

CS-C2130 / CS-C2140 / CS-E4910

Software Project 1 / 2 / 3

Lecture 1: Introduction to the Course

Jari Vanhanen

Agenda

- **16:15-17:30** Introduction to the Course, Jari Vanhanen
 - motivation
 - Scrum
 - support to the project
 - the project
 - forming the team and selecting a topic
 - evaluation principles
 - **17:30-17:40** Accenture Quality Award / Minna Seppälä
 - **17:40-18:00** Scrum Masters introduce themselves
 - **18:00->** Scrum Masters and developers can have discussions
-

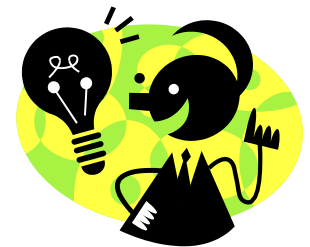
Three courses, same project

- CS-C2130 & CS-C2140 Software Project 1 & 2
 - BSc level course
 - 5cr + 5cr
 - September – April
 - Both courses must be taken during the same academic year
 - except, if a student is absent from the university during the spring
 - Evaluation and credits of both courses in April
- CS-E4910 Software Project 3
 - MSc level course in Software and Service Engineering (SSE) major
 - 5-8cr

Course = A Large Project Work

- SW development projects for real clients
 - from the client's idea to incremental deliveries of production quality code
 - the results will be utilized by the clients
 - different domains
 - different programming languages and technologies

What are the differences between small programming assignments and real software projects?



A Typical SW Development Scenario in Industry

- External client and diverse end-users
- Large system
- Large team
- Every work hour costs money
- Bugs may cause serious consequences
- Developers change

What needs attention in large, real projects compared to small programming assignments?

A Typical SW Development Scenario in Industry

- External client and diverse end-users (understanding real needs)
- Large system (technical complexity, software design)
- Large team (communication, coordination, team spirit)
- Every work hour costs money (efficiency, prioritization)
- Bugs may cause serious consequences (quality, proof of quality)
- Developers change (maintainability, knowledge transfer)

Programming skill is not the only element of success.

Prerequisites

Enough programming experience to be able learn more quickly ...

- SW Project 1 & 2
 - **1st year programming and databases courses / good programming skills (mandatory)**
- SW Project 3
 - **SW Project 1 & 2** or a similar project (mandatory)
 - **CS-C3150 Software Engineering (mandatory)**
 - SSE major's core SW engineering courses (recommended)
 - SW Design and Modelling
 - SW Testing and Quality Assurance
 - SW Processes and Projects
 - Requirements Engineering
 - SW Architectures

Educational Goals (1/2)

- Getting **hands-on experience** of a real SW development project
 - requirements engineering, design, programming, QA, project mgmt
 - seeing the common challenges related to these activities
- Learning to use **new technologies**
 - programming languages, frameworks etc.
- Learning to **apply Scrum** and various work practices and tools
 - **try new practices and tools, and analyze experiences**
 - enlarge your software engineering toolkit
 - understand the limits of practices and tools

Educational Goals (2/2)

- Learning various academic / soft skills
 - social skills
 - team work
 - searching for information
 - note-taking
 - decision making
 - presentation skills
 - time management
 - independent learning
 - networking
 - business thinking
 - ...

... and learning the **"I can do this"**-attitude

According to research, largest gaps in the expectations of IT companies and skills of the university graduates are related to soft skills.

Educational Goals - Summary

- After this course you should
 - **understand the common challenges** involved in SW development
 - be a **better programmer**
 - be able to **apply Scrum** and suitable work practices and tools in your projects
 - have improved in many **academic/soft skills** applicable practically anywhere

Use this course as an opportunity for learning!

Think about your personal learning goals and make decisions (project topic, your responsibilities in the team etc.) that support them!

