



University of San Carlos

CIS 1102 PORTFOLIO

Presented by:

Hersheay Gayl Abao

CONTENT



Computer Science As A Discipline



What is Computer Science?



History



Core Concepts



How Computer Science Benefits the Society



Computing Discipline and Majors



COMPUTER SCIENCE AS A DISCIPLINE



WHAT IS COMPUTER SCIENCE?

- The discipline of computer science includes the study of algorithms and data structures, computer and network design, modeling data and information processes, and artificial intelligence.
- It is the academic discipline focused on the study of computers and computational systems.
- It encompasses both theoretical aspects, such as algorithms and data structures, and practical applications, including software development and system design.
- It focuses on the principles of theory, abstraction, and design



HISTORY

The history of computer science began long before the modern discipline of computer science, usually appearing in forms like mathematics or physics.

19th century

Charles Babbage - designed the first mechanical computer

Ada Lovelace - wrote the first algorithm
- first computer programmer.

1940s

Alan Turing - theoretical foundation with his concept “Turing Machine”

1950s and 1960s

-creation of the *first electronic computers*, like ENIAC.
-programming languages such as *Fortran* and *COBOL*

1970s

-*microprocessor*
-led to the personal computer revolution.

20th century

-internet (late 2000s)
-transforming global communication.

The field of artificial intelligence has seen significant growth, and today, computer science continues to evolve, impacting every aspect of modern life, from technology to healthcare.



- Most CS programs arose from mathematics or engineering programs. The emphasis on Computer Science was on the programming of computers, the development of algorithms, the theory of computing, and closely related topics.

CORE CONCEPTS IN COMPUTER SCIENCE:

Computation:

- The process of performing calculations and solving problems using algorithms.
- Creating a step-by-step process to solve a problem, like sorting a list of numbers.
example: Algorithm Design

Information Processing:

- The handling, organizing, and analyzing of data to extract meaningful information.
- Analyzing large datasets to gain insights, such as predicting customer behavior.
example: Data Analysis

System Design:

- The creation and organization of systems, such as software or hardware, to perform specific functions.
- Designing systems that manage hardware and software, like Windows or Linux.
example: Operating System Development



HOW HAS COMPUTER SCIENCE BENEFITTED THE SOCIETY?

- Improving healthcare and saving lives
- Helps predict and avoid natural disasters
- Improving the quality of education
- Paves the way for a digitally-connected world

Advancements in computer science have transformed healthcare, enabling breakthroughs in medical research, remote surgeries, and global networks of healthcare facilities. It helps us predict natural disasters early, so we can take action before things get worse. Education has also been transformed, e-learning platforms are making it possible for people in even the most remote areas to get quality education. Social media, video calls, and other digital tools have made it easier than ever to keep in touch with loved ones or work with people across the globe, no matter where we are.

COMPUTING DISCIPLINE AND MAJORS



5 COMPUTING DISCIPLINES AND MAJORS:

These five disciplines are interrelated in the sense that computing is their object of study, but they are separate since each has its own research perspective and curricular focus.



