Career opportunities in Quantum Computing

With interest in Quantum Computing increasing, the field is set for aspirants to hone skills and explore opportunities

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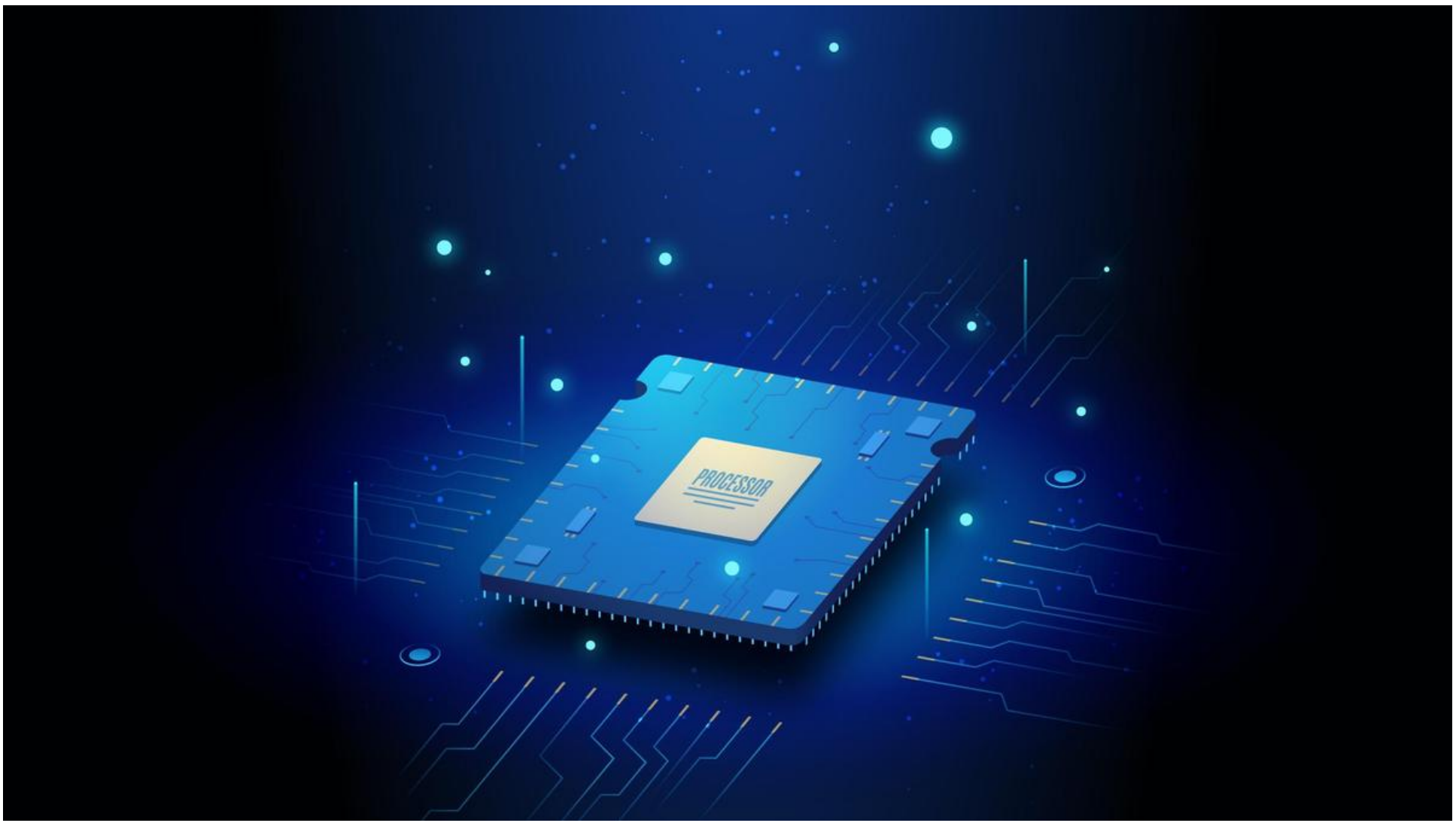

From the current binary approach to computing, the shift is towards tapping into computational capabilities using everything that lies between 0s and 1s. | Photo Credit: Freepik

> “You cannot build a better light bulb by building better and better candles.” This was a striking takeaway from Shalini Ghose’s TED Talk on “A Beginner’s Guide To Quantum Computing”.

Distant. Exciting. Confusing. Gimmicky. Too early for me. These are probably some of the initial responses one is likely to hear when a conversation around quantum computing starts. Let’s be honest. Everyone’s a beginner in this space because the field is different, operating environments are different and, more importantly, the rules are completely different. Even bizarre.

From the current binary approach to computing, the shift is towards tapping into computational capabilities using everything that lies between 0s and 1s. Within these possibilities lie (most likely) the answers to the world, the mind, the cosmos, and ultimately the universe.

Gaining ground

Over the last few years, debates and discussions around quantum computers have been gaining significant ground, especially in India. This follows the successful attraction of special interests from GCCs in setting up their R&D wings in India, considering the talent pool and geographical advantage.

In the context of quantum computing, a NASSCOM report reveals that over $1bn is dedicated to advance progress over the next five years. Besides, there increased and sustained interest from the quantum ecosystem in India to support this such as support from government agencies for the infrastructure; participation from academia to develop curricula and materials; service providers who further help specialise in different branches of quantum mechanics and computing through programmes and certifications, and start-up communities who act as the bridge between vision and reality. When the field is set, the next and the most important question is the careers one can potentially explore in quantum computing.

Requirements

India’s ambitions with quantum computing estimates a demand of over 25,000 professionals in the next 5-7 years. This demand can be classified across three requirements:

Software development: Which includes quantum programming languages, transpilers, open-source development ecosystems and more

Hardware development: Which involves superconducting architectures, nuclear magnetic resonance and more

Allied technologies: Which take care of cryogenic components, optical benches, cathode ray oscilloscopes that enable functionality of the device

While the rules of Quantum Computing are different, fundamentals remain the same. In comparison to digital computing, one needs a good academic background and specialisation in

Physics: A solid foundation in theories of Quantum Computing, where how particles or waves function, is critical

Engineering: Specifically Electrical, Materials Science, and Computer Engineering to develop the hardware and peripheral requirements

Maths: Strength in concepts such as calculus, algebra, discrete mathematics, and probability theory

Ph.Ds. in any of these fields are highly preferred; however, specialisations or certifications from IBM or Microsoft courses, and practical exposure help secure internships and job opportunities. Specialists of classical computing have an edge here as Quantum Computing involves transferable skills such as

Algorithm design and development, where skills from conventional computing can be borrowed to develop quantum algorithms

Software development featuring skills in coding, debugging, testing, deploying are indispensable

Problem-solving a myriad of unheard-of challenges in problems in the quantum space, be it with respect to hardware architecture or software

Professional skills such as efficient project management, communication, inter-personal skills and traits will be valuable to foster a collaborative work environment

The timing is now ripe to explore career opportunities and hone necessary skill sets. To get started, understand your strengths, work on your academic or practical shortcomings, seek mentors, get internships for hands-on exposure, and gear up as a holistic professional to embrace change.

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