ECE 5550G Real-Time Systems

Group Project Specifications

NOTE: this project is only required for students enrolled in ECE 5550G.

1 Project Guidelines

Each project group will consist of 1–2 students. For your project you may propose your own topic. In fact, you are encouraged to work on a topic that is related to your research. Some ideas are provided at the end of this document.

2 Project Deliverables

On Tuesday May 9, 2023: Project deliverables due. Deliverables will need to include **at least**: a project report in PDF format, and if applicable, project source code.

3 Project Ideas

Some of these ideas include materials we have not (yet) covered in class so you may want to read up on the topics that sound interesting to you. Use these ideas at your own risk.

- Implement, test, and compare EDF against RM and DM.
- Implement, test, and compare 2 overload scheduling algorithms in FreeRTOS.
- Implement the non-preemptive versions of RM, and compare it to the preemptive version in terms of real-time performance.
- Implement an energy-aware real-time scheduling algorithm and evaluate its effectiveness. Some starting points:
  - "An experimental evaluation of real-time DVFS scheduling algorithms". S. Saha and B. Ravindran. Proceedings of the 5th Annual International Systems and Storage Conference (SYSTOR '12). 2012. http://dl.acm.org/citation.cfm?id=2367604.
  - "Energy-Aware Scheduling for Real-Time Systems: A Survey. M. Bambagini, M. Marinoni, H. Aydin, and G. Buttazzo". ACM Transactions on Embedded Computing Systems (TECS), Volume 15 Issue 1, February 2016. http://dl.acm.org/citation.cfm?id=2808231.
- A survey on the use of machine learning algorithms in the scheduling and optimization of real-time systems. Note the survey should be comprehensive and well-organized instead of just a list of papers. You may use the following survey paper as a reference point.

  Burns, Alan, and Robert I. Davis. "A survey of research into mixed criticality systems." ACM Computing Surveys (CSUR) 50, no. 6 (2017): 1-37.