Computer Organization & Architecture

Introduction

- This course is all about how computers work
- But what do we mean by a computer?
  - Different types: desktop, servers, embedded devices
  - Different uses: automobiles, graphics, finance, genomics…
  - Different manufacturers: Intel, Apple, IBM, Microsoft, Sun…
  - Different underlying technologies and different costs

- Best way to learn:
  - Focus on a specific instance and learn how it works
  - While learning general principles and historical perspectives

Why learn this ?

- You want to call yourself a “computer engineer”
- You want to build software people use (need performance)
- You need to make a purchasing decision or offer “expert” advice

- Both Hardware and Software affect performance:
  - Algorithm determines number of source-level statements(effificent algo)
  - Language/Compiler/Architecture determine number of machine instructions optimizing compilers)
  - Processor/Memory determine how fast instructions are executed (high)performance implementations on architecture
  - I/O and Number_of_Cores determine overall system performance

Organization of a Computer

- Five classic components of a computer – input, output, memory, datapath, and control

- datapath
  + control
  =
  processor