SCRUM

Scrum

- Iterative and incremental agile software development framework for **managing** product development

**Does not cover design, implementation,
or concrete testing practices**

- Widely used in software industry
- On this course all projects use Scrum

SCRUM

SW Project 3 students



Clients



DEVELOPERS



SW Project 1&2 students

PRODUCT BACKLOG REFINEMENT

DAILY SCRUM

SPRINT REVIEW



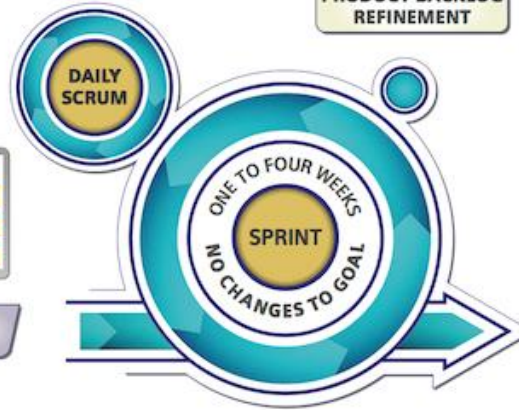
PRODUCT BACKLOG



SPRINT PLANNING
PART 1 AND 2



SPRINT BACKLOG



POTENTIALLY SHIPPABLE
PRODUCT INCREMENT



RETROSPECTIVE

(cc) Odd-e Pte Ltd

Scrum Roles – Product Owner (PO)

- **Someone from the Client's organization**
- Responsible for
 - maximizing the value of the product and the work of the development team
 - managing the Product Backlog
- Participates to Sprint Planning and Sprint Reviews

Scrum Roles – Developers

- **Students from SW Project 1 & 2 courses**
- deliverer a potentially releasable increment of “*Done*” product at the end of *each Sprint*
- Responsible for
 - programming, testing, analysis, design and any other tasks required to successfully deliver the project
 - actively thinking “How can I best proceed the project now”, instead of waiting that someone tells what to do

Scrum Roles – Scrum Master

- **Students from SW Project 3 (5-8cr) course**
 - Ensures that the developers and the PO understand and use Scrum
 - Responsible for
 - plan, teach and **ensure the application of Scrum**
 - prepare and lead the **Scrum events**
 - manage **team building**
 - recruitment, communication channels, team spirit
 - **initiate discussions on any problems**, if the team does not react to them
 - e.g. overseeing that team learns to proceed the project on their own
 - **give tips** about methods and tools:
 - e.g. architecture, testing, user requirements, teamwork etc.
 - Some may work also as a developer
 - taking course size >5 cr (max. 8 cr)
-

SCRUM TRAINING

Lecture: Scrum Basics

- We 14.9.
- Basics of Scrum and applying it in the course project

Certified Scrum Master Training



- **For Scrum Masters only**
- Th-Fr 15.-16.9. 8:15 – 16:00
 - in 233a Vilho, Learning Centre, Otaniementie 9
 - 8:00 - 8:15 coffee and something to eat available
- Arranged by agile42 / Lasse Ziegler
- Interactive introduction to the principles and practices of Agile and the Scrum framework
- Qualifies you to receive the Scrum Alliance Certified Scrum Master certification

Lecture: Scrum Master's role

- **For Scrum Masters only**
- We 21.9.
- Scrum Master's role
 - in the course project and
 - in the Scrum simulation

Scrum Simulation



- **For Scrum Masters and developers**
 - Intro + 3h simulation + discussion = 4h
 - building LEGOs instead of coding
 - 4 sessions (26.9. – 7.10. 16-20), 4 teams per session
 - Preferably the whole team in the same session
 - the simulation is an important **team building activity** also
 - if you arrive alone, you will be assigned to some random team
 - **Register to a session on the “CS-C2130”-Google Sheet**
 - register ASAP when the Scrum Master and ≥ 2 members agree on a suitable slot
 - **try to fill the first sessions first**
 - you can change your session as long as there are free slots
 - **Mandatory participation OR an essay will be required**
-

Scrum Materials

- [Scrum Guide](#)
 - official definition of Scrum
- [Scrum Primer](#)
 - a more concrete presentation of Scrum
- CS-C2130 Project Manual
 - applying Scrum in the course project

These will be discussed on the "Scrum Basics"-lecture.

