IN1006 Systems Architecture 2023/24

Week 1 Tutorial questions: Introduction to Computer Systems

# Exercises

## Complete Session 1 self-check online tutorial questions (Moodle) - complete

1. What is the definition of Systems Architecture? Why do all Computing students need to understand this topic?  
     
   - It’s the fundamental organisation of a (computer) system, embodies in its components, their relationships to each other and the environment, and the principles governing its design and evolution.  
     
   - It enables the understanding of the fundamental capabilities of a computer system, how these capabilities are realised by the components, how a computer system may be altered and extended and what effects such actions may have on its capabilities.
2. Explain layers of abstraction in computer systems?  
     
   (What is abstraction – The act of representing features without including the background details, in other words focusing on essential details and ignoring unnecessary details.)  
     
   - Systems can be decomposed into layers, abstraction allows layers to hide low level information from higher levels. This allows for consistency amongst higher levels as they remain useful without being cluttered by unnecessary details.
3. Draw and explain Von Neumann model with its five components and data paths.

Central Processing Unit

Registers

CU

ALU

Main Memory

Input/Output System

* Control Unit (CU) [controls the flow of data between CPU and other devices]
* Arithmetic Logic Unit (ALU) [completes binary number operations]
* Registers [Fast temporary memory located on the CPU each with their own dedicated purpose]
* Main Memory [Also known as RAM, in direct communication with the CU]
* Input/Output System [All inputs and outputs in relation to results from ALU]

This model can only carry out sequential instruction processing, there is also a single data path between the CPU and main memory of which is known as the Von   
  
Neumann bottleneck.