Careers in Computer Science

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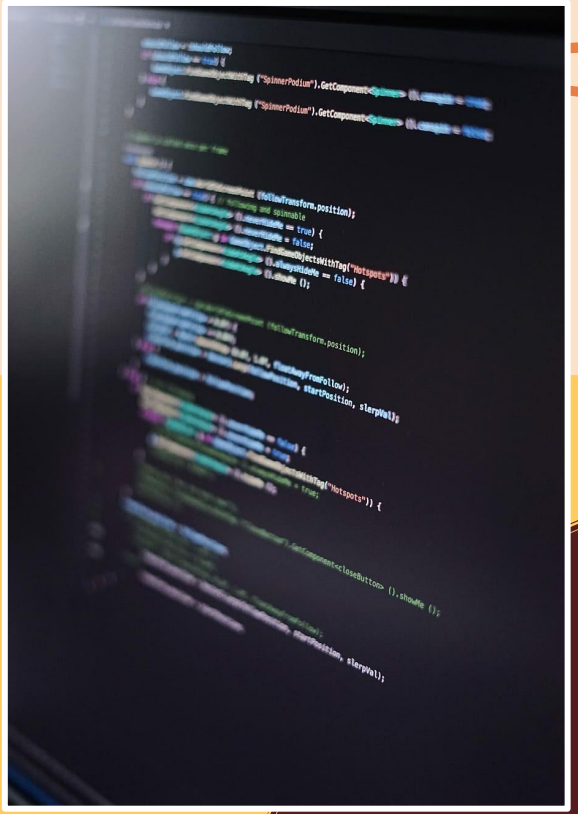
What is Computer Science?

Computer science is the science that deals with the theory and methods of processing information in digital computers, the design of computer hardware and software, and the applications of computers.

Computer scientists solve problems with technology. They write and program software, develop websites, create applications for mobile devices and much more!



Why is computer science important?

01

In today's modern world we are surrounded by technology.

02

From using your computer to checking emails, to cyber security the list goes on and on...

03

Just simply having a background in CS can help you in future careers.

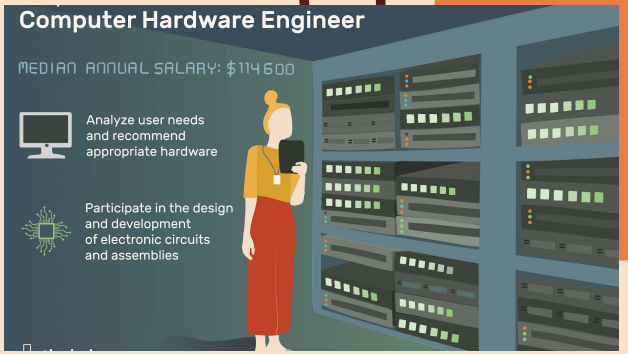
04

CS allows society to advance in technology that have great lasting benefits on society.

CE

COMPUTER ENGINEERING

What is computer engineering?



"Computer engineering is a branch of engineering that integrates several fields of computer science and electronic engineering required to develop computer hardware and software." Some may say, what does a computer engineer even do?

There are many types of computer engineers and they all have different things to do:

- **Software engineers deals with computer programming, smartphone applications, and software development in general.**
- **Hardware engineers design and maintain physical products.**
- **Network engineers design and maintain systems and networks.**

https://en.wikipedia.org/wiki/Computer_engineering

Why is computer engineering important?

Computer engineering is extremely important in today's modern world. Computer engineers create tools that allow computers to work correctly.

"Computer engineers help create those tools and they advance the technology that allows computers to be so prominent." Computer engineers help society progress forward.

History of women in CS and CE

Ada Lovelace

Ada Lovelace (1815-1852) is considered the first computer programmer, even though she lived long before the computer was invented.

Grace Hopper

Grace Hopper invented the compiler a program that translates english language instructions into the language of the target computer.

Katherine Johnson

Johnson helped confirm the accuracy of electronic computers used by NASA and performed critical calculations that ensured safe space travel from the 1950s on.

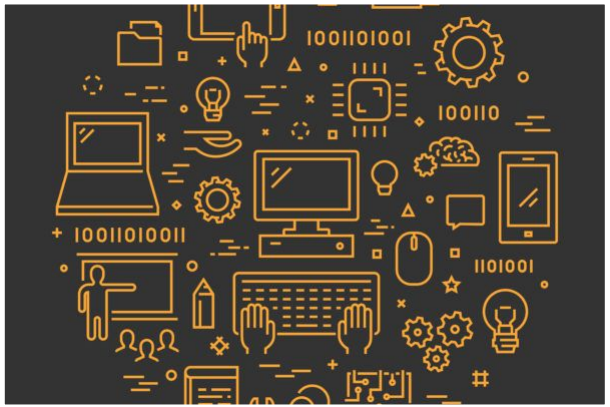
Margaret Hamilton

“Margaret Hamilton is an American computer scientist, systems engineer and business owner. Hamilton was the Director of the Software Engineering Division of the MIT Instrumentation Laboratory, which designed the onboard flight software that made Neil Armstrong and Buzz Aldrin’s Apollo mission possible.”

