Project info

Advanced Computer Science Studies in Sweden
Introduction to Studies in Embedded Systems
HT 2019

Pontus Ekberg

Important dates

Proposal deadline:	Wednesday 9/10, at 17:00	(Student portal)
	Feedback on Thursday 10/10	(Student portal)
Meeting with TAs:	Wednesday 16/10	(by appointment)
	Monday 21/10	(by appointment)
Drop-in help:	Friday 18/10, from 13:15 in ITC 1515	
Writing workshops:	Wednesday 23/10, at 10:15 - 12:00 in ITC 1245	(slot 1)
	Wednesday 23/10, at 15:15 - 17:00 in ITC 1245	(slot 2)
	Thursday 24/10, at 10:15 - 12:00 in ITC 1146	(slot 3)
Presentations:	Monday 28/10, at 13:15 - 17:00 in ITC 1311	(slot 1)
	Tuesday 29/10, at 8:15 - 12:00 in ITC 1311	(slot 2)
	Friday 1/11, at 8:15 - 12:00 in ITC 1311	(slot 3)
Report deadline:	Friday 1/11, at 17:00	(Student portal)

Project proposal

Hand in a *one page PDF* describing the outlines of your project, including:

- *What* you want to do.
  → Why is this interesting?
  → What are the identifiable subgoals?

- *How* you plan on doing it.
  → What tools/language/software will you use?
  → Are there any potential obstacles?

- *When* (roughly) you plan on doing it.
  → A rough time plan for the subgoals.
  → Don't forget time for writing report and preparing presentation!

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Upload your proposal on the Student Portal by Wednesday, at 17:00.

Project proposal feedback

Green light: Get started!

Yellow light: Some suggestions before you get started.

Red light: Seems infeasible, much too simple or just irrelevant.

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Hopefully all done by Thursday!

(Check Student Portal)

If you want to get started earlier, send me an email after uploading your proposal and I will try to find the time to look at it before Thursday.

Meetings with TAs

- Your group will have meet with Chencheng and Gaoyang to discuss your progress and potential issues.
- 20 minute time slots available on 16/10 and 21/10.
- You will have to book a time. Doodle(?) to be sent out. *Check email.*
- Come prepared to this meeting to say (briefly):

  $\longrightarrow$ What you have achieved so far
  $\longrightarrow$ What will you do next, and the plan after that
  $\longrightarrow$ What (if anything) you are struggling with

- If you are unable to attend, you have to inform them and send a status report via email instead, *latest 21/10*.

Drop-in slot in lab room (optional)

- On Friday 18/10 we will be in the lab room 1515 from 13:15 (and latest until 17:00) to try to help out with issues that you may have.
- We will leave when there are no more groups who require help.
- It is best to be there from the start if you want to be sure to catch us.

Academic writing work-shop (optional)

- Sarah Schwarz, who held the lecture on *Academic writing in English* will host three work-shops where you can go and work on your reports, and get suggestions on writing.
- Maximum 30 students / 10 groups per slot.
- Sign-up to a slot! First come first served.
- Doodle (or similar) to be sent out.
- If you have any questions, ask Kristina.

Oral presentations

- Each group will give a final presentation of the finished project
- 10 minutes presentation per group. ***Strict!***
  $\longrightarrow$ 15 minutes including questions and switching of computers
- All group members ***equally active*** in presentation.
- Use slides. There is not enough time for the black board.
- Three time slots: Monsday 28/10, at 13:15 - 17:00 in ITC 1311
  Tuesday 29/10, at 8:15 - 12:00 in ITC 1311
  Friday 1/11, at 8:15 - 12:00 in ITC 1311
- We will make a presentation schedule later. ***You have to attend the whole slot that contains your presentation***, but not the others.
- You will write and receive feedback on the presentations.

