TDDE25: Projects

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Project: Context

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TDDE23 (6 hp)

Functional and imperative programming 1

TDDE25

Perspectives: Overview, quizzes (2 hp)

TDDE24 (5 hp)

Functional and imperative programming 2

TDDE25

Perspectives: Programming project in Python (4 hp)

In many ways a closer relation to TDDE23-24 than to the rest of TDDE25...

Project: Why?

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Why a programming project?

- Direct **hands-on programming experience** early in your education
  - Don't wait to learn *everything* and *then* apply it
- A chance to **create** something larger
  - Short lab exercises illustrating specific topics are useful
  - You can also learn a lot by collaborating on a larger piece of software
- A chance to practice **working independently**
  - You are at the university now!
  - Take personal responsibility for what you ***do*** and what you ***learn***

Project: Now?

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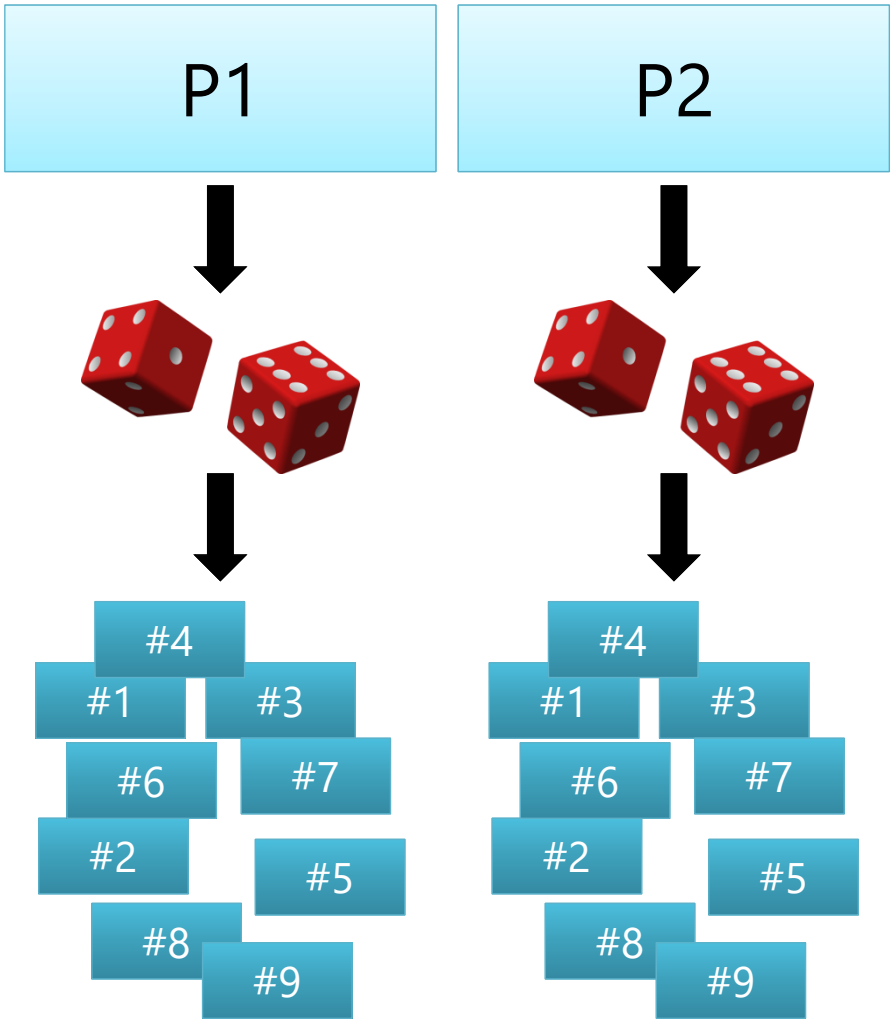
We expect you to…

- **Dive head first** into the world of programming!
- Spend a **great deal of time** on your project:
  Work hard, write a lot of code
- Try different approaches, **solve a lot of problems**
  - You will have the basics from TDDE23,
    learn more in TDDE24 as you go

- **Make mistakes**:
  There is much you haven't learned yet
- **Learn** as much as possible from the mistakes,
- and **show us** what you learned!