https://www.purdueglobal.edu/blog/information-technology/history-women-information-technology-6-female-computer-science-pioneers/

https://insights.dice.com/2020/03/06/13-famous-women-changed-tech-history-forever/?wpse_show_all_content=1

CAREERS IN COMPUTER SCIENCE AND COMPUTER ENGINEERING



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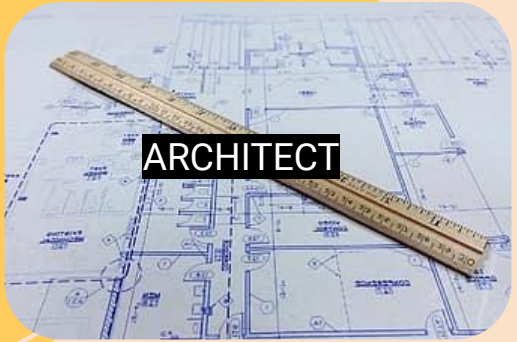
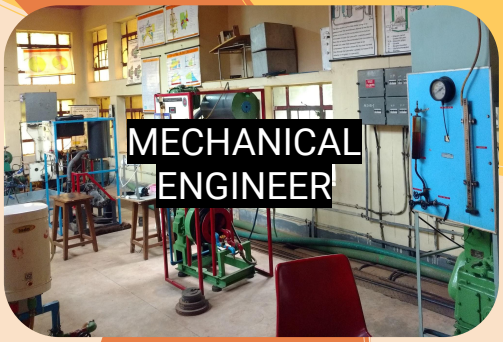
Which of these jobs **doesn't** use computer science?





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COMPUTER SCIENCE IN LAW

PATENT LAW - **Patent law** is the branch of **intellectual property law** that deals with new inventions. Traditional **patents** protect tangible scientific inventions, such as circuit boards, car engines, heating coils, or zippers.

- These lawyers often deal with computer science as many modern inventions involve computer science and patent lawyers are needed to decide whether or not a patent should be granted to the inventor
- A computer science degree is most often required to become a patent lawyer

However, patent law isn't the only way in which law is connected to computer science. Nowadays, almost all lawyers use computer science in their day to day work.

- Examples of this include online legal research, case management software, electronic discovery in the handling of legal discovery projects, and legal marketing online to obtain new clients

Computers in Law

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COMPUTER SCIENCE IN FASHION

FASHION x CODING - recently, more and more big companies have been merging computer science with fashion. From determining textile weaves to sizing designs; **computers** have become vital in the fashion industry. **Computer** aided design (CAD) programs reduce the demand for manual sketches and new software programs continue to replace old manual skills.

- CAD or Computer aided design allows designers to view designs of clothing on virtual models and in various colors and shapes, which saves time by requiring fewer adjustments of prototypes and samples later

3D PRINTED CLOTHES - 3d printed clothing is becoming more and more apparent in our day to day lives. Designers have already been incorporating 3d printed parts into everyday wear. From 3d printed shoes, and clothes, to durable 3d printed fabrics, more and more people are realizing the potential in using technology in the fashion industry.

- big brands such as new balance and adidas have started 3d printing the soles of shoes. the 3d printed soles have been found to be lighter, more durable, and provide more support

3d printing in fashion

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COMPUTER SCIENCE IN ARCHITECTURE

3D PRINTERS IN ARCHITECTURE - **Architects** and other AEC professionals are increasingly **using 3D printers** to produce beautiful, physical, and highly-detailed architectural models. This allows experts to now showcase their ideas and impress their clients with tangible models that take into account precise building or construction site information

- 3d modeling not only speeds up the design process but also provides a real life view of the finished product
- 3d modeling also enables **architects** and designers play around with different ideas and identify potential design problems before they become actual issues.

COMPUTER ARCHITECTURE - Another way computer science is connected to architecture is through computer architecture. Computer architects, or system analysts, design computer systems. This type of job combines one's knowledge of computer science and art, to program, and design the systems.

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COMPUTER SCIENCE IN MECHANICAL ENGINEERING

MECHANICAL ENGINEERS and COMPUTER SCIENTISTS - Computer scientists and mechanical engineers are similar in many ways. Like **mechanical engineers**, **computer scientists** identify and solve problems using many of the same mathematical and **scientific** principles. They also design, develop, and test tools, only their work advances computing solutions rather than physical devices.

Mechanical engineers also use computer science in their work frequently. In fact, because many fields of mechanical engineering are so mathematically challenging, computers are extremely helpful and used constantly.

- Computers make it possible for mechanical engineers to study proposed aircraft and car body designs without having to build altual physical models
- Using computer simulations engineers can visualize the fluid flow and temperatures in areas that are experimentally inaccessible such as the inside the heart and the inside of a car engine.
- It is often much quicker to run a computer experiment than a physical one.

