Internet of Things (IOT) - Exam Info

This document is an orientation of the exam in the subject Internet of Things (IOT) taking place in January 2019.

Time, place, mode, contents and special rules for the examination are specified in the document.

The target group of the document is comprised of students, examiners and external examiners.

December 2018
Bent H. Pedersen

Mode of Exam

The final project in this course will summarize alle the topics of the course and require you to combine what you have learned into a working prototype of an IoT system.

Requirements

System

The thing/device must have at least one sensor or actuator that physically interacts with the real world.

The thing must be connected to and communicate with other devices over the internet

The thing must contain code in an appropriate language for the task

Appropriate cloud solutions must be utilized for communication

There must be a human interface that interacts with a human. As a minimum, there must be some form of data presentation to the user on another device than the thing(s).

The system must be a working prototype, meaning that it does not need to be production ready nor thoroughly tested.

Non-system requirements

The implementation and documentation must show that different technologies have been carefully considered, documented and chosen.

You will have to present this at the exam. You do not have to write a report.

Exam

The exam consists of three parts

1. The final project charter (handed in before the exam)

You have to update your project charter to reflect the final project state.

This must be finished and saved on Moodle by the date described under Hand-in

The project chart must contain the elements described on Moodle.

2. 10-minute group project presentation

Here you show the physical product you created and how it works. You must demonstrate the you have a working prototype.

You should focus on demonstrating functionality. 10 minutes is maximum time, you are free to use less time.

3. 15-minute individual exam

You will have to orally present your documentation during the examination. Your presentation should contain multiple of the following:

- Physical design considerations
- Arguments for the
    - Technologies chosen
    - Architecture chosen
    - Programming language chosen
    - Hardware chosen
    - Usage of libraries
    - Other relevant topics...

Maybe finish with an outline of future work and enhancemants.

You should aim for 7-8 minutes of presentation. Expect that teachers ask questions throughout your presentation.

Hand-in

You only need to update your project charter before the exam. **At latest at Friday the 11th of January**

- Project charter (an updated version of the one handed in on Moodle)
- Good graphical overview of the architecture (and distributed architecture) of your system

Failed exam

In case a student fails the exam, he or she may join a re-exam. **The student must sign up for the re-exam at the administration office.**

Examination Schedule and Rooms

Please show up well before the stated time – and not later than 30 minutes before.

Monday, 14th of January 2019 – Room C1 (Exam) and C3 (Presentation)

Start	Name
09.00	**Group - Anonymous**
09.10	Emil Dall
09.25	Esben Munk Laursen
09.40	Patrick H. Laursen
09.55	**Group - Home security**
10.05	Bence Szilveszter Hajdu
10.20	Kristof Horvath
10.35	Mareks A. Kalejs
10.50	**Group - JANKEN ROBO**
11.00	Morten Greis Hansen
11.15	Kristian Jakobsen Iversen
Lunch	
12.00	**Group - Intelligent Bike!**
12.10	Rafael Garcia Cuellar
12.25	Aleksandr Daskevic
12.40	Miguel Angel Herranz Marcos
12.55	**Group - Mission impossible login system 3.0**
13.05	Nicolai Mensel Jørgensen
13.20	Stefan Thomsen
13.35	**Group - Single4Ever**
13.35	Simon Gharib

Tuesday, 15th of January 2019 – Room C1 (Exam) and C3 (Presentation)

Start	Name
09.00	**Group - Poki IOT**
09.10	Alex Andreasen
09.25	Dennis Dueholm
09.40	Ronni Hartung
09.55	**Group - Republic of IOT**
10.05	Anders Richter Gadeberg
10.20	Rasmus Møhring Madsen
10.35	Mahnaz Mirzabagherian
10.50	**Group - Sound Clearer**
11.00	Martin Gustavsen
11.15	Simon Bay Nymand
Lunch	
12.00	**Team Mac**
12.10	Mads Dürr-Vium
12.25	Rayan El Hajj
12.40	**Team Awesome**
12.50	Tim Knudsen
13.05	Niels Hviid Lund
13.20	Morten Jull Petersen

Absence due to sickness

If you are sick at the day of the exam and therefore are unable to take an examination you have to inform the academy at once on telephone **76 13 32 00**.

By sickness you have to send a medical statement not later than 48 hours after the day of exam, subsequently you will be admitted a new exam later.

Curriculum

Internet of Things in Context

https://www.postscapes.com/internet-of-things-technologies/

https://www2.deloitte.com/insights/us/en/focus/internet-of-things/iot-primer-iot-technologies-applications.html

Linux / Raspberry Pi / Electronics

https://www.tldp.org/LDP/intro-linux/html/sect_03_01.html

https://www.raspberrypi.org/documentation/remote-access/vnc/README.md

https://www.raspberrypi.org/documentation/remote-access/ssh/README.md

https://learn.sparkfun.com/tutorials/raspberry-gpio

RPi-GPIO documentation

https://electronicsclub.info/

https://www.instructables.com/id/Basic-Electronics/

Python / IDE

http://www.spronck.net/pythonbook/pythonbook.pdf

https://youtu.be/RlgLIr2gZFg

https://wiki.python.org/moin/TkInter

Cloud networking

http://mqtt.org/

https://www.youtube.com/watch?v=6x-ijyG-ack

https://github.com/diegohaz/rest

https://ifttt.com/

NodeJS

ExpressJS

MongoDB

Mongoose

Graphs-pi-frontend example

Graphs-pi-backend example

Appendix 1

Course learning objectives

Internet of Things
Timing: 1st year of study
Scope: 10 ECTS
Content: The purpose of this course is to train the student to be able to develop IoT devices and integrate them with richer clients using current cloud technologies and asynchronous communication. The student will be able to setup and program basic IoT devices. Doing integration with servers for data collection and presenting the data using current web technologies.
Learning objectives: *Knowledge* The student must have knowledge of: • Common IoT device hardware and software technologies • Common network protocols for IoT device infrastructure • Options/languages for programming IoT devices • IoT device operating systems • Basic electronics for IoT devices • Sensors and actuators • Relevant cloud-based communication technology for integration of IoT devices and web systems *Skills* The student can: • Develop programs for publishing data from IoT devices to the cloud • Develop IoT devices for collecting data from the surroundings • Develop IoT devices that is able to manipulate the surroundings • Enable IoT devices to react on requests from the web • Implement current IoT network communication • Implement data-visualization of data collected from IoT devices *Competencies* The student can: • Analyze requirements of a specific IoT project • Choose suitable network technologies for implementation of IoT in a specific project context • Choose a suitable setup and programming language for implementation of IoT in a specific project context
The examination: Internal oral exam based on final project.

Assessment:
7-point scale

Prerequisites for the exam, including compulsory participation

The following requirements apply:

There are study activity requirements that must be met in order to be qualified to do the exam. These requirements are described in the course description. Failure to meet these requirements without a valid reason (e.g. illness, maternity leave or exceptional circumstances) is considered to indicate a lack of study activity and can lead to suspension of any state education grant or termination of enrolment. Decisions on the consequences of lack of participation are made by the student counsellor in consultation with the head of department after meeting with the student in question, and will be based on an individual assessment.