Written report

- Each group has to hand in a written report.
- Should contain descriptions of *what* you have done, *how* you have done it, and what you have *learnt*.
- Very roughly five pages of *text*. Use figures, listings etc. when useful.
- Use LaTeX template.
- Aim for a “classic” layout. Abstract, introduction, etc.
- Use *proper references* when needed.
- Use a spell checker and check grammar!
- **Deadline:** Friday, 1/11, at 17:00 (upload to Student Portal)

You don't have to use C!

For programming aspects of the project, you are free to use the language of your choice.

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Access to all Sense HAT features is most easily done in Python, but there may also be bindings for other languages.

- Designed to be simple, easy to use and readable.
  → Enforces proper indentation, uses keywords such as `and` instead of `&&` etc.

- Interpreted: programs are not compiled to machine code, but executed by the Python interpreter.
  → Already installed on your Raspberry Pi's

- Object-oriented, but your programs don't have to be.

- Dynamic typing.

- Sense HAT API: https://pythonhosted.org/sense-hat/api/

- Sense HAT emulator: https://trinket.io/sense-hat

RTIMULib

- The Python API uses a C++ library called RTIMULib for accessing the *Inertial Measurement Unit* (IMU)
  → Consists of accelerometer, gyroscope and magnetometer

- Read more about the IMU on raspberrypi.org

- If you want to use it from C++, download it from GitHub and check, for example, the demo in the following directory of the downloaded repo: **RTIMULib-master/Linux/RTIMULibDrive11/**

- The sensors have to be *calibrated* before use, otherwise the readings will be unusable. Follow instructions on raspberrypi.org

Example project idea #1

“Weather station”

- Show temperature, humidity, pressure from sensors on LED matrix.
- Controllable using joystick.
- Runs a web server on RPi where you can see graphs of previous sensor data?
- Can fetch predictions from external web service and display (in limited form) on LED matrix?

Example project idea #2

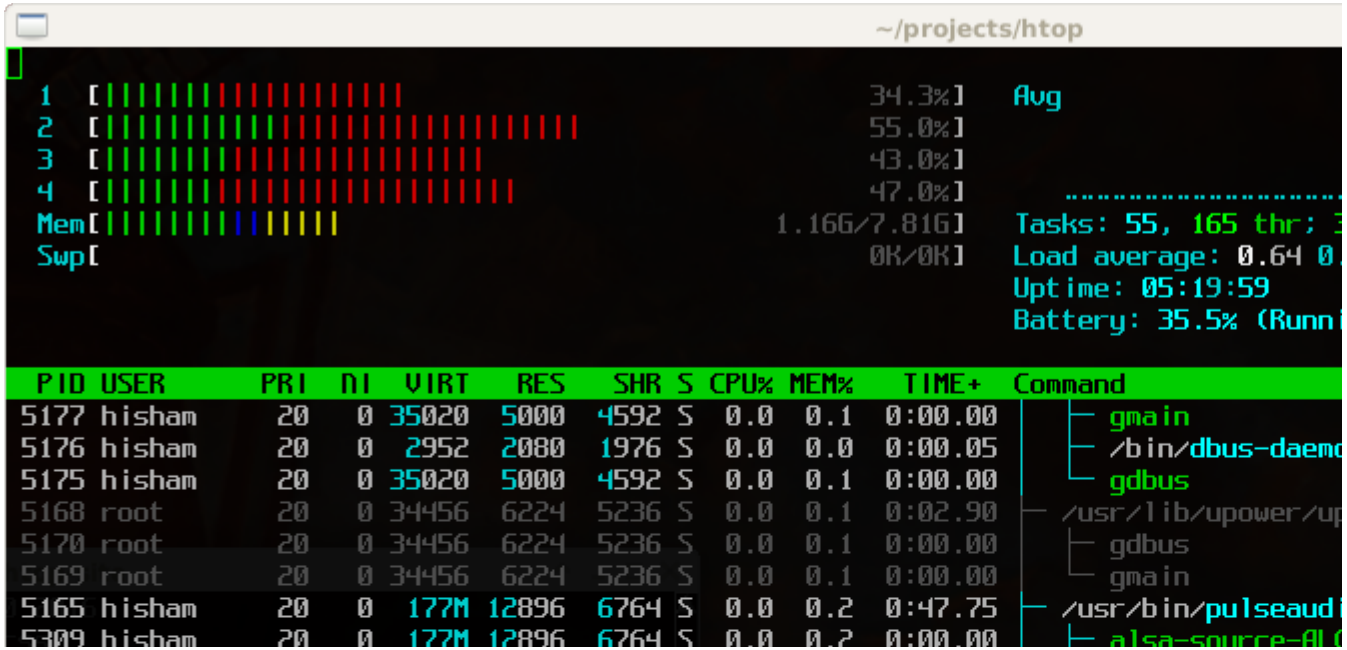
“Game collection”

