ITP2200
Introduction to Software Testing

Bogdan Marculescu

A note on exams and teams

Teams announced:

- Contact team members

- Establish processes: when do we meet, how do we decide things, how do we establish deadlines, announce delays, what happens if deadlines slip

- Team changes have to be approved
  - By the team
  - By myself

Høyskolen Kristiania

A note on exams and teams

Be patient - communication online may be harder, take more time, everyone has to deal with this crisis

Keep deadlines – try to keep deadlines, let you team know if you will be delayed

Ask for help when needed – you're a team, I will help when required

Make plans, and be ready to change them.

CODE!

Høyskolen Kristiania

Høyskolen Kristiania

Lecture 11
Testing non-functional properties

Introducing non-functional testing

We’ve looked at behaviour

- Unit testing – correctness of individual unit behaviour
- Integration testing – that all components interact correctly
- Regression testing – system still behaves correctly after changes

But two systems with similar behaviour don’t necessarily have the same quality.

Example: racing and mountain bikes. Both bikes, but quite different.

Høyskolen Kristiania

Introducing non-functional testing

Non-functional testing

- Testing the system under test (SUT), from the perspective of performance rather than functionality.
- Assessing the way a system operates, rather then the behaviour it exhibits.
- Connected to a wide set of non-functional requirements, both explicit and implicit

Høyskolen Kristiania

Non-functional Testing

Security:

- Can the appropriate users get access to the needed functionality?
- Can unauthorized users be prevented from having access?
- What data is accessible?
- Can the system be rendered unusable by some malicious input (for example, sql injections, denial of service attacks)?

Høyskolen Kristiania

Non-functional Testing

Scalability, stress, performance

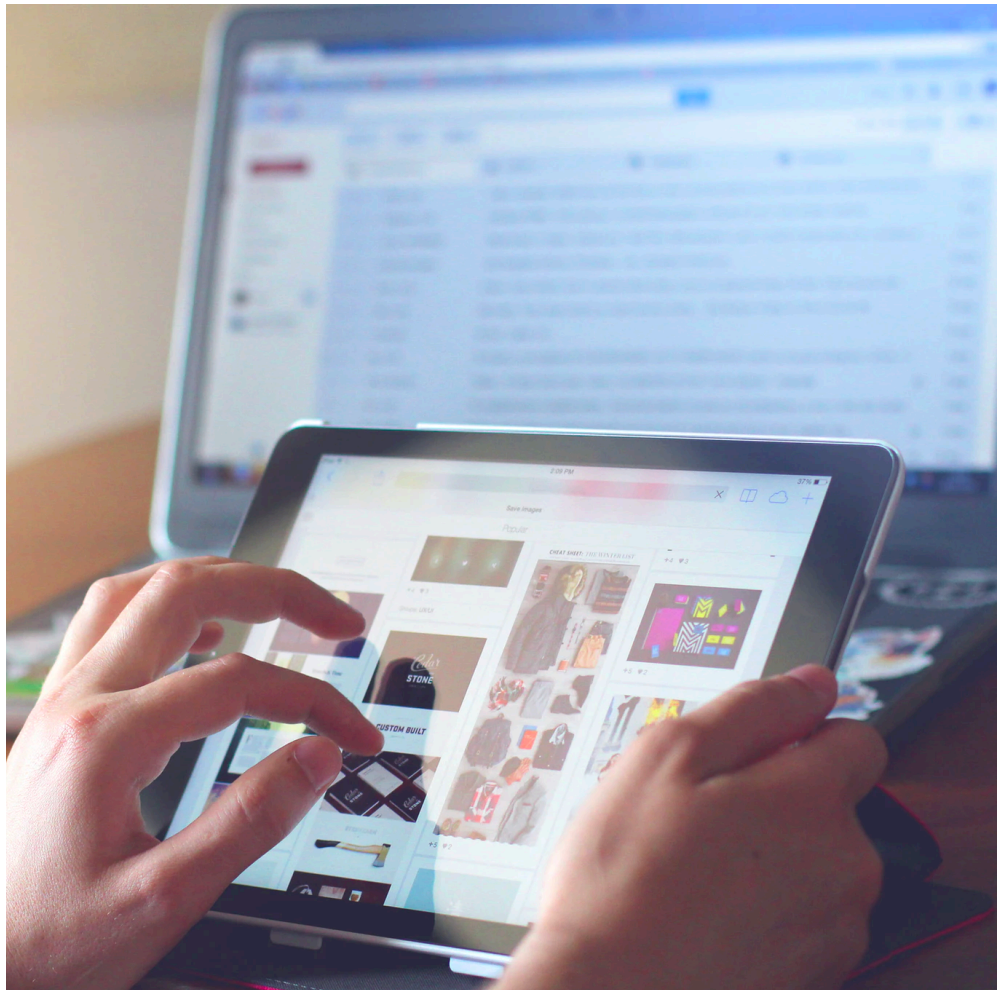
- Performance - Time needed for a method to execute. Execution times, loading times, consumption of resources (battery, memory, processing power).