OTHER SUPPORT TO THE PROJECTS

Coach (1/2)

- Course personnel
- Coaches the team with Scrum and other work methods
 - non-technical focus
- Helps the teams identify potentially serious problems and may give suggestions
- Evaluates compliance with the required work methods (Scrum)
- Several meetings (f-2-f or Zoom)
 - Sprint 0 plan
 - Sprint 0 review
 - three project reviews
 - other meetings (a few times)
- Other forms of participation
 - continuously observes the project
 - answers questions by e-mail
 - evaluates the team
 - points and feedback



Coach (2/2)

- Help the coach help you!
 - visibility and status updates
 - prepare questions and send them to the coach before the meetings
 - invite the coach to some Scrum event(s)
 - increases visibility to your work practices
- Every project will face problems
 - instead of hiding them, identify and solve them quickly
 - ask help when needed
- Budgeted effort per team (~30h)
 - ~10h for meetings
 - ~4h for reading, grading and feedback after each project review (*3)
 - ~8h for observing the project, e-mails, preparing for meetings



Experience Exchange Sessions (EES)

- 4-5 sessions during the project
 - varying themes related to what the teams have recently been working with
- Participants
 - 1-2 students per team, teacher and some guest expert(s)
- A team will earn 0.5p from each EES, if
 - team proposes 2 discussion topics for the EES (DL 1pm the day before the session)
 - practical problems and/or good solutions to a common problem
 - someone participates to the EES
- Agenda
 - free discussion on problems and good practices/tools
 - teacher prepares the agenda based on proposals
 - proposed topics will be discussed in small groups with other interested people

two of the EESs will be arranged in a slightly different format by Accenture

Infrastructure

- HW & SW
 - Students' own devices
 - Aalto IT
 - open source
 - Clients' devices and licenses
- Work room
 - Aalto Space app
 - Client's office

THE PROJECT

Project Stakeholders and their Goals



Students

- learn about SW development and Scrum
- good grade
- a new entry to the CV
- network with other students and employers



Client organization

- get useful SW and new ideas
- get experiences of new technologies etc.
- network with students

Coach & Course

- provide a good learning environment, i.e. a realistic but safe sandbox
- ensure the fulfillment of educational goals
- help to notice *serious* problems before it is too late



Fixed Project Duration and Effort

- Duration
 - ~21 weeks
- Effort per person
 - 25*(credits-1) hours
 - e.g. 25*(10-1) = 225 hours for the project
 - 225h / 21weeks = **11h / week**

17.10.2022	Projects begin
~28.11.2022	Project Review 1
~6.3.2023	Project Review 2
~24.4.2023	Project Review 3 (end of the project)

e.g. 2 team work sessions/wk
+ some independent work
= lots of work!

- All students are REALLY expected to invest this amount of effort
- This will be an exhaustive, but educational course
 - Course feedback: usefulness 4.76/5 (SWP1&2), 5/5 (SWP 3)
- In your feedback, real projects is the most praised component of the course
 - real projects are possible thanks to the motivated students and great results each year

Project Scope

- Fixing the project effort means that the **scope must be flexible**
 - deliver the most important features first
 - usually product owners have more ideas than can be implemented
 - adjust the scope with PO during the project based on progress
- Product Quality?
 - aim for production level quality
 - some exceptions allowed, if explicitly asked and understood by the PO
 - e.g., if some part of GUI is built only for internal testing, its usability does not matter (much)

Forming the Team (1/2)

- Course registration deadline was already
 - send e-mail to the teacher immediately,
 - if you cancel your registration
 - If you missed the deadline
- Student list published on the **“CS-C2130”-Google Sheet**
 - **add your personal preferences immediately**
 - work times, technologies, project topics, ...

See MyCourses Announcements

Optimal team composition:
 -common weekly work times
 -similar technology and topic prefs
 -at least one, who is familiar with the required main technologies

