# ENERGY EFFICIENT PROGRAMMING

MOTIVATION OF THE PROJECT

The motivation of this project is to increase the battery life cycle by improving the way of how programs are created. Knowing that each CPU cycle drains the battery in a small amount, so the less CPU cycles used for a given task, the longer the battery lasts.

AIM OF THE PROJECT

The thesis will attempt to explore the ideas of understanding energy consumption on android phones by individual applications. Two principal ideas to be analysed:
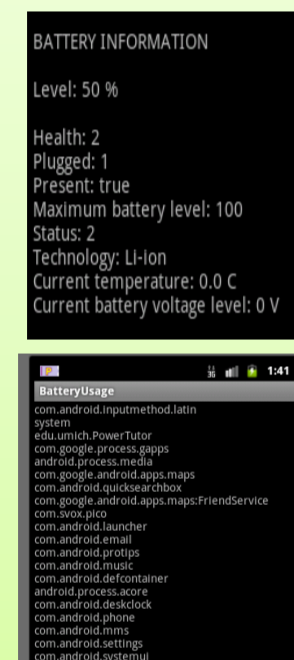
- Determinate how precise is the API for android battery in comparison with physical measure.

- Determinate what makes an algorithm efficient in the aspect of battery consumption.

RELATED WORK

The following papers are going to be analyse in order to make a comparison with this dissertation.

• Lafond and Lilius (2004) provided experiments related to the implementation of different algorithm using java version machine to measure battery consumption.

• Carroll and Heiser (2010) developed a power model for Smartphone and analysed the energy usage and battery lifetime under a number of usage patterns.

RESEARCH METHOD

CASE STUDY 1

1. Create an application for android to measure the battery consumption of the system and illustrate the battery state including percentage level and voltage level.

2. Compare the result of the application with the measure of the battery given by a digital multi-meter.

CASE STUDY 2

1. Developing the previous battery consumption application by adding the capability of measure battery usage by individual program.

1. Create three applications with the same aim but using different algorithm structure. Each algorithm will represent different level of complexity: low, medium and high.

2. Compare the battery usage for each application and analyse if the complexity of the structure of the algorithm affect the performance of the battery.
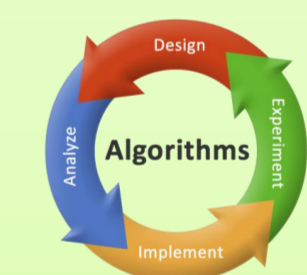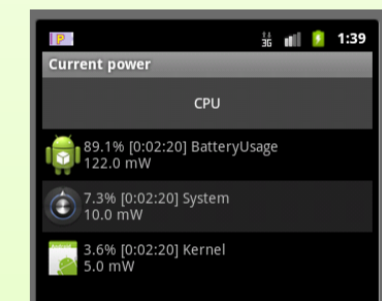
LIMITATIONS

• The major problem is to get accurate measurements of power consumption with the application and the physical tester.

• Determinate which part of the algorithm structure increase the battery consumption.

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References
•Carroll, A. & Heiser, G., 2010. *An Analysis of Power Consumption in a Smartphone.* Boston, USENIX.
•Lafond, S. & Lilius, J., 2004. *An Energy Consumption Model for Java Virtual Machine,* Turku: Turku Centre for Computer Science.