Project: Group Assignment

- We generate **project groups** of 3 students



Professionalism: Work with the people you are assigned to

Within the same program (U, D); usually the same class (a/b/c)

Might need a couple of groups of 2; then *we will ask you* if you're comfortable with this

Game:
Capture the Flag

Capture the Flag: Outdoors

- **Capture the flag**: Traditional outdoor sport
  - Each team has a flag and a territory of its own
  - Objective: Capture the other team's flag
    - Without being tagged/touched in the other team's territory

Image: WikiHow

Capture the Flag: Electronically

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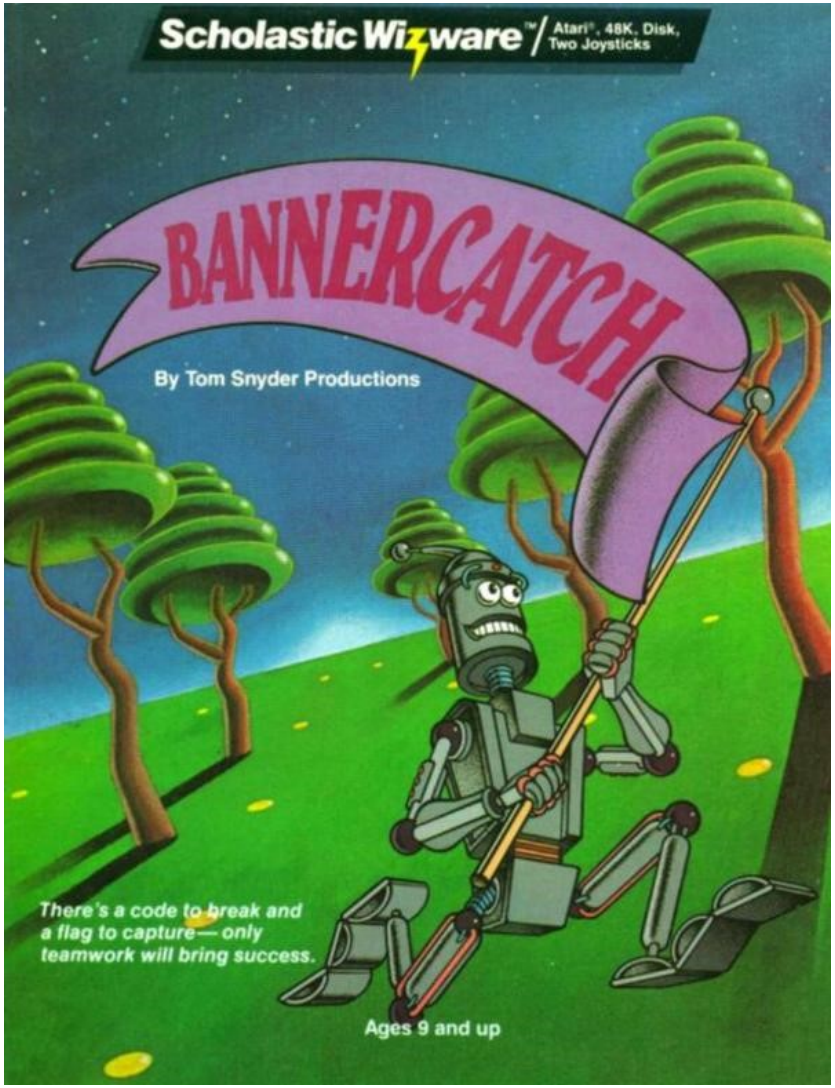
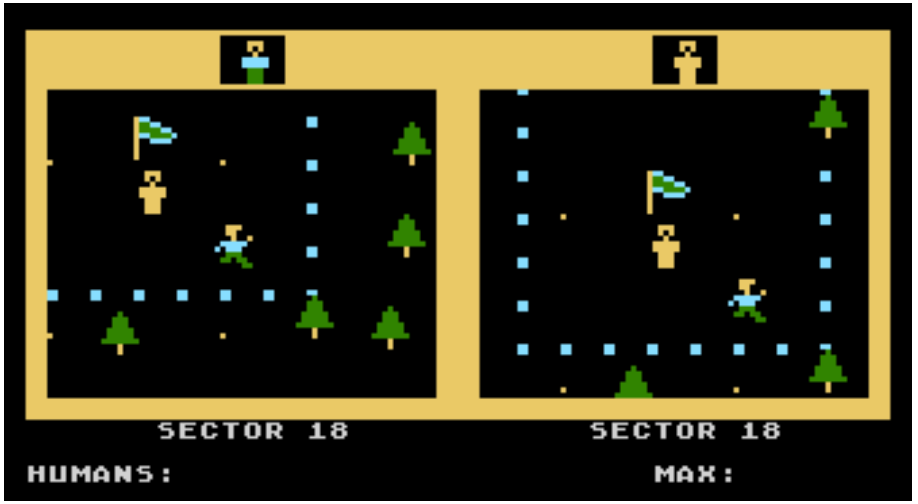
- Electronic versions exist since 1984…





