

Software Architecture

DAT220/DIT544

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Software Engineering Division
Chalmers | GU



Schedule

We are
HERE!

Week		Date	Time	Lecture	
3	L1	Wed, 20 Jan	10:15 – 12:00	Introduction & Organization	Ho
3	L2	Thu, 21 Jan	13:15 – 15:00	Architecting Process & Views	g Ho
4		Tue, 26 Jan	10:15 – 12:00	Skip	
4	S1	Wed, 27 Jan	10:15 – 12:00	<< Supervision: Launch Assignment 1>>	TAs
4	L3	Thu, 28 Jan	13:15 - 15:00	Roles/Responsibilities & Functional Decomposition	Truong Ho
5	L4	Mon, 1 Feb	10:15 – 12:00	Architectural Styles P1	Truong Ho
5	S2	Wed, 3 Jan	10:15 – 12:00	<< Supervision/Assignment>>	TAs
5	L5	Thu, 4 Jan	13:15 – 15:00	Architectural Styles P2	Truong Ho
6	L6	Mon, 8 Feb	10:15 – 12:00	Architectural Styles P3	Sam Jobara
6	S3	Wed, 10 Feb	13:15 – 15:00	<< Supervision/Assignment>>	TAs
6	L7	Thu, 11 Feb	13:15 – 15:00	Design Principles (Maintainability, Modifiability)	Truong Ho
7	L8	Mon, 15 Feb	10:15 – 12:00	Performance – Analysis & Tactics	Truong Ho
7	S4	Wed, 17 Feb	13:15 – 15:00	<< Supervision/Assignment>>	TAs
7	L9	Thu, 18 Feb	10:15 – 12:00	Tactics: Reliability, Availability, Fault Tolerance	TBD
8	L10	Mon, 22 Feb	13:15 – 15:00	Guest Lecture 1	TBD
8	S5	Wed, 24 Feb	13:15 – 15:00	<< Supervision/Assignment>>	TAs
8	L11	Thu, 25 Feb	10:15 – 12:00	Guest Lecture 2	TBD
9	L12	Mon, 1 Mar	13:15 – 15:00	Reverse Engineering & Correspondence	Truong Ho
9	S6	Wed, 3 Mar	10:15 – 12:00	<< Supervision/Assignment>>	TAs
9	L13	Thu, 4 Mar	13:15 – 15:00	To be determined (exam practice?)	Truong Ho
9		Fri, 5 Mar	Whole day	Group presentation of Assignment (TBD)	Teachers
11	Exam				2

Agenda

- 10:15 - 10:30: Teams and working in teams
 - Information about the teams that are formed
 - Way of working in teams and with supervisors
- 10:30 - 11:00: Launch of Assignment 1
 - Introduce about the case;
 - Some instructions;
 - What we expect and best practices learned from last years.
- 11:00 - 11:30: Q&A about the Assignment 1

