COMPUTER SCIENCE AS DISCIPLINE

Prepared by Razel Kaye Arenas

DEFINITIONS

- Computer science is a technological discipline dedicated to **designing tools that address and solve problems** (Nasution et al. 2022).
- Computer science, also known as computation or computing science (distinct from computational science or software engineering), involves the **study of processes that interact with data and can be expressed as data through programming** (Zakari et al. 2019).

HISTORY

Early Computation: Abacus

- Abacus is "*the first automatic computer*" and is the earliest known tool of computing
- It was thought to have been invented in Babylon, circa 2400 BCE.
- The abacus generally features a table or tablet with beaded strings.

HISTORY

Analog Computer

- The ancient Greeks created **advanced analog computers,** including the **Antikythera mechanism**, discovered in a Greek shipwreck in 1901.
- Analog computers are not like today's computers. Modern computers are digital in nature and are immensely more sophisticated.

HISTORY

The 1940s: The Electronic Digital Computer is Born

- The creation of the general-purpose electronic digital computer was driven by the need for complex computations during WWII.
- Key developments include the **Mark I** by Howard Aiken in 1944, and Alan Turing's work on breaking the German Enigma code at Bletchley Park. **The Colossus**, another British computational device, aided in this effort.

HISTORY

Pioneers and Innovations in Computing

- **Konrad Zuse** in Germany created the **Z3** in 1941, the first functioning general-purpose calculator.
- The invention of the **transistor** in 1947 by **Bardeen, Brattain, and Shockley** revolutionized computing, leading to the **microprocessor era**.
- **Mauchly, Eckert, and John von Neumann** (1903-1957) began designing the **EDVAC** (Electronic Discrete Variable Automatic Computer), a stored-program electronic computer, in 1944. "

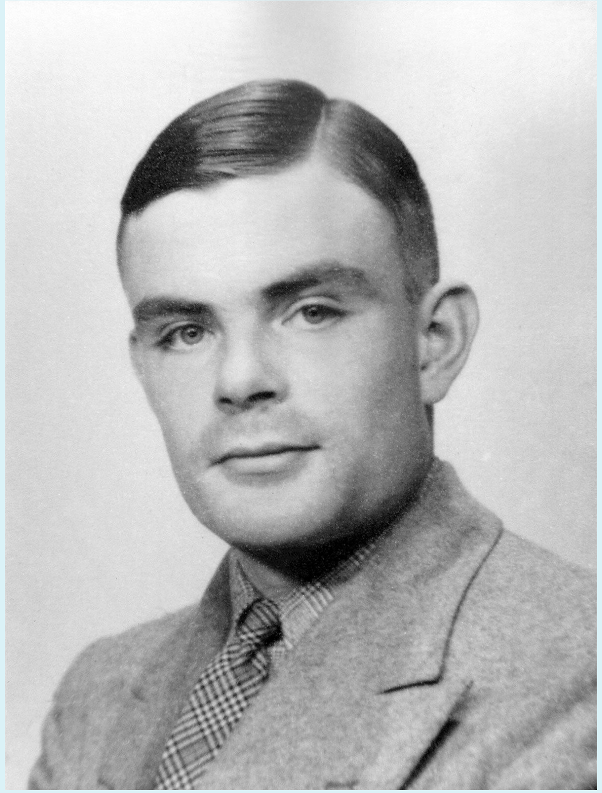
HISTORY

Founders of Modern computing

- **Charles Babbage** (1791-1871) developed the **Difference Engine and Analytical Engine**, early mechanical devices that laid the groundwork for modern computers.
- **Ada Lovelace** (1815-1852), a collaborator of Babbage, is often regarded as the **'first computer programmer'** for her work on Babbage's Analytical Engine.

HISTORY

Alan Turing



- Regarded as the **“Father of Computer Science”**
- He provided a new concept of both algorithms and the process of calculations with the invention of his **Turing Machine.**
- The Turing Machine is a basic abstract symbol manipulating device that can be used to simulate the logic of any computer that could possibly be constructed. It was not actually constructed, but its theory yielded many insights.

