Introduction

Written exam IN5140/IN9140
2022 AUTUMN
Duration: 28.11, 09:00-13:30

No examination support material is allowed.
This exam set is only available in English. You may answer in Norwegian or English.

In this exam, you are permitted to make drawings/use sketching for Task 4.1. 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 4.1. You will NOT be given extra time to fill out the "general information" on the sketching sheets (task codes, candidate number, etc.).

Good luck!

The exam is divided into the following four sections:

- Section 1: Multiple Choice questions (10%)
- Section 2: Various question types (16%)
- Section 3: Text answers (31%)
- Section 4: Case (43%)

Section 1 - Intro

Section 1: Multiple Choice questions
This section contains 5 multiple choice questions where **one answer is correct**.

- Each correct answer is rewarded with 2 points
- Each wrong answer gives 0 points
- A total of 10 points is achievable in Section 1

1.1 PDCA

Based on PDCA (Plan, Do, Check, Act), which step best describes “implement for further improvement”?

Select one alternative:

- Check
- Do
- Act
- Plan

Maximum marks: 2

1.2 Scrum practices

Which of the following is **NOT** a Scrum practice?

Select one alternative:

- Backlog Grooming
- Daily Planning
- Daily Standup
- Daily Scrum

Maximum marks: 2

1.3 Agile

Which one of these statements is **wrong**?
Select one alternative:

- Kanban focuses on iterations called Work-In-Progress
- Agile development is both incremental and iterative
- In Kanban a task should be finished as soon as possible
- Scrum focuses on iterations called Sprints

Maximum marks: 2

1.4 Technical Debt

Select the correct statement regarding Technical Debt
Select one alternative:

- The principal of Technical Debt is its the negative impact
- All Technical Debt should be adressed
- The interest of Technical Debt is the cost of removing it
- The average waste generated by Technical Debt is around 30% of the development time

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Maximum marks: 2

1.5 BPMN Syntax

In BPMN, a **Choreography Task** represents...
Select one alternative:

- ...a set of Participants of the same kind
- ...a task marked with the "User Task" symbol
- ...a connection between Conversations and Participants
- ...an Interaction (Message Exchange) between two Participants

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Maximum marks: 2

i Section 2 - Intro

Section 2: Various question types
This section contains 6 multiple choice questions where **several answers might be correct**.

- The questions type varies.
- Each task describes number of achievable points for that task.
- A total of 16 points is achievable in Section 2.

2.1 Magic Triangle

What are the three dimensions of the Magic Triangle?
(2 points if all the three correct ones are chosen, 0 points if not).
Select the three correct alternatives:

- [ ] Technical debt
- [ ] Effort (Cost)
- [ ] Lean
- [ ] Skill
- [ ] Quality and Scope
- [ ] Process debt
- [ ] Social debt
- [ ] Time
- [ ] Agile

Maximum marks: 2

2.2 Roles in Scrum

Select the three roles in a Scrum Team as describes by the **Scrum framework**:
(2 points if all the three correct ones are chosen, 0 points if not).
Select the three correct alternatives:

- [ ] Product Owner
- [ ] Scrum Master
- [ ] Team Leader
- [ ] Business analyst
- [ ] Stakeholder
- [ ] Development Team

Maximum marks: 2

2.3 Types of Debt

Select the correct answer from the drop-down menus.
1 point for each correct answer, 1 bonus point if all questions are answered correctly.

Task A
Which type of debt best describes "*the presence of sub-optimality in the development community, which causes a negative effect*"?

Answer here: Select alternative (Social Debt, Process Debt, Technical Debt)

Task B
Technical debt is always negative

Answer here: Select alternative (True, False)

Task C
Technical debt can be a bi-product of Social debt?

Answer here: Select alternative (True, False)

Task D
Which type of debt (technical, social or process) is the most important to address?