Capture the Flag: Project

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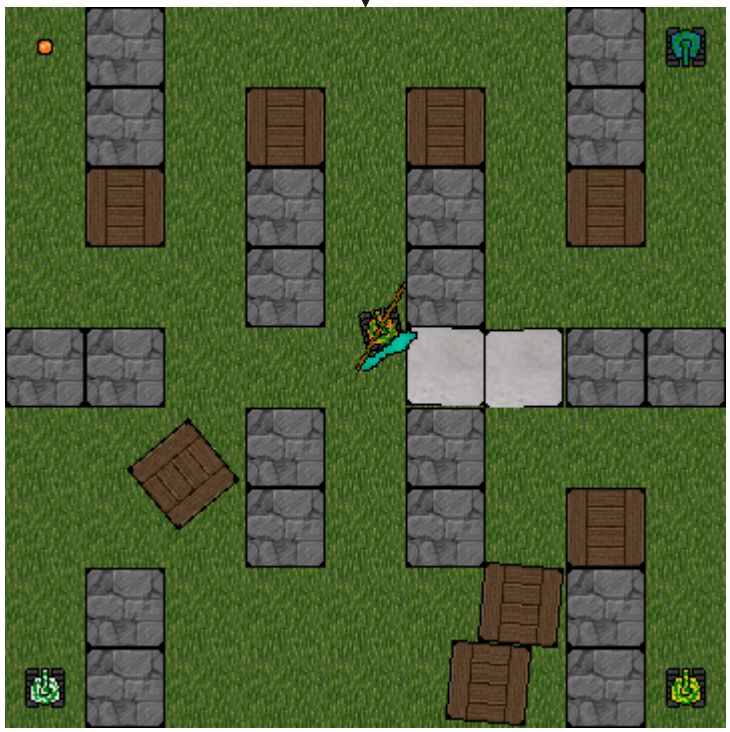
- Project: Implement ”Capture the Flag” in Python
  - **Basic framework given**
    - Graphics, 2D physics
  - **Many tasks remain**
    - More discussions later…

Image tiles given –
focus on programming



Projects **will** lead to **difficulties**

Difficulties are **expected** and **good**!