HISTORY

- In the 1960s, **computer science** emerged as a **distinct discipline**. **George Forsythe**, a numerical analyst, invented the word.
- The rise of the supercomputer occurred in the 1970s. The **CRAY-1** was designed by Seymour Cray (b. 1925) and was shipped in March 1976.
- Thanks to **Steve Wozniak and Steve Jobs**, the creators of Apple Computer, the **personal computer** rose to prominence in 1980s.

FIVE COMPUTING DISCIPLINES AND MAJORS

(Computer Engineering, Computer Science, Information Systems, Information Technology, Software Engineering)

COMPUTER ENGINEERING

It emerged from Electrical Engineering during the late 1970s, and it was in the 1990s that it grew to become a discipline in itself.

Focused on computer **architecture** and **infrastructure**, from the applied to the theoretical aspects.

It also focuses on the **design, construction, and programming** of the chips that digitally control devices *(e.g. cellphones, computers, and security devices)*

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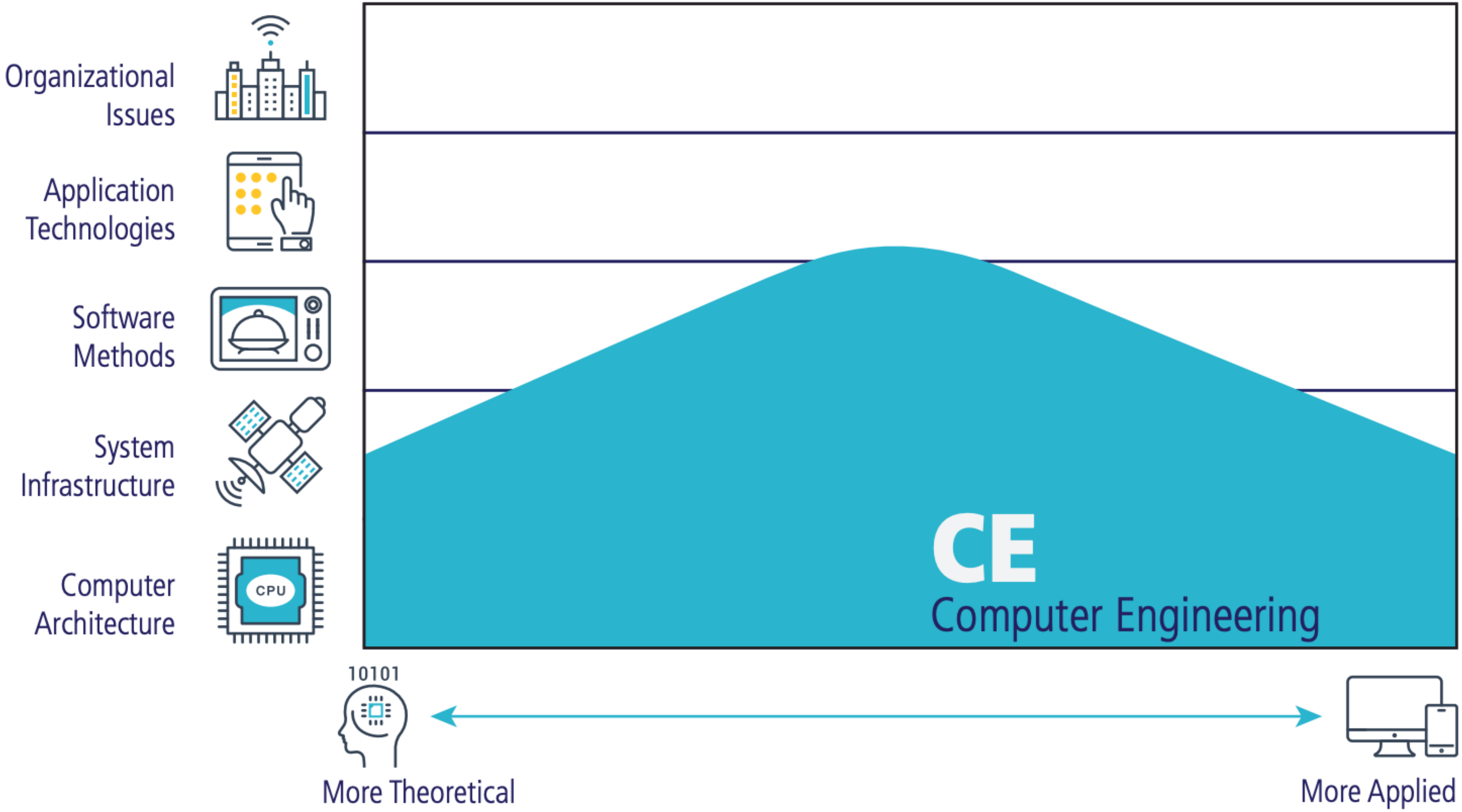

