Worksheet 4: The CPU and Fetch-Execute Cycle

Task 1

The purpose of the CPU is to fetch, decode and execute data. Describe what happens at each stage of this cycle.

|  |  |
| --- | --- |
| **Fetch** | **The git fetch command downloads commits, files, and refs from a remote repository into your local repo**. |
| **Decode** | **compares the expression to each search value one by one.** |
| **Execute** | **happens when the target process is executed, or realized, becoming the actual process**. |

**Task 2**

The performance of a CPU is dictated and dependent on a number of factors. Complete the table below, stating the factor after reading how this affects performance.

|  |  |
| --- | --- |
| **Factor** | **How this affects performance** |
| Clock speed | The higher the speed (Hz), the more instructions the CPU will be able to carry out per second. |
| Catch size | The more a CPU has available, the more data can be stored closer to the CPU rather than revisiting RAM for the data. |
| Catch types | The closer to the CPU, the quicker data can be accessed by the CPU. L1 is the quickest/closest, followed by L2. L3 is close to RAM. |
| Number of cores | The more cores a CPU has available, the more duplicate processors are available to carry out the instructions. |

**Task 3**

The performance of a CPU is affected by clock speed, number of processor cores and cache size.

Calculate the maximum number of cycles per second in each case and rank them in order of performance.

1. A dual core processor running at 2.7GHz with 4Mb of shared Cache memory
2. A quad core processor running at 1.5GHz with 8Mb of shared Cache memory
3. A single core processor running at 3.2GHz with 2Mb of Cache memory
4. A dual core processor running at 3.2GHz with 4Mb of shared Cache memory

Where would a single core processor running at 6.4GHz with 4Mb of shared Cache come in the ranking?

1 – 2.7GHz it 2.7 billion cycles with 4,096‬ kilobytes shared speed in Ram

2 – 1.5GHz it 1.5 billion cycles with 4,096‬ kilobytes shared speed in Ram

3 – 3.2GHz it 2.7 billion cycles with 4,096‬ kilobytes shared speed in Ram

4 – 3.2GHz it 2.7 billion cycles with 4,096‬ kilobytes shared speed in Ram