You need to be ***challenged!***
You need to practice ***overcoming*** difficulties,
experimenting with potential solutions,
in situations where ***not all problems have been predicted***
and fixed by someone else

Project Schedule

Project Timeline Overview: Startup Phase

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- Fri 2022-10-07 **WebReg opens** for signing up
  Individual sign-up: Show your interest in participating this year!
- Tue 2022-10-11 **Deadline** for signing up
- Mon 2022-10-17 **Preliminary group assignments** are sent out
- All group members **contact** both their preliminary partners,
  to ”commit” to actually working together
- Wed 2022-10-19 **Deadline**: Tell us if group members are missing!
  Everyone is **individually** responsible for contacting me;
  it’s fine if both A and B tell me that C is missing
- Mon 2022-10-24 ***Final*** group assignment sent out;
  rearrangements based on who has ”disappeared”
- Mon 2022-10-31 Next period starts: **full speed ahead**!

Project Timeline Overview: Phase 2

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Week 44

Week 45

Week 46

Week 47

Week 48

Week 49

Project
Investigate, explore, implement, write a lot of code!

Guidance and **goals** given in *project-specific instructions*, together with **milestones** to achieve

Use your creativity and imagination,
and **expand** the project as much as time allows

Week 50

Finalize and **polish** the project

Present (TDDD70)

Week 51

Demonstrate!

Week 44-50:

15h/week

4-hour lab (assistants present for ≈ *2* hours)

5 hours of additional work (4 hp ➔ plenty of time!)

4-hour lab (assistants present for ≈ *2* hours)

2-hour *demo* + *progress report* session (report submitted before!)

Significant progress expected each week!

Software projects:
Tips for Successful Completion

Project: Reading Instructions

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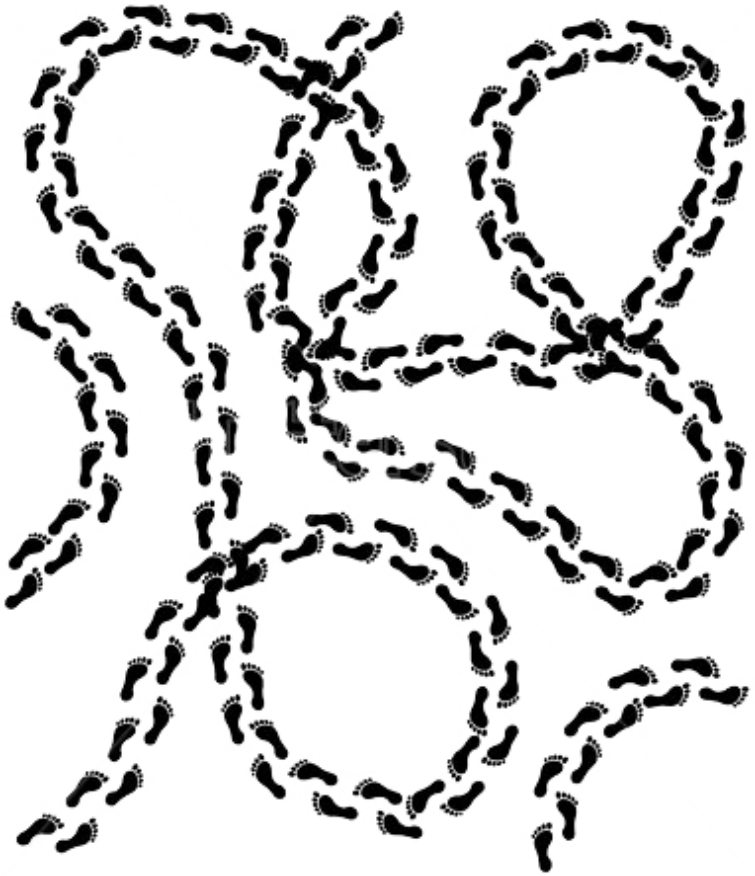
- Engineers must **know what the users want and need!**
  - Read and re-read the **instructions**
  - Otherwise:
    - Running as fast as possible – in the wrong direction?
    - You'll miss important hints!



Project: Keeping Track?