COMPUTER SCIENCE

It focuses in developing and maintaining **computer software.**

It has the widest range of computing topics.

Computer science is probably the **more theoretical and research-oriented** computing discipline.

The work of computer scientist falls into three categories

- They devise new ways to use computers.
- They develop effective new ways to solve computing problems
- They design and implement software.

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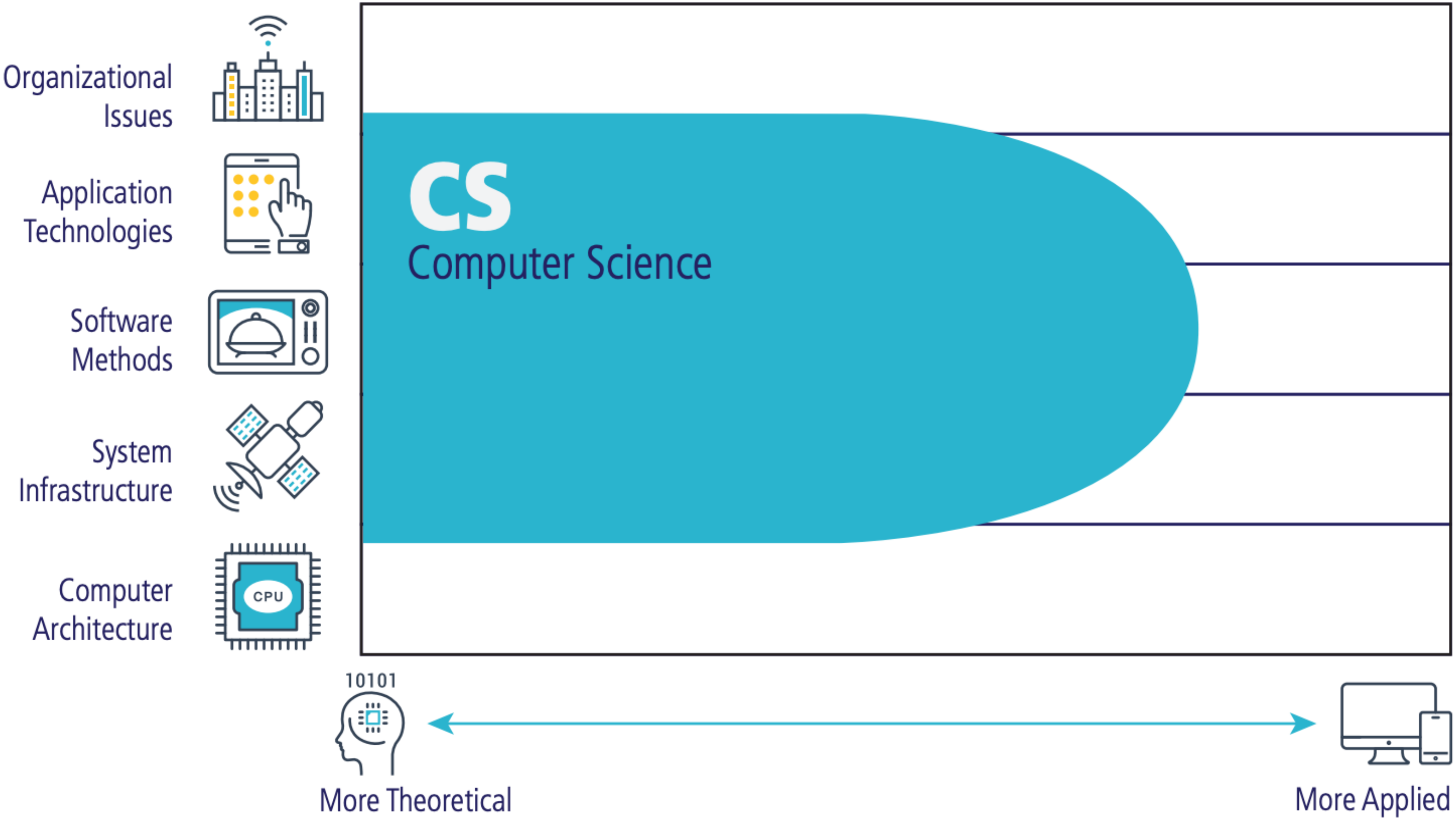