Group Formation is **DONE!**

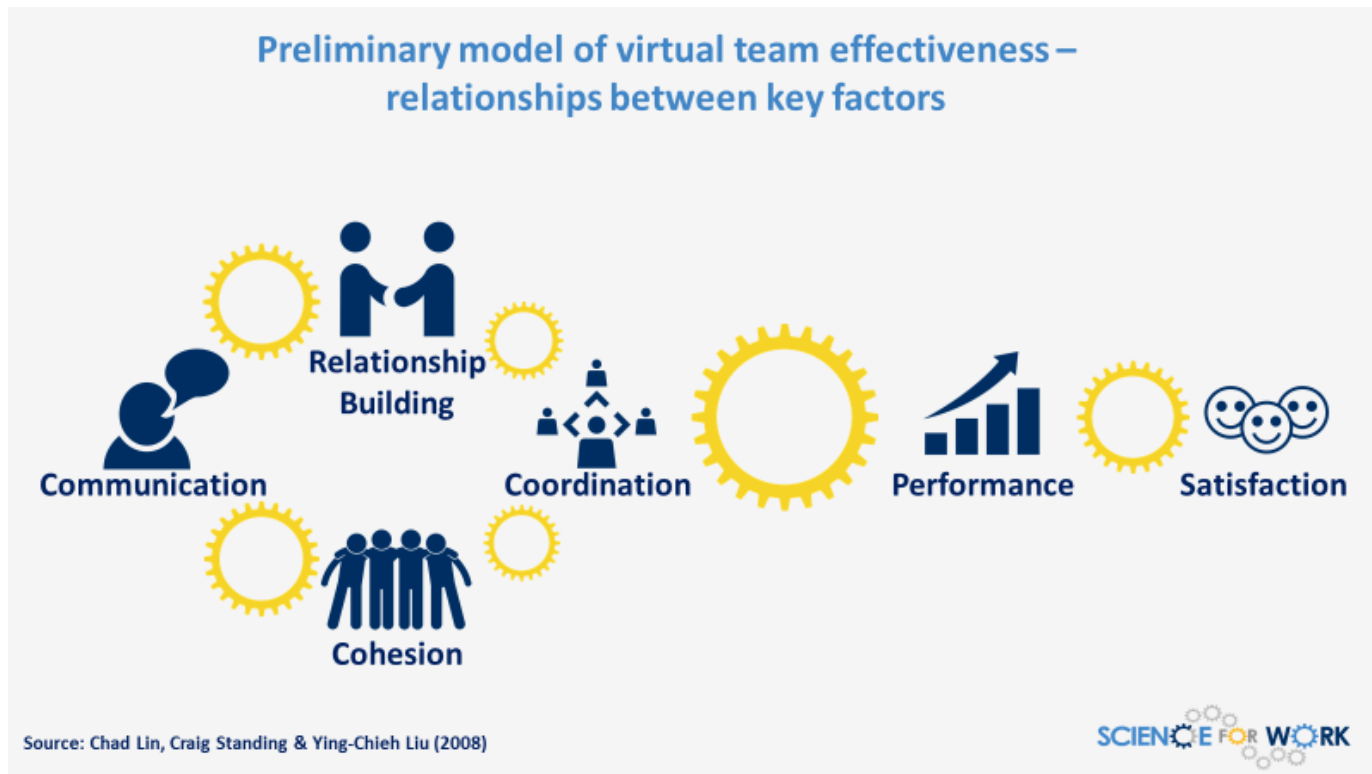
- 8 groups are formed (**40** students)
- Groups are announced and created on Canvas

https://chalmers.instructure.com/courses/12514/discussion_topics/53779

- Recommendation: Choose a group name
 - Deadline: Feb. 2.
- A supervisor will be assigned to every group

Working as a team

- **Communication** is the key to success!
- **Coordination** is strongly related to performance



(*) Lin, C., Standing, C. and Liu, Y.C., 2008. A model to develop effective virtual teams. *Decision Support Systems*, 45(4), pp.1031-1045.

Tips for efficient communication

- Go beyond text, email.
- “Face to face” meetings
- Share your screen
- Engaging in activities such as virtual shared coffee breaks to catch up on non-work issues
- Make use of team-communication tools
 - Slack
 - Group homepage in Canvas
 - Social-networks ...

We provides tools and possibilities, you ACT!



Supervision sessions

- Aim:
 - Give instructions/tutorials
 - Followup on team progress
 - Help teams to solve issues and plan for next steps.
- Online meetings
 - Each team has a zoom room (created by either the team or supervisor)
 - Duration of each supervision session: 25 – 30 mins

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 - Introduce about the case;
 - Some instructions;
 - What we expect and best practices learned from last years.
- 11:00 - 11:30: Q&A about the Assignment 1

Assignment schedule

We are
HERE!

Week		Date	Lecture	Assignment 1 – Task 1 (A1T1)	Ass Ta	ent 2
3	L1	Wed, 20 Jan	10:15 – 12:00			
3	L2	Thu, 21 Jan	13:15 – 15:00			
4		Tue, 26 Jan	10:15 – 12:00			
4	S1	Wed, 27 Jan	10:15 – 12:00	Launch A1T1		
4	L3	Thu, 28 Jan	13:15 - 15:00			
5	L4	Mon, 1 Feb	10:15 – 12:00			
5	S2	Wed, 3 Jan	10:15 – 12:00	Work A1T1		
5	L5	Thu, 4 Jan	13:15 – 15:00			
6	L6	Mon, 8 Feb	10:15 – 12:00			
6	S3	Wed, 10 Feb	13:15 – 15:00	Work A1T1		
6	L7	Thu, 11 Feb	13:15 – 15:00	Hand-in A1T1 Peer Rev A1T1	A1T2 released	
7	L8	Mon, 15 Feb	10:15 – 12:00			
7	S4	Wed, 17 Feb	13:15 – 15:00	Hand-in PR A1T1	MQTT intro	A2 released
7	L9	Thu, 18 Feb	10:15 – 12:00			
8	L10	Mon, 22 Feb	13:15 – 15:00			
8	S5	Wed, 24 Feb	13:15 – 15:00		Work A1T2	
8	L11	Thu, 25 Feb	10:15 – 12:00			
9	L12	Mon, 1 Mar	13:15 – 15:00			
9	S6	Wed, 3 Mar	10:15 – 12:00		Work A1T2	Hand-in A2
9	L13	Thu, 4 Mar	13:15 – 15:00			
9		Fri, 5 Mar	Whole day		Present A1T2	
11	Exam					