Information Technology



Computer Science



Software Engineering



Computer Engineering



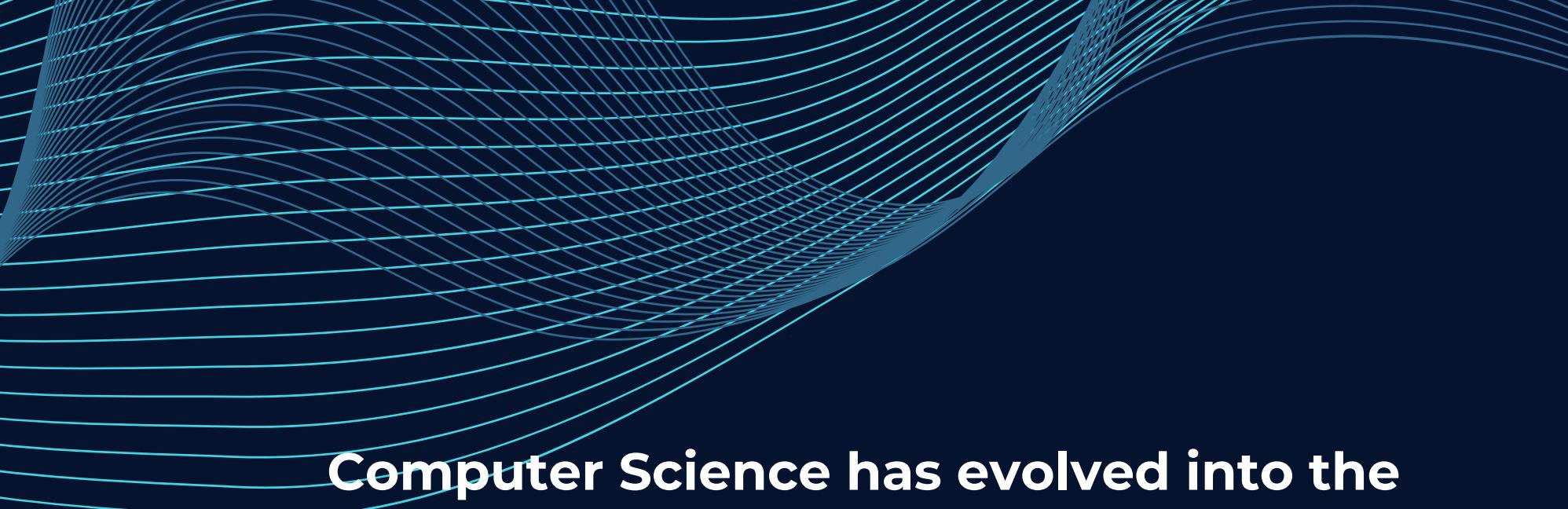
Data Science

INFORMATION TECHNOLOGY

- Information Technology (IT) involves using computers, storage, networking, and other devices to handle electronic data.
- IT is all about *creating, storing, securing, and sharing data*.
- Business Focus: IT is mainly used in business settings, not just for personal or entertainment use.
- IT combines both computer technology and telecommunications to support business operations.
- IT department ensures that the organization's systems, networks, applications, data and information all connect and function properly.

The IT team handles the following three major areas:

- Deploying and maintaining business applications, services and infrastructure including servers, networks and storage.
- Monitoring, optimizing and troubleshooting the performance of applications, services and infrastructure.
- Overseeing the security and governance of applications, services and infrastructure.



COMPUTER SCIENCE

Computer Science has evolved into the following 15 distinct fields:

- Algorithms and complexity
 - Architecture and organization
 - Computational science
 - Graphics and visual computing
 - Human-computer interaction
 - Information management
 - Intelligent systems
 - Networking and communication
 - Operating systems
 - Parallel and distributed computing
 - Platform-based development
 - Programming languages
 - Security and information assurance
 - Software engineering
 - Social and professional issues
- Computer science, the study of *computers* and computing, including their theoretical and algorithmic foundations, hardware and software, and their uses for processing information.
 - Computer science continues to have strong mathematical and engineering roots.
 - Focuses on understanding and solving complex problems using algorithms.

SOFTWARE ENGINEERING

- Software engineers create and maintain programs to address user needs.

- Their responsibilities include:

- Designing applications
- Developing software
- Testing programs
- Documenting applications

- While "software engineer" and "software developer" are often used interchangeably, they have different emphases:

- Software engineers focus on "big picture" design
- Developers concentrate on programming work
- In practice, software engineers often write original code

- Software engineers must adapt to:

- Rapidly advancing technology
- Evolving user needs

History of Software Engineers:

- In 1963, Margaret Hamilton coined the term "software engineering" while developing software for the Apollo spacecraft. At that time, software development faced a crisis as it struggled to keep pace with rapid hardware advancements. This period sparked the rise of software engineering, introducing new programs and languages to address these challenges.
- The NATO Software Engineering Conferences of 1968 and 1969 gave the industry a much-needed boost. By the 1980s, software engineering had firmly established itself alongside computer science and traditional engineering professions.



COMPUTER ENGINEER

Computer Engineering Today:

- Incorporates design fundamentals and theories from computer science
- Distinct from computer science due to its focus on hardware
- Emphasizes computer design and hardware development
- Combines aspects of both electrical engineering and computer science

History of Software Engineers:

- Originated as a specialization within electrical engineering
- Evolved into its own discipline over time
- Initially applied digital logic design concepts from computer science
- Focused on creating microprocessors and technological systems

DATA SCIENCE

- Combines mathematics, statistics, specialized programming, advanced analytics, AI, and machine learning with domain expertise]
- Uncovers actionable insights hidden in organizational data
- Guides decision-making and strategic planning
- Involves stages such as data ingestion, storage, processing, analysis, and communication of insights
- Utilizes popular programming languages for exploratory data analysis and statistical regression

A data science project undergoes the following stages:

- Data Ingestion: Collects both structured and unstructured data from various sources, like customer data, IoT, and social media, using methods like manual entry, web scraping, and real-time streaming.
- Data Storage and Processing: Involves storing, cleaning, and transforming data using ETL tools, preparing it for analytics. Data is then stored in a data warehouse, data lake, or other repositories.
- Data Analysis: Data scientists explore and analyze data to identify patterns, biases, and relevance for predictive analytics and machine learning, guiding business decisions.
- Communication: Insights are presented through reports and visualizations, making them easy for decision-makers to understand and act upon.