INFORMATION SYSTEMS

Centered on combining **business procedures** with information technology solutions.

Their primary focus is information processing, and they need to be knowledgeable about **how businesses and technology operate.**

Information Systems also has an interested in the applied aspects of application technologies and software development.

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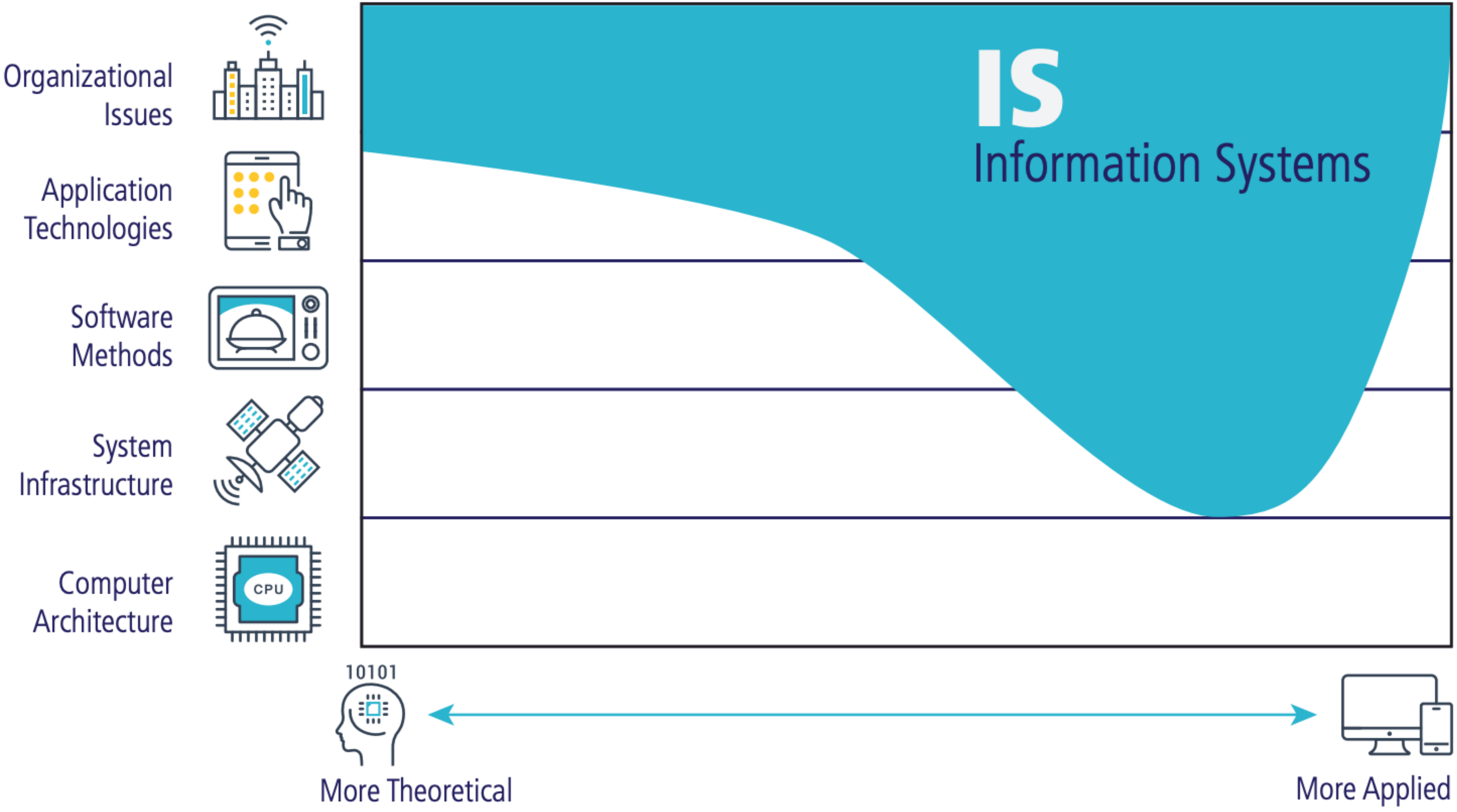