- Scalability – how does the system cope with an increase in users

- Stress – how does the system cope with extended use

Høyskolen Kristiania

Non-functional Testing



Usability:

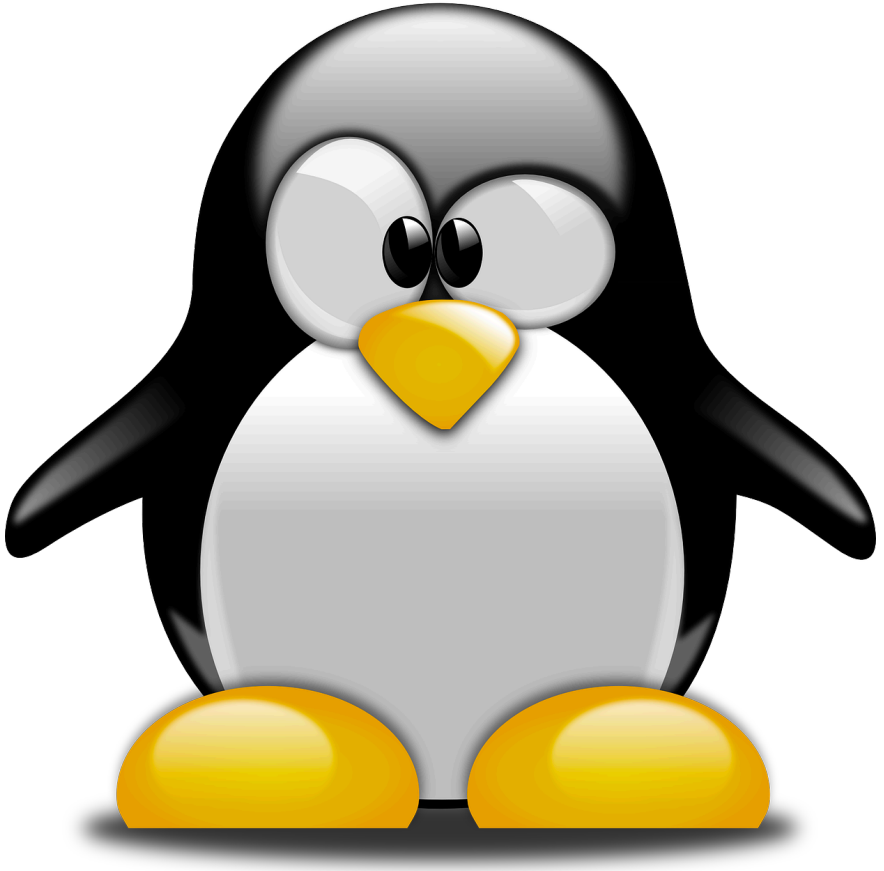
- Can the intended user use the system?
- Does the user find the system intuitive? Can the user employ all the functionality?
- Is the output presented in a way the user finds intuitive, familiar, appropriate for their purpose?

Høyskolen Kristiania

So, how do we test for all of that?

Let’s discuss methods for:

- Security Testing
- Scalability, Stress Testing
- Performance Testing
- Usability Testing



Høyskolen Kristiania

Security Testing

Security:

- Mostly using human oracles, and a deep knowledge of the system
- Use cases can help clarify security requirements and help define boundaries
- Graphs can be used to define access and inform test design

- The problem is often observability – not easy to identify a security breach has taken place

Høyskolen Kristiania

Performance, Scalability, Stress Testing

Performance:

- Automated time measurements
- But may suffer problems (probes to measure performance may affect performance).
- Observability can also be an issue (especially on thread handling)

- Small drops in performance may have a major impact on scalability and stress testing.

