

# UNIVERSITY OF OSLO

## Faculty of Mathematics and Natural Sciences

IN5140 – Process improvement and agile methods in systems development

Final exam

Torsdag 6 Desember 2018

Length: 9-13 (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.

Good luck!

### ***Exercise 1: Multiple choice (20 %).***

One alternative is correct.

No	Question	Answer A	Answer B	Answer C	Answer D
1	Which of the following meetings is not part of Scrum?	Product review meeting	Retrospective meeting	Retrospective meeting	Sprint planning meeting
2	Which one is a characteristic of a software project and not a software system?	Reliability	Usability	Lead time	Maintainability
3	When implementing the functionality of a system to be developed, maintainability is improved when:	one ignores code size	one develops all features to have the same code size each	one develops maximal code	one develops minimal code

No	Question	Answer A	Answer B	Answer C	Answer D
4	Which one of the following methodologies does least impact the establishment of DevOps methodology?	Waterfall Software Delivery	Agile Software Delivery	Continuous Software Delivery	Lean Manufacturing
5	Technical Debt includes only:	Bugs but not missing features	Bugs and missing features	Missing features but not bugs	None of the others
6	To keep the daily scrum meeting brief, it is recommended that...	... there is no talking about tasks in the meeting.	... everyone remains standing.	... no one talks for more than one minute.	... no electronic tools are used in the meeting.
7	What does DevOps stand for?	Deployment and Optimisation	Development and Operations	Deployment and Operations	Development and Optimisation
8	Which one is not a particular Scrum practice?	Retrospective meeting	Team Building	Backlog grooming	Daily standup meeting
9	<b>What does a task board show?</b>	The number of tasks still to be done against the time allocated	Tasks completed against the budget spent	The progression of the selected tasks	Return on investment
10	What is the meeting during which the team demonstrates what was accomplished during the Sprint to the product owner and any other interested parties?	Sprint review meeting	Stakeholder review meeting	Product review meeting	Sprint retrospective meeting

## ***Exercise 2. Miscellaneous questions (25 %)***

**Answer briefly the questions as follows:**

1. What are the three problems of architecture in the Waterfall model?
2. Describe the three main concepts of Technical Debt: the debt, the principal and the interest.
3. Describe the concept BizDev.
4. **A core principle in both Lean and Agile is to provide value for the customer.**  
**Question 1:** What is work that does not give value to the customer, and that which the customer is thus not willing to pay for, called in Lean?  
**Question 2:** Not everything that is needed to develop software is directly valuable for the customer. Give one or more examples.

5. Describe three different types of distributed teams. What can distributed teams do to build trust?
6. Why and how should the retrospective meeting in agile teams be conducted?

### ***Exercise 3 (20%)***

**Answer the following questions:**

- a) Why is it important to think about software architecture?
- b) Discuss the strengths and weaknesses of at least three different empirical research methods
- c) How should daily stand-up meetings be conducted in distributed teams? Discuss.

### ***Exercise 4 (35%)***

Company X is a large company in the public sector in Norway that provides a wide specter of different public services. The company maintains and extends more than 100 information systems, and develops new information systems. There are four fixed dates each year for software releases.

The development process is as follows: Proposed new functionality is discussed by the system architects and project managers of the company together with a third-party representative from Company Y. The project managers and architects divide the functionality into a list of user stories and send it to Company Y. Company Y reviews the user stories, estimates the work and sends it back to the project manager in Company X. When the functionality is finally approved (may go fourth and back before the functionality is approved), two developer teams in Company Y start developing the requested functionality using Scrum with two week sprints. Company X and Y are not co-located. When all the user stories are implemented, a test team in Company X tests the new functionality, and, depending on the test results, approves it or not. If it is not approved, it is sent back to Company Y for improvements. When the functionality is finally approved, the new version of the system is released.

- a) Document the process described above in a process model using BPMN.

Both company X and Y were dissatisfied with the development process. The quality of the delivered functionality was increasingly poor and often the release date had to be postponed.

- b) Propose improvements to the process described in the case description.
- c) Describe three measures (variables) that the project could use to evaluate the effects of the changes in the development process that you proposed in (b).