INFORMATION TECHNOLOGY

focused **on how to configure, use, and support technology** infrastructures within organizations.

It makes sure that computing infrastructure is **suitable, is available, and works reliably**

It covers **all aspects of technology infrastructure**, including hardware, operating systems, applications, data storage and communication systems.

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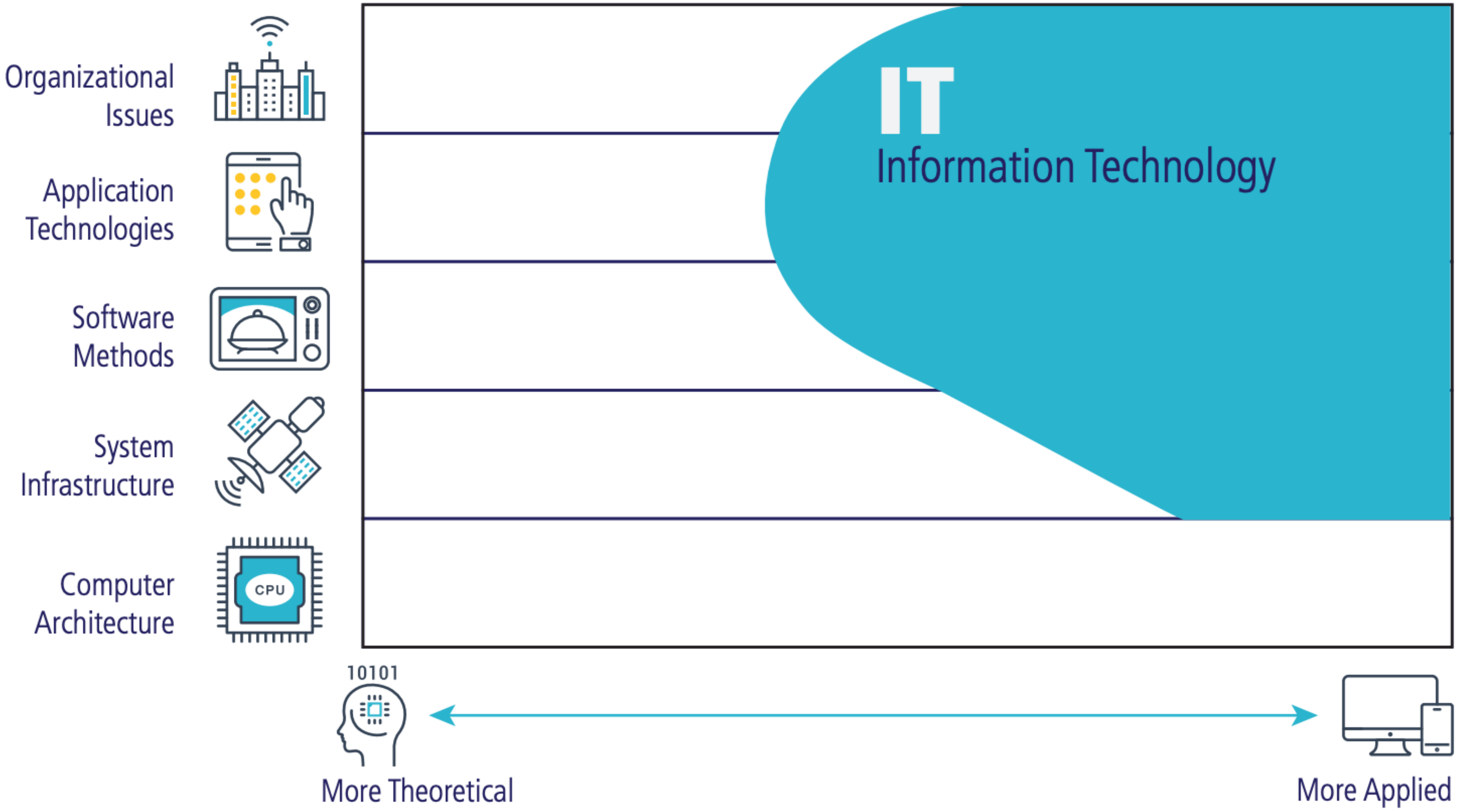

