CS 3307 Written Assignment Unit 2

Operating System Unit 2

The use of numerous processors at once for calculation is known as parallel computing. It is a method that enables a computer to divide a single task into several smaller tasks that are then carried out simultaneously on various processors.

Simply put, picture a large pile of clothes that needs to be washed, dried, and folded. This task would take a long time for you to do on your own. However, if you had assistance, you could break the task down into smaller components and complete it more quickly. This operates in a manner akin to parallel computing. To complete a work more quickly, it can be helpful to break it up into smaller components that are then executed simultaneously on various processors.

**Parallel computing:**

In the research of (Wikipedia contributors, 2023), “is a kind of computation where a lot of calculations or operations happen at once.” The dynamic nature of real-world applications makes it challenging to manage real-time data at times when numerous tasks are occurring concurrently but in different places. Modeling is needed for data and real-world applications, and parallel computing can handle this. It is more efficient to manage complicated and large datasets using parallel computing techniques because they are less expensive. Data mining, real-time simulations, applications in engineering and science, etc. are all areas where parallel computing is used.

According to (Myrianthous, 2022), “The primary advantage of parallel programming relates to multi-core systems and its capacity to utilize all of them when carrying out tasks so that these can be finished in a significantly shorter amount of time.Datasets in the big data era can balloon to massive sizes, making it potentially difficult to load them all onto a single machine. Such datasets can be partitioned in parallel computing to make use of several computers and load them in a distributed manner.”

**Fundamental Principle:**

Utilizing multiple processing components simultaneously to solve problems is the basis of parallel computing. Instructions are separated into pieces and solved simultaneously to solve problems. The system's resources are all active at the same time. When putting parallel algorithms into practice, understanding data dependencies is essential. Since calculations that depend on previous calculations in the chain must be carried out in the correct order, no program can run faster than the longest chain of dependent calculations (sometimes referred to as the critical path). Most algorithms, however, don't only consist of a continuous series of interdependent calculations; there are sometimes possibilities to carry out individual calculations concurrently.

**Processing in parallel in the financial, banking, cryptocurrency, and investing sectors:**

Multiple computers are utilized by blockchain technology for transaction validation. The financial industry uses blockchain to complete any operation involving financial transactions. Without parallel computing, blockchain and financial transactions cannot function.

Reference:

Wikipedia contributors. (2023). Parallel computing. *Wikipedia*. <https://en.wikipedia.org/wiki/Parallel_computing>

Myrianthous, G. (2022, April 23). What is Parallel Computing | Towards Data Science. *Medium*. <https://towardsdatascience.com/parallel-computing-92c4f818c>