Introduction to the Module

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Module Code: COMP1712

Module Name: Computer Architectures and Operating Systems

Credits: 15

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Module Aims

This module aims to bring the [you] an understanding of the general architecture of a computer, while also going into more details of its main components. While the main focus will be on the current mainstream architectures, there will also be short introductions to what may become the next revolution in computing. The various aspects of HW-SW interaction will also be covered.

Module Learning Outcomes

1. Develop a good understanding of present and future computer architectures, while being able to reflect on their respective strengths and weaknesses.
2. Explore the details of the particular components within computer architectures, i.e. memory, communication and processor; and reflect/recognise their development (needs).
3. Demonstrate a working knowledge of principal components of an industry-standard operating systems.

Indicative Content

- **General Architecture**
  - Communication: typical structures, I/O standards, and their interrelation with the other two main components.
  - Memory: hierarchy, magnetic, optical, and silicon-based storage, RAID systems & caches.
  - Processor: micro-architecture, the differences between e.g. x86 and ARM architectures, cellular & GPU architecture, multi-core and processor optimisations (e.g. branch prediction, data fetching, loop unrolling)
- **Compilers and OSs**
  - Overview of an operating system (e.g. memory resource usage), the file system and interfacing as a general user (compiler optimisations, interrupts).

Teaching and Learning Activities

- Lecture is interactive
- Supported through structured learning materials

Assessments

1. Report - 40%
    - LO - 1 and 2.
    - Pass mark - 40%
    - 1,500 words.
    - A report on different aspects of computer architecture and exploration of various computer components .
2. Practical - 60%
    - LO - 3.
    - Pass mark - 40%
    - Practical element includes and is not limited to exploring and retrieving information about an OS current environment using various tooling.