SOFTWARE ENGINEERING

The discipline of developing and maintaining **large software systems.**

Is focused on **everything (from applied to theoretical)** related to software methods, that is, writing software.

Infrastructure and application technologies are also part of software engineering.

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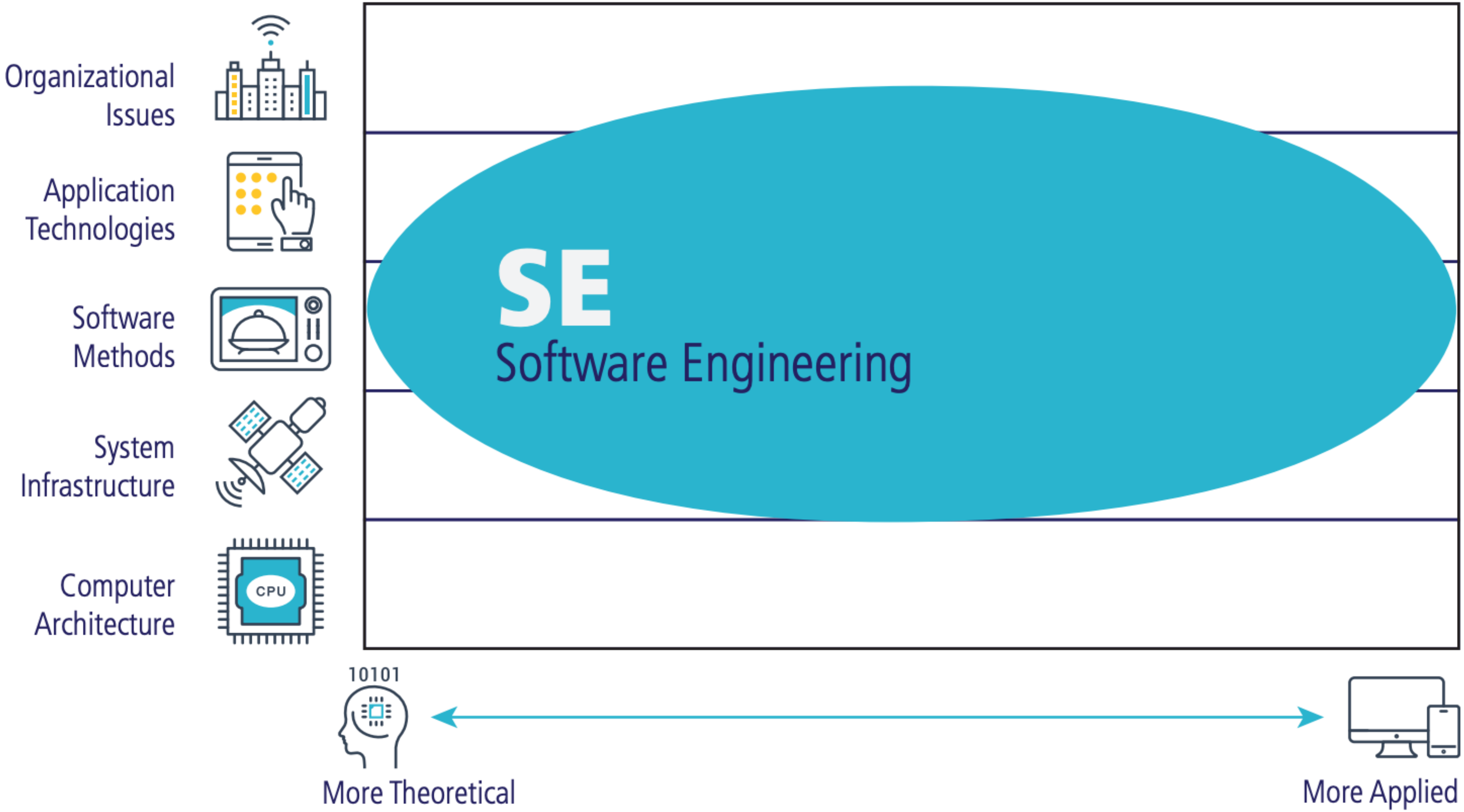

