NEWSLETTER

2020-2021

Message from Head of the Department

Prof. Subhasree Sengupta
MCA, B.Tech, M.Tech

I take the privilege to welcome you to the Department of Computer Science & Engineering, Future Institute of Technology, Kokata, India..
Technology changes rapidly, especially in the field of computing, whereas the science, if it changes at all, does so much more gradually.
Our understanding is that persons who are clear and thorough about the fundamentals can adapt to rapid changes in technology relatively easily.
We want the education imparted to our students to be the basis of a life time of learning.
Ever since we started our journey way back in 2014, our department has produced hundreds of professionals and has established a name for itself in the country and abroad. They have consistently excelled in the highly competitive industrial environment, in top-ranking companies.
I attribute this success to the winning combination of a dedicated faculty team that works hard at imparting quality education to our students.
Learning is a continuous process and does not end with the acquisition of a degree, especially because steady and rapid advances in computing technologies shorten the life of tools and techniques prevalent today.
Therefore we do not aim to make our students walking manuals of any language or package. Instead, they are given a strong foundation in computer science and problem-solving techniques, and are made adaptable to changes.
We believe that this approach to teaching-learning, coupled with practical experience gained during Industrial Training in reputed organizations, equips our students to handle the challenges posed by the software industry.

PARALLEL COMPUTING

*Multiple calculations or processes are carried out concurrently. It is possible to execute tasks faster and more effectively than with serial computing in a way which is known as **parallel computing**.*

Using a single processor to do operations in traditional sequential (serial) computing, the speed and performance are constrained. In contrast, parallel computing makes use of several processors or cores to tackle various aspects of a problem simultaneously. This division of work can considerably save the amount of time needed to finish a task, making it an appealing option for managing complicated problems and large-scale computations.

When dealing with computationally demanding jobs that may be divided into smaller, independent subtasks, this strategy is especially helpful.

Categories of parallel computing

Task Parallelism

Task parallelism divides a large task into smaller subtasks, each of which is given to a distinct processor or core. The parallelism is then achieved by these processors working concurrently on each of their individual subtasks. In applications where separate components of the computation can be completed independently, task parallelism is frequently used.

Data Parallelism

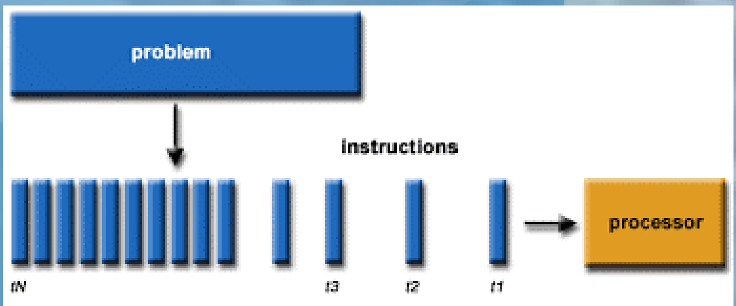
In data parallelism, the same process is carried out simultaneously on several pieces of data. This method is frequently used in applications, such image processing or matrix operations, that process big datasets or arrays.

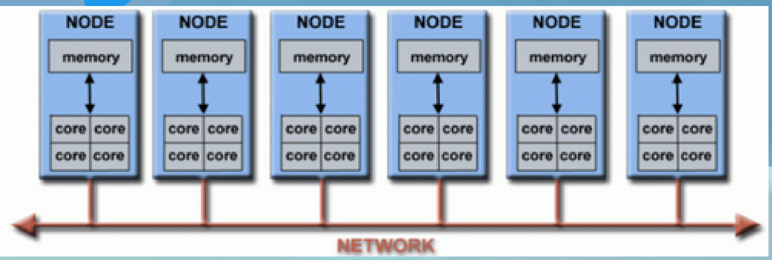
METHODS EXIST FOR ACHIEVING PARALLEL COMPUTING

Shared memory parallelism
It is the concept enables communication and direct access to shared memory by allowing several processors to share a single memory address space.

Distributed Memory Parallelism
In this architecture, each CPU has its own personal memory, and message passing is used to connect the processors. This method is frequently applied in supercomputers or clusters.

Due to the rise of multi-core processors and distributed computing environments, parallel computing has gained importance in modern computing. However, controlling problems like load balancing, data synchronization, and averting race situations can make it difficult to design parallel algorithms and applications.