- Mini games playable on RPi using joystick and LED matrix.
- Networked multiplayer?
- Use IMU sensors for interesting controls?
- With sound?

Example project idea #3

“LED matrix htop”

- Extract and display CPU usage, memory usage etc. on LED matrix
- Controllable with joystick.
- History plotted on web server?



Example project idea #4

"Your very own thing"

Presentation tip #1

The audience is everyone else in the room.
Your fellow students as much as the teachers.

Presentation tip #2

Don't just read from the slides. If that is all there is to a presentation, the audience might just as well just read it on their own. It is pretty boring to listen to such a presentation actually. Especially if the presenter turns their back to the audience. The slides are not the presentation, they are only a visual aid.

Presentation tip #3

If several people are presenting, look at the person currently talking.

Presentation tip #4

- Lorem ipsum dolor sit amet, consectetur adipiscing elit.
- Fusce a libero luctus, pretium orci eu, viverra ipsum.
- Mauris eget quam sed elit molestie tincidunt.
- Etiam molestie elit sed turpis interdum, ac tempor odio rhoncus.
- Fusce a lorem porttitor, vulputate arcu nec, cursus est.

Cras ut tellus non mauris viverra rutrum quis at sapien. Sed vitae nunc quis elit maximus bibendum eget eget tellus. Suspendisse viverra erat at ex sodales, accumsan efficitur nisi iaculis. Aliquam ut ante et metus bibendum accumsan. Nam eros eros, vestibulum ut sem sed, pretium bibendum lorem. Cras aliquam, sapien et auctor vestibulum, tellus magna semper ex, a commodo orci tellus non odio. Maecenas tempus efficitur enim eget posuere. Nullam egestas dictum ullamcorper. Phasellus et purus ut enim iaculis maximus quis eu nisl. Cras augue sem, porttitor eget convallis ultrices, auctor nec leo. Ut convallis eleifend sapien, non bibendum metus elementum sed. Sed eleifend purus felis, a facilisis sem pharetra eget. Donec pellentesque elit sed urna ultrices maximus. Phasellus sagittis felis id erat aliquam convallis. Praesent euismod odio at lorem pellentesque interdum.

- Curabitur dapibus massa eget enim tincidunt, ut eleifend neque eleifend.
- Mauris vitae est ac augue convallis accumsan in consequat ligula.
- Pellentesque eget magna eget nunc mollis lacinia vitae gravida metus.
- Mauris dapibus urna vitae nisl molestie, nec venenatis risus bibendum.
- Proin placerat felis vel dolor consequat, at laoreet ipsum bibendum. Ut sagittis nisl sed mi ultricies, eget interdum nulla venenatis. Ut laoreet enim sit amet dapibus hendrerit.

- Sed id sem condimentum, lacinia nisl a, cursus libero.
- Nunc eget est eget nisi sollicitudin viverra quis vitae erat.

(Avoid the wall of text)

Presentation tip #5

Talk *to* the the audience, not *at* the audience.

Presentation tip #6