tasks than Task 3.1. You will NOT be given extra time to fill out the "general information" on the sketching sheets (task codes, candidate number, etc.).

Good luck!

i Exercise 1

Multiple choice (20 %)

One alternative is correct.

You will get points for a correct answer. A wrong answer or no answer gives 0 points.

1.1 IN5140-H19 Exam Task 1.1

Action research is a research method where:

- researchers inform industry about theoretical knowledge
- creating practical value is combined with creating theoretical knowledge
- the principal action in an organization is to produce research
- practitioners inform researchers about industry practice

Maximum marks: 2

1.2 IN5140 H19 Exam Task 1.2

Lean is essential

- a set of principles, practices and techniques tailored for improving a software development method
- a set of principles, practices and techniques tailored for improving software processes
- irrelevant to software development because Lean was developed for the automotive industry
- a set of principles, practices and techniques for process improvement

Maximum marks: 2

1.3 IN5140 H19 Exam Task 1.3

What is the interest of technical debt?

- The extra-negative impact paid because of the presence of the technical debt
- The effort required to fix the technical debt
- The investment that companies do to manage technical debt
- The technical issue that needs to be solved

Maximum marks: 2

1.4 IN5140 H19 Exam Task 1.4

Which of these statements is not true about technical debt?

- Technical debt is invisible
- The lack of features can be considered technical debt
- Agile can be good to manage technical debt
- Technical debt can be useful

Maximum marks: 2

1.5 IN5140 H19 Exam Task 1.5

According to the agile principles, what is the most efficient way to share information in a development team?

- Face-to-face communication
- Task boards like Scrumboards or Kanbanboards
- Documentation
- Slack

Maximum marks: 2

1.6 IN5140 H19 Exam Task 1.6

According to the Spotify model a guild is...

- Project management
- A community of interest for specific areas
- A community of agile coaches
- A commercial or customer team

Maximum marks: 2

1.7 IN5140 H19 Exam Task 1.7

What does DevOps stand for?

- Development and Operations
- Development and Optimisation
- Deployment and Operations
- Deployment and Optimisation

Maximum marks: 2

1.8 IN5140 H19 Exam Task 1.8

Which one is NOT a particular Scrum practice?

- Forming teams
- Backlog grooming
- Retrospective meeting
- Sprint planning meeting

Maximum marks: 2

1.9 IN5140 H19 Exam Task 1.9

Kanban is an example of:

- Software process
- Process model
- Process
- Development process

Maximum marks: 2

1.10 IN5140 H19 Exam Task 1.10

What is NOT a cause of waste in software development?

- Technical debt
- Wishful thinking
- Extra features
- Fixing bugs

Maximum marks: 2

i Exercise 2











Miscellaneous questions (42 %)


Answer briefly the questions as follows:

2.1 IN5140 H19 Exam Task 2.1

What is construct validity?

Fill in your answer here

Format ▾ | **B** | *I* | U | x_2 | x^2 | I_x |  |  |  |  |  |  |  |  |  |  |

Σ | 










Words: 0

Maximum marks: 4

2.2 IN5140 H19 Exam Task 2.2

Describe the concept of Agile Architecting and the three main dimensions that one needs to manage.

Fill in your answer here

Format | **B** | *I* | U | x_2 | x^2 | I_x |  |  |  |  |  |  |  |  |  | 

Σ | 





Words: 0

Maximum marks: 4

2.3 IN5140 H19 Exam Task 2.3

How does recent research suggest that agile teams should conduct daily stand-up meetings?

Fill in your answer here

Format ▼ | **B** | *I* | U | x_2 | x^2 | I_x |  |  |  |  |  |  |  |  |  |  |

Σ | 




Words: 0

Maximum marks: 4

2.4 IN5140 H19 Exam Task 2.4

What is team shopping? Give examples of different setups.

Fill in your answer here

Format ▾ | **B** | *I* | U | x_2 | x^2 | I_x |  |  |  |  |  |  |  |  |  |  |

Σ | 











Words: 0


Maximum marks: 4

2.5 IN5140 H19 Exam Task 2.5

Describe two empirical research methods, and mention at least two advantages and two disadvantages of each of them.

Fill in your answer here

Format ▾ | **B** | *I* | U | x_2 | x^2 | I_x |  |  |  |  |  |  |  |  |  |  |

Σ | 











Words: 0


Maximum marks: 4

2.6 IN5140 H19 Exam Task 2.6

Describe the concept "Magic Triangle".