To make parallel programming easier and better utilize the computational capacity of parallel architectures, specialized programming models and tools, such as MPI (Message Passing Interface) and OpenMP, are frequently employed.
In general, parallel computing is essential for high-performance computing, which enables us to solve complex problems and handle enormous volumes of data.

-Subham Chakroborty, asst prof.

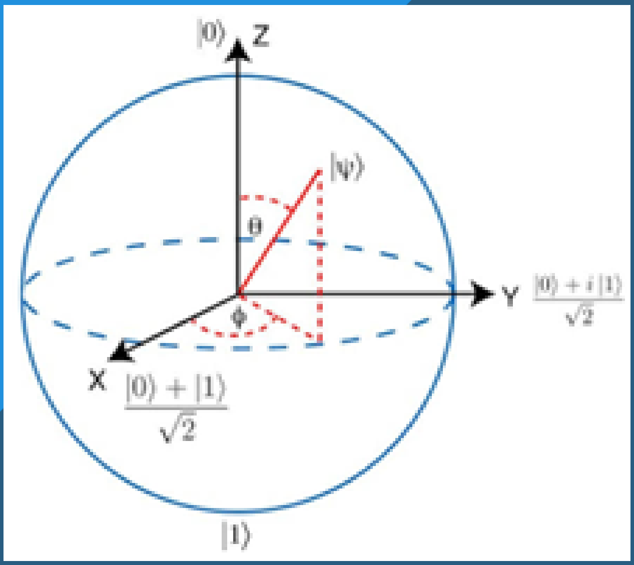
QUANTUM COMPUTING

THE NEXT GENERATION HIGH SPEED COMPUTING

The science of quantum physics and its incredible phenomena serve as the foundation for the cutting-edge computing method known as quantum computing. The intersection of information theory, computer science, mathematics, and physics is stunning. By directing the actions of tiny physical objects, such as miniscule particles like atoms, electrons, and photons, it outperforms conventional computers in terms of processing capacity, energy consumption, and exponential speed.

The novel form of computation, Quantum computing, which is based on quantum physics, deals with the physical world's uncertain and unpredictable nature. Because quantum mechanics is a more comprehensive model of physics than classical mechanics, quantum computing is a more comprehensive model of computing with greater potential to address issues that classical computing cannot address. Unlike traditional classical computers, which are based on classical computing and use binary bits 0 and 1 independently, they use their own quantum bits, also known as "Qubits," to store and process the information.

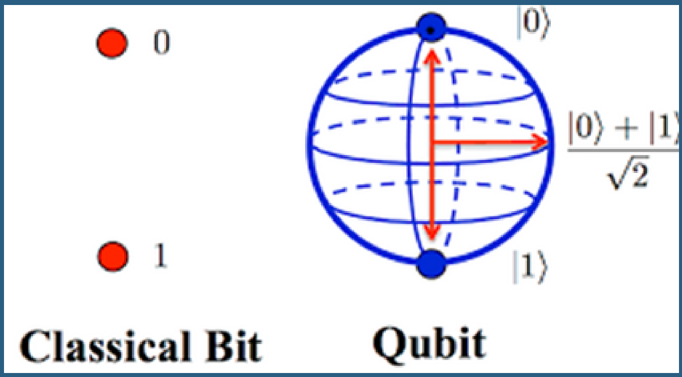
Quantum Computers are computers that use this sort of computation.



Logic gates, transistor circuits, and integrated circuits cannot be used in such tiny computers. As a result, it employs the information about the spins and states of subatomic particles like atoms, electrons, photons, and ions as its bits. More combinations are possible when they are superposed. They are therefore more powerful since they can operate in parallel while efficiently utilising memory. Due to the fact that quantum computing is the only paradigm that might defy the Church-Turing theorem, quantum computers outperform classical computers by orders of magnitude.

NEED FOR QUANTUM COMPUTERS

Any computational problem that can be solved by a classical computer may also be solved by quantum computers. The Church-Turing thesis states that the opposite is also true, i.e., that quantum computers cannot solve all the problems that conventional computers can. Although some difficult and intractable problems cannot be resolved by today's conventional computers in a reasonable amount of time and require more computing power. In 1993, Peter Shor demonstrated how quantum computers may tackle similar issues far more quickly—like in a matter of seconds—without overheating.These have the capacity to process exponentially large amounts of data. It also shows how a real-world quantum computer may decrypt the secret codes used in cryptography.



-Chittabarni Sarkar,asst prof.