

Project info

**Advanced Computer Science Studies in Sweden
Introduction to Studies in Embedded Systems
HT 2018**

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Important dates

Information: Monday 1/10, at 13:15 - 15:00 in ITC 1211

Proposal deadline: Tuesday 2/10, at 23:59 (Student Portal)

Proposal feedback: Wednesday 3/10 (Student Portal)

Meeting with TAs: Tuesday 9/10 (by appointment)

Drop-in slot (optional): Friday 12/10, from 13:15 in ITC 1549

Meeting with TAs: Monday 15/10 (by appointment)

Presentations: Wednesday 24/10, at 8:15 - 12:00 in ITC 1111
Thursday 25/10, at 13:15 - 17:00 in ITC 1111
(Friday 26/10, at 13:15 - 17:00 in ITC 1111)

Report deadline: Friday 2/11, at 17:00

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 Tuesday.

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 Wednesday!

(Check Student Portal and/or mail.)

Meetings with TAs

- Your group will have *two* meetings with Marina and Gaoyang of 15 minutes per meeting.
- Tuesday 9/10 and Monday 15/10
- You will have to book a time. Doodle(?) to be sent out. *Check email.*
- Come prepared to these meetings to say (briefly):
 - What you have achieved so far
 - What will you do next
 - What (if anything) are you struggling with
- If you are unable to attend, you have to inform them and send a status report via email instead.

Drop-in slot in lab room (optional)

- On Friday 12/10 we will be in the lab room 1549 from 13:15 (and latest to 17:00) to help out with issues that you may be having.
- 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.

Oral presentations

- Each group will give a final presentation of the finished project
- 15 minutes per group.
- All group members equally active in presentation. Use slides.
- Two main time slots: Wednesday, 24/10, at 8:15 – 12:00
 Thursday, 25/10, at 13:15 – 17:00
- We will make a presentation schedule later. *You have to attend the whole slot that contains your own presentation.*
- Reserve slot: Friday, 26/10, at 13:15 - 17:00
- 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.
- Use a spell checker and check grammar!
- **Deadline:** Friday, 2/11, at 17:00 (upload to Student Portal)
- It is *highly recommended* to hand in the week before.

You don't have to use C!

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

Access to Sense HAT sensors is most easily done in **Python**, but there are also bindings for **C++**.



- 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/>

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](https://github.com/BMI068) 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”

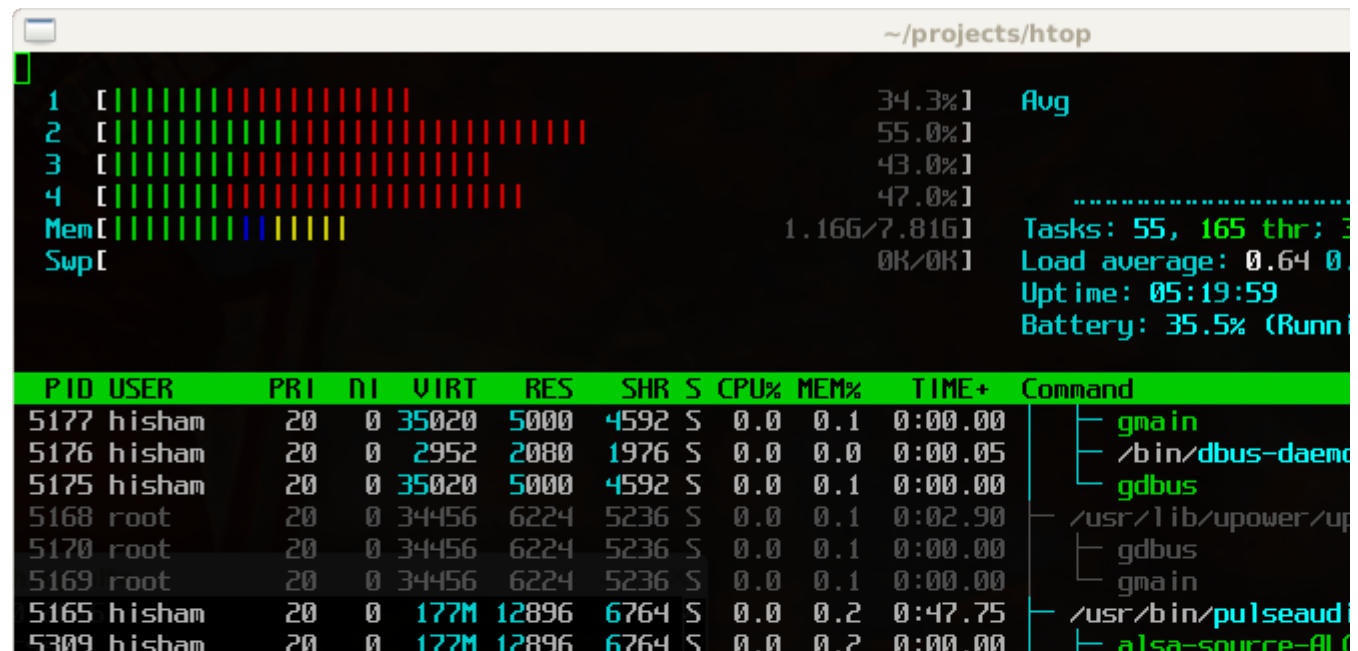
- Mini games playable on RPi using joystick and LED matrix.
- Networked multiplayer?
- Use IMU sensors for interesting controls?
- With sound?



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?



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



**KEEP
CALM
AND
DON'T
PANIC**