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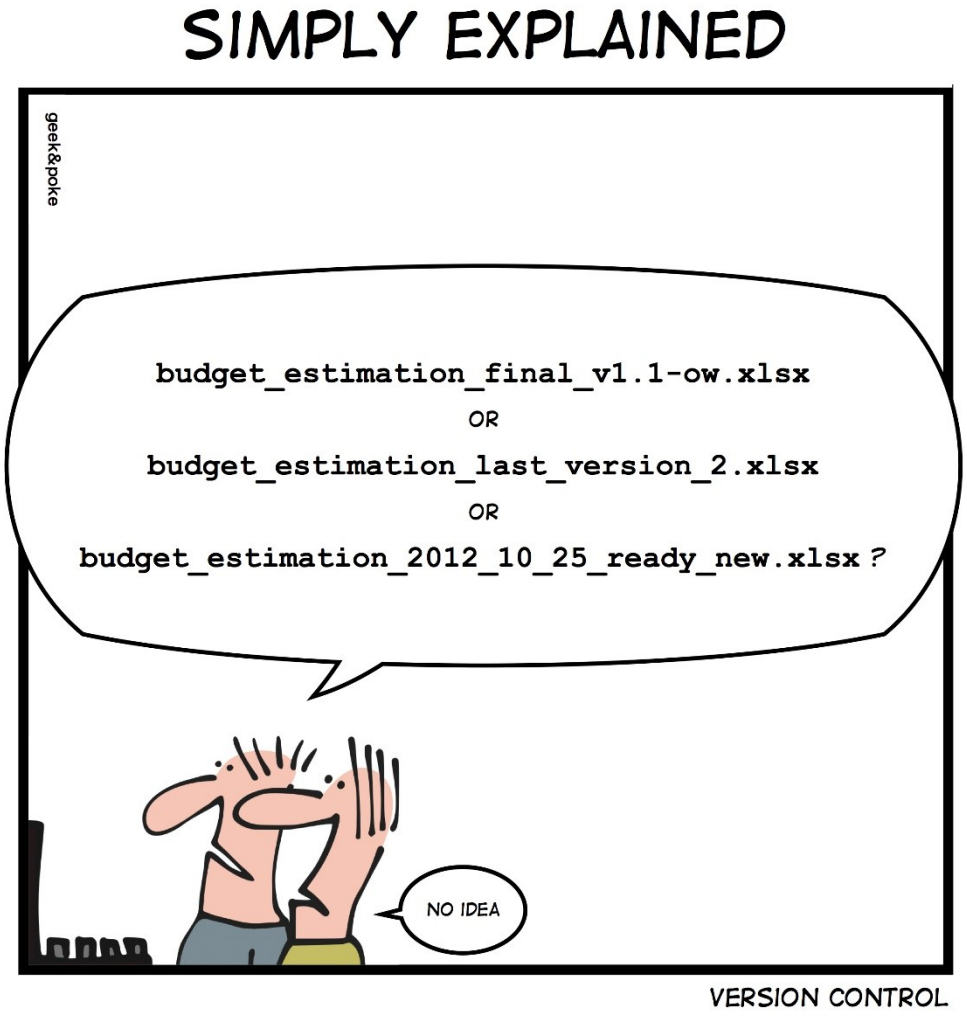
- Engineers must **keep track of their code and documents**!
  - Version control – Git!
  - Commit and push regularly
  - Assistants may use this to review your progress

Committing early and often is a good way of showing that you did not cheat, copy files from others!