ALL ABOUT ME

(Analysis or reaction and "Get to know you")

ANALYSIS / REACTION

After researching about computer science and its discipline, it is clear that this field is dynamic and constantly evolving sign, significantly shaping the world we live in today. I cannot help but be amazed and impressed by the people behind to the development of computer science. Their contributions have not only spurred the rapid evolution of the world but have also fundamentally transformed the way we live, work, and interact. In today's world, it is hard to imagine life without the presence of computers and technology. These tools have become an integral part to nearly every aspect of our daily life, from communication and entertainment to education and industry.

While researching the five major computing disciplines—computer engineering, computer science, information technology (IT), information systems (IS), and software engineering—I find myself in awe of the depth and breadth of each field. Each discipline, while interconnected, offers a unique perspective and set of skills that contribute to the ever-evolving landscape of technology.

ANALYSIS / REACTION

For example, computer engineering is all about creating the hardware and software systems that we rely on. It's cool to think about how engineers are working on the physical components. On the flip side, computer science dives into the theories behind computing. Then there's information systems (IS), which is all about making sure technology aligns with business goals. I never realized how important it is to have tech that supports a company's strategy until I looked into IS. And when it comes to software engineering, I'm impressed by how much thought goes into designing, building, and maintaining software. It's not just about writing code; it's about making sure the software is easy to use and can adapt over time.

But out of all these disciplines, IT really stood out to me. After doing all this research, I'm even more confident in my decision to pursue a degree in IT. My skills and interests line up perfectly with what IT is all about—making sure the technology we use every day works smoothly and securely. I'm drawn to the hands-on, problem-solving aspect of IT, where you're constantly figuring out how to keep systems running and protect them from threats. Especially with how important cybersecurity and data management have become, I'm excited about the idea of working in IT. It's a field where I can have a real impact by protecting information and making sure everything is secure. Knowing that I could be on the front lines of keeping a company's tech infrastructure safe is both challenging and motivating for me.

GET TO KNOW ME

Razel Kaye Arenas | 18 years old

Educational Background

Junior High:
- Talamban National High School

Senior High:
- Talamban National High School (ABM)

Tertiary:
- University of San Carlos (BS IT- 1)

Why IT?

- Practicality
- Aligned with my skills and interest (problem-solving skills and interest in technology)

SOURCES

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