Concurrent and Distributed Devices (CDD101)

Dr. Joseph Kehoe

Course Structure

- Concurrency
  - a property of systems where several processes are executing at the same time, and may or may not interact with each other
- Distributed Software
  - a model in which components located on networked computers communicate and coordinate their actions by passing messages. The components interact with each other in order to achieve a common goal.
- Internet of Things
  - the inter-networking of physical devices, vehicles buildings, and ... Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure.

Aims of Module

- **Ability to program**
  - Concurrent and distributed systems
- **Practical understanding of the theory**
  - What are the issues in designing these systems
- **Knowledge of appropriate tools**
  - How and when to choose appropriate toolsets
  - (profilers, debuggers, libraries)
- **Ability to develop systems**
  - Experience in developing one system of each type

Rationale

- **Moving from Sequential to Concurrent Model of Computation**

- **Most software now runs on specialist devices**
  - IoT, Phone, Tablet, Wearable, GPU, Car

- **This is the future of software development**

Tools

- **Programming Models**
  - OpenMP, Cilk, Intel TBB
  - OpenCL/CUDA
  - MPI
  - STM, BSP
- **Support**
  - Debugging and profiling

Delivery

- **Three Lectures per week**
  - Two Class based lectures/tutorials
  - One Lab based practical workshop

Assessment

- **CA 60%**
  - 20% for IoT Team Project
  - 20% for Distributed System Project
  - 10% for Concurrency Labs
  - 10% for Concurrency Project
- **FE 40%**
  - Three Hour Paper

What Next?

- **Introduction to concurrency**
- **Install Linux**
  - Virtual Box or dual/single boot
- **Install Emacs, Doxygen**

References