Team ID	Subteam ID	Role	Name	E-mail (@aalto.fi)	Course	Cr	Prefs	Preferred project IDs	Technologies that I know already	Technologies that I would like to learn	Possible weekly teamwork times	Work languages	Favorite team (IDs)	Other notes
		DJ	Example, Eric	eric.example	CS-C2130 & 40	10		C,H,L,M,T	Scala, SQL		The evenings after 18 on weekdays (except tuesday after 18), weekends and some day times in the weekdays, if necessary	fin, eng	6, 9	A second year computer science student with one summer of experience for HTML, CSS, PHP and JS
	S20	Ds	Example, Andy	andy.example	CS-C2130 & 40	10			L,T,W,Y About 3.5 years of work experience (development) with Ruby on Rails, Python, HTML, CSS, JavaScript AngularJS, Gulp, Babel, Jira, J2E, Git			fin, eng	He has already formed a subteam with NN1, NN2 and NN3	
		S	Master, Mike	mike.master	CS-E4210	8		all fine	testing tools, CI tools, Agile/fant backlog management tool, requirements analysis		Monday and Thursday 8-18, We-Fri 10-22, Saturday 10-16	eng		Developers can choose the topic. I can be the Scrum Master for any team.
	S20	DJ	NN1	...	CS-C2130 & 40	10								

Forming the Team (2/2)

- Scrum Masters recruit team members (max. **4 developers**)
 - they use the “CS-C2130”-Google Sheet
 - to inform what kind of preferences they and their partial team has
 - to find developers who have similar prefs with each other and/or with the Scrum Master
 - to **mark who have joined their team**
- Developers may also contact Scrum Masters
 - **especially the pre-formed sub teams should find a SM quickly**
- Developers may use the Google Sheet to mark subteams of 2-4 developers who would like to work together
- Teacher assigns the remaining students to all the teams on **Mo 19.9.**
 - fill “Preferred Teams” column **by 18.9.**
 - Final team size: **about 7** developers

... or you will be randomly assigned to some team

Project Topics

ID	Client organization	Contact person	Project Proposal
A	Aalto University	Anni Rytkönen	Assessment workflow system for teachers and students
B	Accountor	Tommi Jäske	Extreme Pay Experience
C	Amos Ahola	Amos Ahola	A Timeless Classic Game on Unreal Engine 5
D	Beamex	Juho Nummiliikki	Bringing machine vision to everyday use in process industry
E	Bytecraft	Antti Halava	AI-Assisted Game Content Creator
F	CollectiveCrunch	Olli Salminen	System to store and fetch petabytes of geo data
G	Conveqs	Kari Koskinen	Virtual traffic
H	Droppe	Henrik Helenius	Droppe Supplier Insights Engine
I	Ellie Technologies	Jari Jaanto	Modern Authentication for a SaaS Application
J	Formup	Rune Niska	Reservation system
K	Mafy	Antti Suominen	Matriculation Exam Score Calculator
L	Mafy	Zacharias Levander	Application and Study Material onboarding
M	Maillefer Extrusion	Janne Harjuhahto	Industrial Machine Learning Model Validation
N	Maillefer Extrusion	Janne Harjuhahto	Visualization of Production Quality and Status
O	Polycon	Ida Mäkelä	Effector Mobile Cross-Platform
P	RELEX Solutions	Maria Ilvonen	Timely service for a global customer base
Q	Remedy	Vesa Paakkanen	Asset Index
R	Savox	Veli-Matti Anttila	Smart route management
S	Sievo	Ville Tukiainen	CO2 analytics software (proposal coming soon)
T	Sitra	Antti 'Jogi' Poikola	Linking our thinking
U	Stockmann	Mika Helenius	Stellar Service
V	VR Group	Annina Hokkanen	VR Matkalla - Year On The Rails

Project Topics – Which one to choose?

- What do the development team members want to learn?
 - technologies
 - problem domain
 - getting to know a certain client organization
- Too easy a topic?
 - boring
 - not optimal for learning new things
 - no "bonus" points in the evaluation
 - the topic might be more suitable for some less experienced team
- Too demanding a topic?
 - fulfilling client's goals overrides other educational goals of the course
 - not learning how to deliver something considered operationally ready

Scrum Masters do not have to know the technologies or domain. They are Scrum experts.