Detailed comparison table: computing disciplines explained

source: www.brighton.ac.uk

Overview

Criteria	Computer Science	Information Technology	Software Engineering	Computer Engineering	Data Science
Core focus	Computational systems theory and practical aspects, such as algorithms, programming, and software development.	Practical implementation and management of computer systems and networks.	Practical applications, processes, and techniques for building software systems.	Design, development and integration of computer hardware and software systems.	Data analysis, statistics, and machine learning.
Key subjects and skills	<ul style="list-style-type: none">» Programming» Algorithms» Data structures	<ul style="list-style-type: none">» Network management» Software development» Database management» Cybersecurity	<ul style="list-style-type: none">» Software design and development» Project management	<ul style="list-style-type: none">» Embedded systems» Digital systems design» Computer architecture	<ul style="list-style-type: none">» Data analysis» Statistics and probability» Machine learning
Career paths	<ul style="list-style-type: none">» Software development» AI and machine learning» Data science and analytics» Web development» Cybersecurity	<ul style="list-style-type: none">» Network management» Software development» Database administration» IT consulting» Cloud computing» Cybersecurity	<ul style="list-style-type: none">» Software development/engineering» Systems analysis» DevOps engineering» Quality assurance engineering	<ul style="list-style-type: none">» Hardware engineer» Embedded systems engineer» Network engineer» Systems architect	<ul style="list-style-type: none">» Data science» Data analysis» Machine learning» Business Intelligence

**MEET,
HERSHEY**

MEET, HERSHEAY

Hello! My name is Hersheay Gayl Abao, and I graduated from Asian College of Technology, where I completed the TVL-ICT strand. Information Technology was never my first choice; in fact, it was never even on my mind. Growing up, I always envisioned myself in the medical field, imagining a future where I'd be helping others through medicine. However, as I approached my later years in school, I began to have doubts and second thoughts about pursuing a career in medicine, I wanted to find a career that wouldn't involve me having to be responsible of a person's life, It was scary too scary.

In 10th grade, I was introduced to programming at USC. It was a completely new world for me, and I found myself intrigued by the logic and creativity involved in writing code. This experience opened my eyes to the possibilities within the IT field, and slowly, my interest shifted. What started as curiosity has now lead me to where I am today. IT is definitely a challenging field for me, but I believe that this field is where I am most fitted to be.



SOURCES

Information Technology Law. (n.d.). Google Books. https://books.google.com.ph/books?hl=en&lr=&id=rKXaDwAAQBAJ&oi=fnd&pg=PP1&dq=information+technology&ots=iVAReZdVfE&sig=P9XxnzFq3hKVJGhdkU20xBIS_Ww&redir_esc=y#v=onepage&q=information%20technology&f=false

Baeten, J. C., & Sangiorgi, D. (2014). Concurrency Theory: A Historical Perspective on Coinduction and Process Calculi. In Handbook of the history of logic (pp. 399–442). <https://doi.org/10.1016/b978-0-444-51624-4.50009-5>

Next generation knowledge machines. (2014). In Elsevier eBooks. <https://doi.org/10.1016/c2012-0-06125-x>

Alexander, J. K. (2009). Philosophy of Technology and Engineering Sciences. In Elsevier eBooks. <https://experts.umn.edu/en/publications/the-concept-of-efficiency-an-historical-analysis>

Education, J. (2024, April 16). How has computer science affected society? Jaro Education. <https://www.jaroeducation.com/blog/case-study-8-surprising-ways-computer-science-has-benefited-society/>

McCartney, A. (2024, August 21). What does a computer engineer do? | ComputerScience.org. ComputerScience.org. <https://www.computerscience.org/careers/computer-engineering/>

Computer Engineering - ACM CCECC. (n.d.). <https://ccecc.acm.org/guidance/computer-engineering#:~:text=Computer%20engineering%20is%20defined%20as,systems%20and%20computer%2Dcontrolled%20equipment>

Guide to 5 computing disciplines: key subjects and skills. (n.d.). <https://www.brighton.ac.uk/studying-here/subject-areas/architecture-technology-engineering/computing/guide-to-computing-disciplines.aspx>

Belford, G. G. and Tucker, . Allen (2024, August 11). computer science.

What is Data Science? | IBM. (n.d.). <https://www.ibm.com/topics/data-science>

Information Technology Law. (n.d.). Google Books. https://books.google.com.ph/books?hl=en&lr=&id=rKXaDwAAQBAJ&oi=fnd&pg=PP1&dq=information+technology&ots=iVAReZdVfE&sig=P9XxnzFq3hKVJGhdkU20xBIS_Ww&redir_esc=y#v=onepage&q=information%20technology&f=false

Alexander, J. K. (2009). Philosophy of Technology and Engineering Sciences. In Elsevier eBooks. <https://experts.umn.edu/en/publications/the-concept-of-efficiency-an-historical-analysis>



University of San Carlos

CIS 1102 PORTFOLIO

Presented by:

Hersheay Gayl Abao