Høyskolen Kristiania

Performance, Scalability, Stress Testing

Scalability:

- Testing the SUT with a high number of users/transaction, large amounts of data, etc.
- Usually necessary for online systems

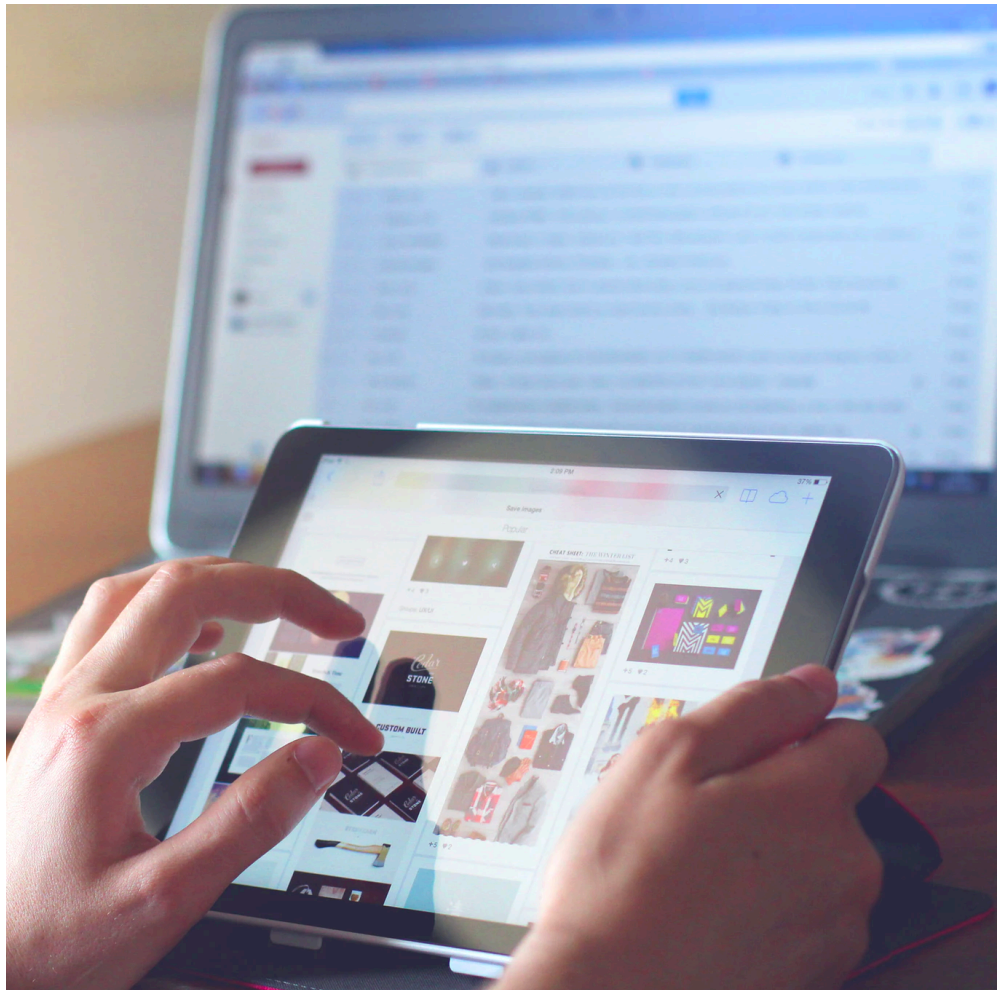
Stress testing:

- Long term running of a system

- Observability and resource availability could be issues
- Often dependent on automated test cases

Høyskolen Kristiania

Usability Testing



Usability:

- Often relies on human oracles
- Tests can be run with some of the intended users: alpha and beta tests.

- Difficult to arrange, resource intensive, and often yielding hard to interpret or replicate results
- Dependent on how problem reporting is handled.

Høyskolen Kristiania

Will this be on the exam?

Not unless you really want it to be.

Notice: all these concepts refer to more complex systems, with a high number of users, or with security concerns and responsibilities

These are closer to you than you think, but not as close as the exam.

Høyskolen Kristiania

Høyskolen Kristiania

Questions so far?