CS 3101 Computer Organization

Homework 1

1. **Why the functions of computer systems are divided into layers in the Computer Level Hierarchy? What are the commonly accepted layers? What does each layer do?**

These functions are split into layers to organize the functions in way to make it easier to understand. Each layer has its own set of instructions that call upon the layers below them.

* + - Level 0 – Digital Logic level that uses gates and circuits.
    - Level 1 – Control Level contains a control unit that manages the data processes.
    - Level 2 – Machine Level that has instructions for the architecture of the computer.
    - Level 3 – System Level translate assembly language instructions.
    - Level 4 – Assembly Level translate instructions from higher levels.
    - Level 5 – High Level Language Level – translate high level languages into a language the machine can understand.
    - Level 6 – User level where users run programs.

1. **Name the main components of the von Neumann architecture for computers and explain their functions.**

* Central processing unit (CPU) – contains ALU, control unit, registers, and program counter.
* Control unit – manages the data and program moving in and out of memory. Also carries out executing programs.
* Main memory system – memory that hold data and the program processing that data
* I/O system – allows a person/user to interact with the machine.
* Arithmetic logic unit (ALU) – carries out calculations.

1. **What are the steps in a fetch-decode-execute cycle?**

* Fetch – The CPU first retrieves the data and instructions from main memory and stores them in registers.
* Decode – Then the CPU translates the instructions into a language the ALU can understand.
* Execute – The ALU then executes the instructions and stores the result into memory or registers.