I hope you notice

- Parallel assignments: **A1T2** and **A2**
- Hand-in deadlines
 - Gives 2 weeks for a hand-in
 - Any duplicated deadlines with other courses???
- Peer-Review
 - A group's hand-in will be reviewed by another group
 - Peer review form will be provided by teachers
 - Aim: Evaluation/Giving-feedbacks skills
- Individual Contribution
 - A individual contribution assessment form is to be added by the end of each hand-in.
- Meet the deadlines!
 - This allows us to give you timely feedback
 - Assignment schedule is **tight**, follows it or falls **behind!** (Yo :-D)

Assignment 1 – 2 Tasks

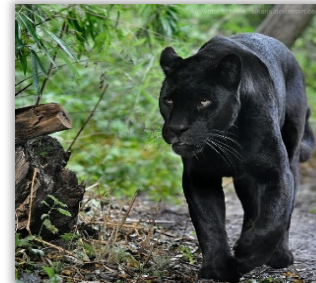
- Task 1: Create software architecture specification (SAS) documentation
 - Case: Wakanda Autonomous System for Poaching Protection (WASPP)
 - Expected Outcome: SAS document of WASPP
 - Hand-in deadline: 23:59, Thursday February 11.
- Task 2: Implementation Mock-ups
 - More details TBA

Assignment 1 – Case Description & Instruction

Wakanda Autonomous System for Poaching Protection (WASPP)

<https://chalmers.instructure.com/courses/12514/assignments/32658>

- **Mission M0:** All drones are equipped with regular optic cameras. Airborne-drones are also equipped with heat-sensing cameras. Air-borne drones can fly up to heights of 150m, which is well above tree level, but they can also hover at lower levels between trees of forests. All drones are equipped with a GPS positioning-device. Land-based drones are equipped with microphones for audio-recordings. All drones are equipped with sensors for detection objects in their path (in order to avoid colliding with these objects - e.g. trees, telephone poles, buildings). All land-based drones are equipped with a thermometer and can register temperature. Land-based drones carry a torch. The torch and heat-sensor are crucial for night-missions. The drone can move around its torch in order to point the light beam at objects.
 - **Mission M1:** The drones themselves split up a particular region: each sub-region of the WNP should always have one land-based drone and one air-borne drone operating. Air-borne drone can work in-tandem with land-based drones. Either of these can call a counter-part to explore the region where there are currently positioned: e.g. a land-based drone can ask an air-borne drone to 'look' at a region across a river or ravine (but only within 50 meters of the borders of the WNP).
 - **Mission M2:** Surveillance for security: drones can be tasked to do surveillance of a region of the WNP. When on a surveillance mission, their priority is to detect any humans encroaching the park.
 - **Mission M3.1:** Drones can detect humans on the ground via their image and heat-camera. If they detect a human in the WNP, then will: i) send a message to the rangers in the ground station, ii) follow the human.
 - **Mission M3.2:** is sent out from the ground station to follow the human.
 - **Mission M4:** or audio-rec (gently!) follow these animal:
 - **Mission M5:**
1. **Stakeholders (10 pts)**
 - a. Describe the stakeholders of this system (describe at least 5, and at most 7)
 - b. For each stakeholder, describe one or more of his interest ('stake') in the system
 2. **Forces and Drivers (10 pts)**
 - a. Describe at least 7 forces that apply to the design of this system.
 - b. Which of these forces do you think are *architectural drivers*? Explain why.



3. Use case diagram (10 pts)

Create a use case diagram that contains at least 7 major use-cases for this system. The use case diagram should present the main interactions between the system and the use case diagram should explicitly mention any external systems that are involved in the system.

4. Structural View: Component/Subcomponent Diagram/s (10 pts)

The components diagram/s should present the main components of the system and between these components. For the component/subcomponents diagram/s, you should be representing the following functionalities (If needed, you can split your model in diagrams, or split across multiple diagrams).



WASPP – What's interesting?

- Scope: System, Application
- Domain:
 - Autonomous drones/vehicle
 - Surveillance systems
- Communication patterns:
 - Complex
 - Drones <-> Drones
 - Drones <-> Control Center
 - Drones <-> Humans



Best practices from previous editions

- Start early
- Working in team:
 - Role-play
 - Giving feedback
- UML models
 - No lectures
 - Read the books
 - Watch [online examples](#)