Fill in your answer here

Format | **B** | *I* | U | x_2 | x^2 | I_x |  |  |  |  |  |  |  |  |  |  |

Σ | 











Words: 0


Maximum marks: 4

2.7 IN5140 H19 Exam Task 2.7

What are the three main challenges related to Software Configuration Management mentioned by Babich? Explain and give examples.

Fill in your answer here

Format ▾ | **B** | *I* | U | x_2 | x^2 | I_x |  |  |  |  |  |  |  |  |  |  |

Σ | 










Words: 0


Maximum marks: 6

2.8 IN5140 H19 Exam Task 2.8

What is a process model useful for? For each of the use you suggest, explain why it is useful, possibly with an example (fictitious or real).

Fill in your answer here

Format ▾ | **B** | *I* | U | x_2 | x^2 | I_x |  |  |  |  |  |  |  |  | 

Σ | 











Words: 0


Maximum marks: 6

2.9 IN5140 H19 Exam Task 2.9

What is large-scale agile software development? Name three challenges associated with large-scale agile. For each, describe why they are a challenge and propose some possible solutions.

Fill in your answer here

Format ▾ | **B** | *I* | U | x_2 | x^2 | I_x |  |  |  |  |  |  |  |  |  | 

Σ | 

Words: 0

Maximum marks: 6

i Exercise 3**38 %****Case description:**

A large broadcast company X uses Scrum as the main process model for software development within the domain of streaming technology. The software department has six teams, where two teams support each of the three platforms IOS, Android and Web. In addition, two other teams work with maintenance and bug fixing across the three platforms.

There is one common Product Owner (PO) for all the teams, who is responsible for the Product backlog, which consists of epics and user stories. PO is also, together with the team lead for each of the three platforms, responsible for selecting new user stories from the Product backlog into the sprint backlogs. The duration of the sprints is four weeks.

A particular challenge is that different departments in the company, especially the TV department, continuously propose new requirements that are considered important by the management of the company.

The productions from the TV department have many viewers, and more and more viewers are using apps and the streaming technology. The TV department has much power and money in the company. Therefore, it is difficult for the software development department to refuse including the new requirements into a sprint after it has started. The result is that during almost every sprint, the sprint backlog in each team is changed, some new user stories are added, but no user stories are removed.











One consequence of this pattern is that the teams have less time for developing the planned functionalities. Time pressure also makes developers produce more bugs, so another consequence is that more time for the platform teams is used for bug fixing.


The company usually releases new versions of the software on all three platforms three times a year. In order to manage to deliver new releases as planned, the platform teams have to make shortcuts, which result in a system that becomes more and more difficult to maintain.

3.1 IN5140 H19 Exam Task 3.1

Note that in this task you can answer both in the text editor and with sketches/drawings. Use the sketching paper handed to you in the exam room. See link to instructions for filling out sketching sheets near the bottom of your screen.

Document the process described above (case description) in a process model using BPMN.

Format | B | I | U | x_2 | x^2 | I_x |  |  |  |  |  |  |  |  |  |  |











Σ | 


Words: 0

Maximum marks: 10

3.2 IN5140 H19 Exam Task 3.2

What would be problematic in the long term for the company's ability of releasing new versions of the software?

Format ▾ | **B** | *I* | U | x_2 | x^2 | I_x |  |  |  |  |  |  |  |  |  |  |

Σ | 











Words: 0


Maximum marks: 5

3.3 IN5140 H19 Exam Task 3.3

What does the company accumulate over time related to the situation described in the previous question?

Fill in your answer here

Format ▾ | **B** | *I* | U | x_2 | x^2 | I_x |  |  |  |  |  |  |  |  |  |  |

Σ | 











Words: 0


Maximum marks: 3

3.4 IN5140 H19 Exam Task 3.4

Propose three possible improvements to the process described in the case description and explain why.

Fill in your answer here

Format | **B** | *I* | U | x_2 | x^2 | I_x |  |  |  |  |  |  |  |  |  | 

Σ | 











Words: 0


Maximum marks: 10

3.5 IN5140 H19 Exam Task 3.5

Describe three measures (variables) that the project could use to evaluate the effects of the changes in the development process that you proposed in your answer to the previous question.

Fill in your answer here

Format ▾ | **B** | *I* | U | x_2 | x^2 | I_x |  |  |  |  |  |  |  |  |  |  |

Σ | 

Words: 0

Maximum marks: 10