Answer here: Select alternative (It depends, Process debt, Technical debt, Social debt)

Maximum marks: 5

2.4 Types of data

Select whether the following statements are true or false regarding data types.
1 point for each correct answer, 1 bonus point if all questions are answered correctly.

Task A
Objective data can be quantitative.
Select an alternative

- True
- False

Task B
Subjective data can be quantitative.
Select one alternative:

- True
- False

Task C
Subjective data on something relevant is more important than objective data on irrelevant aspects.
Select an alternative

- True
- False

Maximum marks: 4

2.5 CMMI (Capability Maturity Model Integrated)

Finish the sentences below regarding CMMI (Capability Maturity Model Integrated), so that they are correct.

1 point for each correct answer, 1 bonus point if both are answered correctly.

Drag answer and drop in answerfield Help

Level 1 - Performed	Level 2 - Managed
Level 3 - Defined	Level 4 - Quantitatively Managed
Level 5 - Optimizing	

Task A

A ***measured and controlled process*** is: [ ] .

Task B

An ***unpredictable and poor process*** is: [ ] .

Maximum marks: 3

Section 3 - Intro

Section 3: Text answers

This section contains various questions from the curriculum. 31 points is achievable in this section.

3.1 Scrum-ish

Briefly explain the abbreviation "Scrum-ish". (4p)

Fill in your answer here

Format

Words: 0

Maximum marks: 4

3.2 Measurements in Software

Elaborate on some factors that can be measured in Software. (4p)

Fill in your answer here

Format

Words: 0

Maximum marks: 4

3.3 Empirical studies

Briefly explain the difference between reliability and validity of empirical studies. (4p)

Fill in your answer here

Format

Words: 0

Maximum marks: 4

3.4 Team compositions

Briefly explain the differences between “component teams” and “feature teams”. (4p)

Fill in your answer here

Format

Words: 0

Maximum marks: 4

3.5 DevOps

Briefly explain the concept of DevOps. (4p)

Fill in your answer here

When should you perform testing in DevOps? (1p)

Fill in your answer here

Maximum marks: 5

3.6 Challenges in Large-Scale Agile

Mention two challenges regarding *Communication* in Large Scale agile.
For each challenge, describe why it is a challenge and propose some possible solutions. (10p)

Fill in your answer here

Format

Words: 0

Maximum marks: 10

Section 4 - Intro & case description

Case description

A large Norwegian Public Service Company (Company X) has over 1000 employees and develops and maintains a comprehensive amount of IT-systems.

Company X hires consultants from a consultant company (Company Y). The consultants consists of a team of 5 and are hired for developing a solution to facilitate communications between internal systems within in Company X. The consultants develops increments using Scrum and the sprints lasts for 2 weeks.

Company Y has run into problems as they are dependent of approvals given by Company X in order to produce new features in each sprint. Company X has a physical weekly meeting were decisions are made - this means it can in worst case take up to one week before Company Y gets approvals.

Company X is unsatisfied as Company Y has not finished the solution within 1 year, which they were budgeted for. This means the project will be way more expensive than what first planned. However, since the solution is crucial for Company X, Company Y needs to finish the solution no matter how long time it will take.

4.1 BPMN

Model a BPMN diagram of a Sprint with the current process as presented in the case description. (15p)

Fill in your answer here

Format

Words: 0

Maximum marks: 15

4.2 Process improvements

Task A

Describe **two** process improvement techniques you have learned about in this course. (6p)

Fill in your answer here

Task B

Apply the two process improvement techniques you described in the previous task (Task A) on the process described in the case description. (10p)

Fill in your answer here

Maximum marks: 16

4.3 Case reflection

The case describes a team trying to work agile within a traditional (waterfall-driven) business.

Task A

Reflect on challenges with working as an agile team in a waterfall-driven organization. (6p)

Fill in your answer here

Task B

Reflect on challenges when changing a large company (more than 1000 employees) from waterfall to agile. (6p)

Fill in your answer here

Maximum marks: 12