Project Topics – Legal Issues

- Standard contract by Aalto
 - Intellectual property rights (**IPR**)
 - Client gets IPRs, or
 - open source
 - Confidentiality / NDA
 - Section 8 in the standard contract is enough for most clients
 - project documentation should always be public
 - except code and technical specs
- Signing the standard contract
 - **ASAP when the project starts**
 - Use 1)the client’s digital signing system or 2)manual signing
 - Manual signing
 1. The client fills the basic information and their signature
 2. Team members sign
 3. Scrum master sends a scanned PDF copy to Jari to be signed
 4. Aalto signs and sends copies to everyone
- Participation fee for companies
 - 3 000e
 - commitment
 - course costs

Project Topics – Selection Process

- Teams apply for topics
 - choose 2-5 favorite topics
 - show your tentatively prioritized choices to other teams on the Google Sheet
 - send a team CV to 2-5 clients **6.-10.10.**
 - popular clients may choose Top-4 based on CVs
- Have a 10-minute meeting with all your favorite clients after the pitches on **12.10.**
 - reserve meetings on the Google Sheet
- Immediately after the meetings on **12.10.**
 - each client prioritizes the interested teams
 - each team (re)prioritizes the clients they met
 - on the Google Sheet
- Jari makes the final pairings on **13.10.**

Do not contact the clients before 6.10.
Contact Jari, if you want some clarification to a topic proposal.

Ensure that the client:

- is committed to the project
- understands the domain and has prepared the project well enough
- provides needed infrastructure
- is confident that possibly required SW/HW works
- doesn't expect skills that the team doesn't have/cannot acquire quickly
- appreciates the educational context

If you are not sure, try another client.

Evaluation Principles

- The students are evaluated as a team
 - team can propose individual changes of +/-1 grade
- Product Owner and Coach evaluate separately
- Results and Work practices are evaluated

Component	When	PO	Coach	TOTAL (max)
Work practices	After each project review	-	0-5p	15p
Project progress	After each project review	0-5p		15p
Final results	After the last project review	0-15p	0-15p	30p
EES participation	After each EES	-	0-0.5p	2p
TOTAL (max)				62p

Evaluation Principles:
<https://mycourses.aalto.fi/mod/page/view.php?id=908246>

In order to pass the course

1. Participate to a team that gets enough points from the project (see Evaluation Principles)
2. Spend $(\text{credits} - 1) * 25\text{h}$ to the project work (i.e. 225h for 5+5cr)
3. Participate to a Scrum Simulation session
-(or write a compensatory essay)
4. Write 4 learning diary entries during the project
-(or write a compensatory essay after the course)

Learning diary

- Each student must write 4 entries to a learning diary
- After the Scrum Simulation (1 entry)
 - What you learned about Scrum
 - Feedback to the organizers about the simulation
- Just before each Project Review (3 entries)
 - 1) three educational observations related to the use of Scrum or other work methods
 - 2) a summary of your main contributions to the project since the previous entry

Submitted individually
to MyCourses.

Student Feedback

There was lots of hand on attitude in this course. It was nice to "study"/"work" as a "worklife" environment. I really enjoy during this course and learned a lot about technologies and also work practice and team work. It is important that team communication works well.

Project taught the importance of good teamwork. **It's more important to have right attitude than a great skillset** (of course it helps).

Materials Related to this Lecture

- Student's Manual
- Evaluation principles
- Project proposals
- Project Contract

All materials are available in MyCourses.

Read them carefully, if you missed this lecture.

Next Steps

- Add your preferences to the Student list ASAP
 - work times, work language, project topics, technologies
 - link was posted today to MyCourses Announcements
- Start forming the teams! Developers can
 - wait that a Scrum Master contacts them
 - contact some other developer(s) and then use the Sub-team column to show to the Scrum Masters who would like to work together
 - contact a Scrum Master as a sub-team or alone

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-

Introduction of the Scrum Masters

1	Ahmed Noushed
2	Arponen Arttu
3	Burkova Anastasiia
3	Turunen Noora
4	Falowo Tobi
5	Haajanen Petri
6	Hämäläinen Joel
7	Hyyryläinen Eetu
8	Järvenpää Joonas
8	Pihlava Ville
9	Koskela Lauri
10	Miettinen Eino
11	Muraja Simo
11	Sulkakoski Ossi
12	Palmberg Rasmus
13	Pelayo Muñoz Minerva
14	Puranen Elina
15	Ruismäki Jarkko
16	Vikberg Esa
16	Yunita Andriani

- SW engineering background (school & work, if any)
- Preferences, e.g. work times, topics
- Anything else...

... in max. 60 seconds