

MSc Theses Proposals by Paulo Ferreira



Learn by doing !

- Professor at UiO – office in room 10460
 - <https://www.mn.uio.no/ifi/english/people/aca/paulofe/index.html>
- MSc theses will be done at UiO / PT (10th floor)
- Do you have your own suggestions? Let's talk !
- More information:
 - come to room 10460 and we have a chat
 - send me an email: paulofe@ifi.uio.no
 - Zoom link: <https://uio.zoom.us/j/8253296061>
 - contact me via Skype, Viber, WhatsApp, etc...
- Requirements:
 - good tracking record (grades, courses), enthusiasm, and commitment.
- MSc themes:
 - Fog and Cloud Computing
 - Java Virtual Machine/Android
 - Ubiquitous/Mobile Systems
 - Distributed Systems

edgeTrans – Visual Simulation of Cloud, Cloudlets, and Sensors

- **Background:**

- An existing simulator for encounter based mobile apps is available (<https://rodrigo-bruno.github.io/mentoring/81914-fernando-moreira-dissertacao.pdf>)
- This emulator does not support several options related to fog computing (e.g., cloud data centers, sensors, openstreetmap, etc.)
- Thus, the emulator must be changed accordingly

- **Goal:**

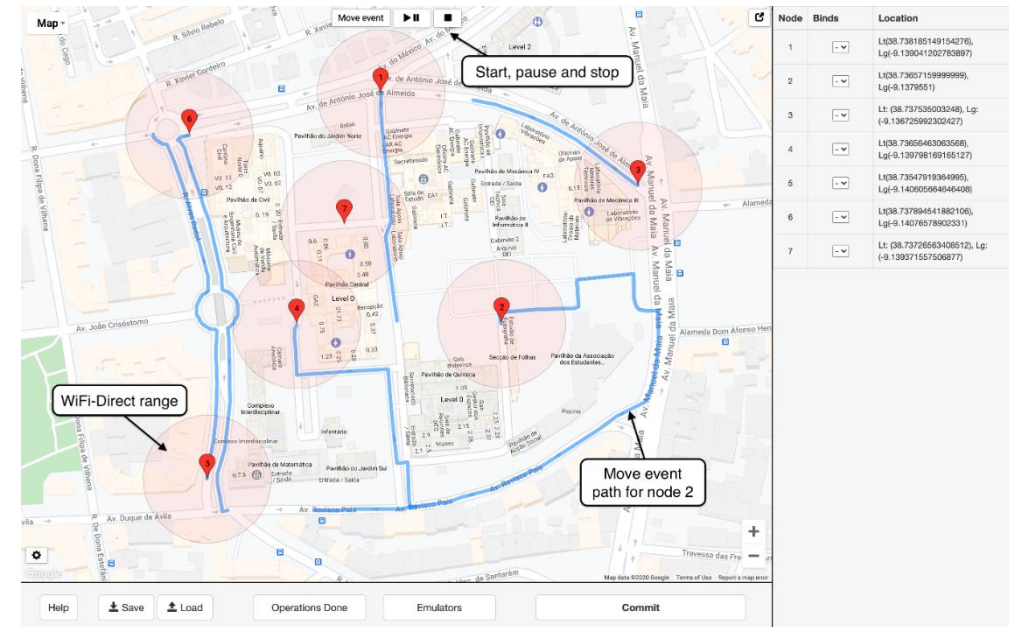
- Create/install the emulators for other devices
- Start with Raspberry PI and move on to a cloud data center based on Linux

- **Requirements:**

- The candidate must enjoy and have adequate skills to deal with several programming languages, and mobile system issues implementation
- The candidate should be able to program in Java
- Also relevant is a good tracking record (grades, classes done), enthusiasm, and commitment

- **Supervisors:**

- Paulo Ferreira and Lyla Vijouyeh



mapDetect –Automatic Detection of the Transport Mode with a Map

- **Background:**

- Automatic detection of a transport mode is usually done with a ML algorithm
- A new version of Woorti (<https://www.woorti.com/>), called FogTMDetector, is a local transport mode detector, i.e., it runs only on the smartphone not requiring network connection, and uses a classifier based on the Random-Forest (https://www.youtube.com/watch?v=o2E1md1t69U&ab_channel=TheMoTiVProject)
- However, sometimes Woorti/FogTMDetector, is not capable of making a correct detection of the transport mode

- **Goal:**

- Improve the current Woorti/FogTMDetector, solution, with a map
- E.g., based on the lines used by public transports, better identify the transport mode being used
- The information must be minimized so that the any smartphone can use it and it does not occupy much memory

- **Requirements:**

- The candidate should be able to program in Java
- The candidate must enjoy and have adequate skills to deal in Java, Android and mobile issues implementation
- Also relevant is a good tracking record (grades, classes done), enthusiasm, and commitment