Project: Problems

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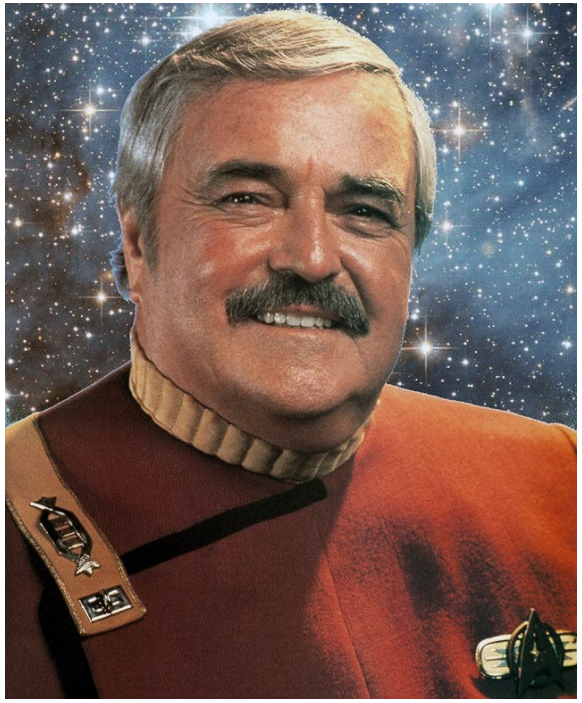
- Engineers are given **tasks and objectives**, not step by step instructions



  - You **will** run into problems
    - Great!
      You're here to **learn to solve problems**!
  - **Try** to solve the problems yourselves, especially programming problems
    - Discuss within the group
    - Search the web for information
    - Try to find workarounds
    - Practice your independent problem-solving skills!

Project: Assistance

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- But don't bang your head against the wall for **too** long…

- "No engineer is an island", so **eventually**:
  - Ask the other groups
  - Ask the assistant

"I've spent 30 hours on this single problem! The course is terrible!"

- Ask the right way!
  - Show clearly **what** the problem is, **how** you have tried to solve it, and **why** the solutions did not work!

Project: Activity

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- Until you get help, ***continue working on other parts***
  - (Keep trying to solve the problem)
  - Look at *another* exercise or milestone
  - Clean up your code
  - Write technical documentation
  - …

Assistants have other projects, courses, scheduled events
Assistants do not work 24 hours a day
Expect help *eventually*, but do something productive meanwhile

Project: Groups

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- This is a **group project** – everyone is expected to:
  - Work **together** and **discuss**
    - Can sometimes work on separate parts / separate computers, but you still need to be a **team** tackling the project **together**
    - By default, do this at **scheduled lab times** (exception: if the whole group agrees to meet some other time)
    - Absence from group sessions should be rare
  - Find times to **work outside the schedule**
    - Remember, 5h / week of additional work
    - Could partly work separately, if it's hard to find common times
  - **Understand** all of the code
    - If you write a piece of code separately: **Discuss and explain to the group**
    - If there's code you haven't written: **Make sure you understand it**

Specific Problems

Potential Problems

- **Group members are not showing up / work in isolation**!
  - This should be reflected in the progress report
  - If it isn't:
    - 1. Discuss with your assistant
    - 2. Discuss with cyrille.berger@liu.se, who is responsible for the CTF project
    - 3. If all else fails, discuss with me, jonas.kvarnstrom@liu.se
  - **This is not "disloyal"**
    - You are not saying "they aren't doing what they should, they should be punished"
    - You are saying "our group is having some trouble, please help"

Potential Problems 2

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- **There's too much to do**!
  - Do you have the prerequisites,
    and have you worked 15 hours per week? That's a lot of time…
  - No ➔
    - Too bad. Studying takes time!
  - Yes, but I can't keep up with the exercises/milestones ➔
    - Discuss the workload with your assistant
    - There could be exceptional circumstances

Potential Problems 3

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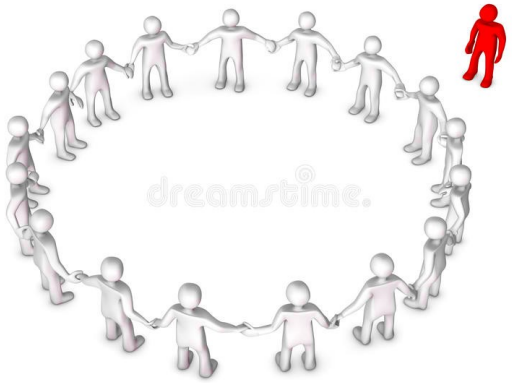
- **Others are writing all the code**!
  - Everyone should be involved in everything
  - Even if you're inexperienced, **demand** the right to write code
  - We are here to *learn*!