- **Supervisors:**

- Paulo Ferreira



Energy Aware Garbage Collection

- **Background:**

- There is a lack of information regarding how much energy is spent by a GC (Garbage Collector)
- Energy spent by a GC (as in other software) is becoming more important day after day
- This means that sustainability is of great concern being the energy spent a crucial aspect

- **Goal:**

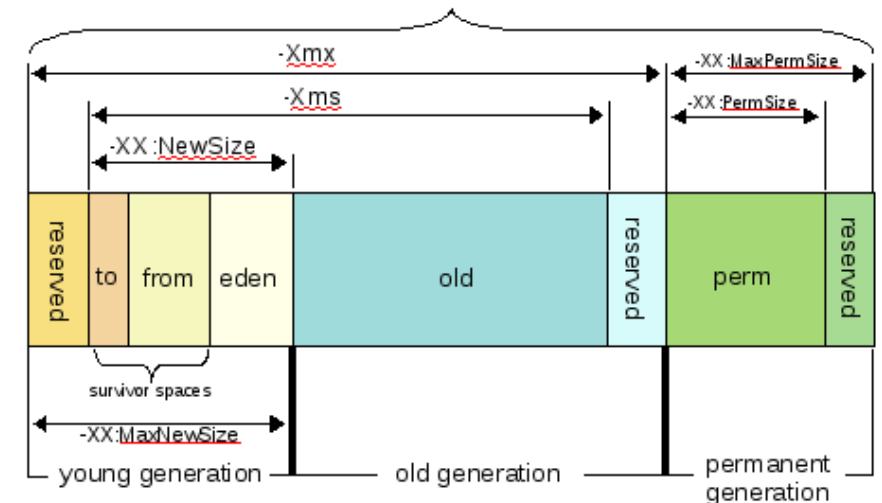
- Perform a related work search of similar energy aware GCs
- Study the behaviour of production GCs energy-wise (Parallel, GC1, Shenandoah, ZGC)
- Propose solutions to make a GC to better use the energy available (e.g., run slowly when there is no urgency, save cores when time is available, etc.)

- **Requirements:**

- The candidate must enjoy and have adequate skills to deal with systems' implementation
- The candidate should be able to program in Java
- Also relevant is a good tracking record (grades, classes done), enthusiasm, and commitment

- **Supervisors:**

- Paulo Ferreira and Eric Jul



GCgraalVM – Garbage Collection for the Graal Virtual Machine

- **Background:**

- Currently, the NG2C Garbage Collector uses the ROLP system (running in the OpenJDK JVM) to detect the age of created objects so that the NG2C allocates such objects close to each other
- Such allocation contributes to improve GC latency while keeping a good throughput

- **Goal:**

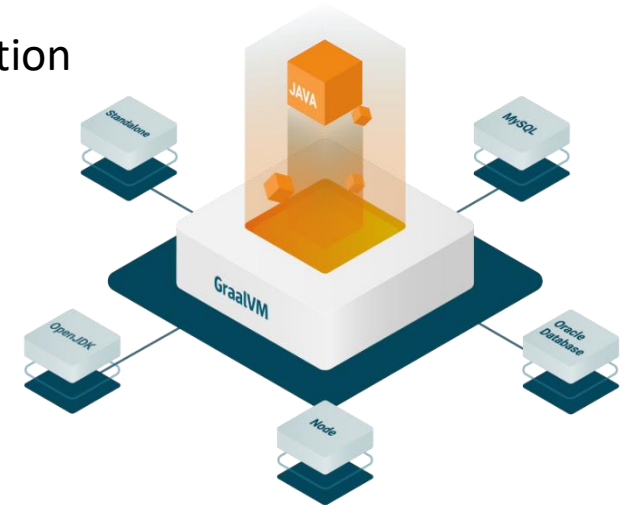
- Develop ROLP for the GraalVM (it is a innovative Virtual Machine that supports several languages - Java, JS, Ruby, etc.)
- The development should be language agnostic

- **Requirements:**

- The candidate must enjoy and have adequate skills to deal with systems' implementation
- The candidate should be able to program in C++ and Java
- Also relevant is a good tracking record (grades, classes done), enthusiasm, and commitment

- **Supervisors:**

- Paulo Ferreira



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- Questions?
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[web page \(these slides\): https://www.mn.uio.no/ifi/english/people/aca/paulofe/index.html](https://www.mn.uio.no/ifi/english/people/aca/paulofe/index.html)

Courses at UiO :

- Fog and Cloud Computing: <https://www.uio.no/studier/emner/matnat/ifi/IN5700/index-eng.html> (IN5700)
- Programming Ubiquitous Things: <https://www.uio.no/studier/emner/matnat/ifi/IN5600/index-eng.html> (IN5600)