If you are more experienced:
Do not *provide full solutions* to others
Feel free to give *hints*,
but leave *them* at the keyboard

You can add unexpected features
to show what you can do,
but let them work on the core solution

This is your way of providing value
to the overall project!

Potential Problems 4

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- **Others are not doing anything**!
  - The inverse of the previous problem
  - Talk to us *sufficiently early*,
    so we can verify what is happening
  - Occasionally we need to assign particular tasks
    to individual group members (or even split a group),
    so individuals can continue at their own speed

Potential Problems 5

- There are **bugs** in the provided software
  - These things will happen – also in industry
  - Report such problems **early**
  - We'll take this into account
    - Fix, provide workarounds, modify assignments, adjust expected results, …

- Instructions are unclear
  - **Ask**, don't assume

- Talking to the assistant did not help / there are delays / …
  - 1. Discuss with cyrille.berger@liu.se, who is responsible for the CTF project
  - 2. If all else fails, discuss with me, jonas.kvarnstrom@liu.se

Potential Problems that WE see

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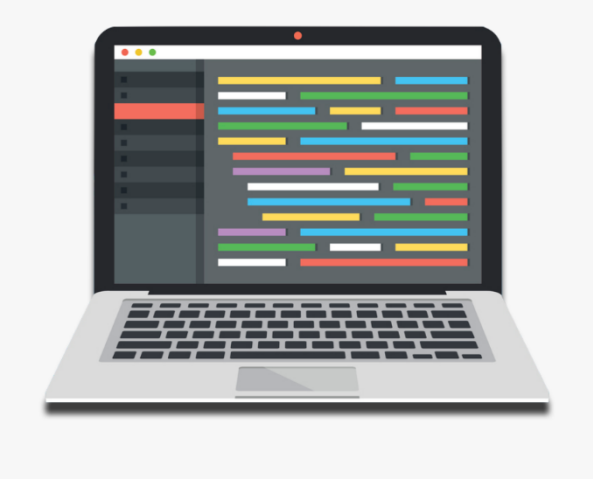
- Too eager to write code, not enough time spent reading
  - Asking about what is very clearly explained in the instructions
  - Going in the wrong direction,
    having to re-do the code and the design



Project: Final Demonstration

Project: Final Demonstration

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- Last week, a **final demonstration session**
  - Show the final result to your project assistant
  - Typically 5-10 minutes
  - Must be well prepared

Entire group present

No valid reason for personal absence?

Re-exam period in March, then August

Project: Final Presentation

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- Near the end: Final **presentations**!
  - **Not part of this course**
  - Engineering Professionalism uses the TDDE25 project as a basis

Project: Deadlines

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- **Final deadline:**
  - Hand in the final results by 2023-01-08 (we'll provide instructions)
  - Feel free to hand it in before Christmas if you prefer!

- Deadlines are hard!
  - "Round off" your project in time
  - Don't risk being too late

Project: Grading

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- Possible outcomes:
  - Project approved in its entirety
  - Additional work needed
  - Additional work needed for *some* project members

Project: After the End

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- The course **ends in December/January!**
  - After this, there is **no lab assistance**

- Standard rules for projects and labs:
  - **Finish** during the course,
    or **re-take** the course next year

- We're a bit more **lenient**:
  - Can hand in during the **March** or **August** re-exam period
  - After that, **it depends** on whether we still have assistants
    who can grade a new hand-in of an old project
    without excessive additional work

Questions?

Note:
Cyrille will present more
about Capture the Flag
(game concepts, requirements…)