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COMPUTER SCIENCE IN ATHLETICS

COMPUTERS IN SPORTS - sports require many mathematical techniques to master, thus the reason computer science has become an important aspect of sports.

- one example of computers in sports is using computers to store and watch videos of games and practices. with videos players can watch their technique from different angles and improve, helping athletes to achieve their goals
- computers are also used to store statistical data which tell coaches the past performance of their players

COMPUTERS AND THE OLYMPICS - many athletes who depend on speed to win will stop at nothing to reduce their times. computers are used to help with this.

- computer applications were used to develop full-body “skinsuits” that many swimmers wear to glide through the water easier, improving their times
- at the 2002 winter games in Utah, tiny computer chips were used to track skiers. these chips tracked skiers’ location, speed, and number. the info was then sent to a central computer for judges to look at, helping them better assess the performance of the skiers

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COMPUTER SCIENCE IN FINANCE

FINTECH - Fintech is a term used to describe **financial technology**, an industry encompassing any kind of **technology** in **financial services**, from businesses to consumers. Fintech describes any company that provides financial services through software or other technology and includes anything from mobile payment apps to cryptocurrency.

- Fintech in used in many of the newest technological advancements, such as apps like Paypal and Venmo, which help you manage your money
- Fintech in used in crowdfunding platforms such as GoFundMe and Kickstarter, which allow internet and app users to send or receive money from others on the platform
- Fintech is also used in quantitative trading, like Quantopian which provides a free online platform for quantitative researches all over the world to write their own investment algorithm for trading

Before Fintech, there was no computer science in the traditional financial industry. However, technology is changing the financial industry for the better. Many financial tasks are manually done and very tedious. Technology adds automation and simplifies tasks, saving time and work. Technology also provides additional fraud detection and security, and has introduced new concepts such as cryptocurrency.

tech in finance

WHAT ARE SOME CAREERS IN CS AND CE?

COMPUTER SCIENCE CAREERS

- DATA ARCHITECT
- DATA SCIENTIST
- SYSTEMS SECURITY ADMINISTRATOR
- WEB DEVELOPER
- COMPUTER SYSTEMS ANALYST

COMPUTER ENGINEERING CAREERS

- GRAPHICS HARDWARE ENGINEER
- HARDWARE ENGINEER
- BIOMEDICAL ENGINEERING
- NETWORK ADMINISTRATOR

https://www.ubuntupit.com/top-20-highest-paying-computer-science-jobs/

BIOMEDICAL ENGINEER

Biomedical engineers combine biology and engineering. They apply engineering principles to contribute to development in medicine and health care.

Inventions and creations made by bioengineers:

- Artificial organs
- Surgical robots
- Advanced prosthetics
- New pharmaceutical drugs
- Kidney dialysis

https://www.mendeley.com/careers/article/biomedical-engineering-career-opportunities/

HARDWARE ENGINEER

"Computer hardware engineers oversee the manufacture, installation, and testing of computer systems, servers, chips, and circuit boards. They work with peripherals including keyboards, routers, and printers. Another title for this occupation is hardware engineer."

Typical work for hardware engineers includes:

- Diagnosing and troubleshooting failed rotational media and solid-state storage devices.
- Conducting technical exploitation and examination of high priority digital media.
- Participating in the design and development of electronic circuits and assemblies.

https://www.thebalancecareers.com/computer-hardware-engineer-525999#:~:text=Computer%20hardware%20engineers%20oversee%20the,this%20occupation%20is%20hardware%20engineer.

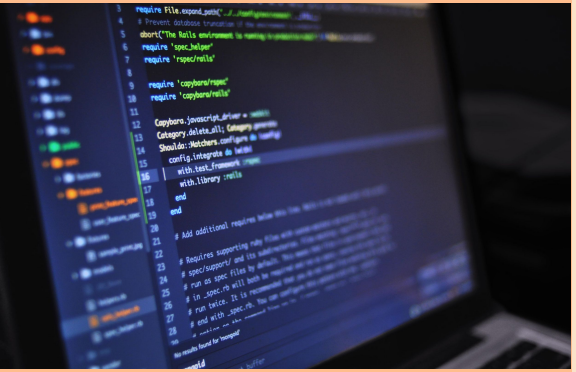
NETWORK ENGINEER

Network engineers plan,construct and manage networks to ensure that they are functioning as intended. “As a network engineer, you’re responsible for the foundation of an organization’s IT system (and by default, the entire organization).”

Network engineers create physical and wireless networks, troubleshoot issues, and researching new technologies.

There are many network engineering paths you can take such as network specialist, network administrator, network technician, network analyst, network manager, and network manager.

https://www.newhorizons.com/article/how-to-become-a-network-engineer#:~:text=Network%20engineers%20(also%20called%20network,default%2C%20the%20entire%20organization).



WEB DEVELOPER

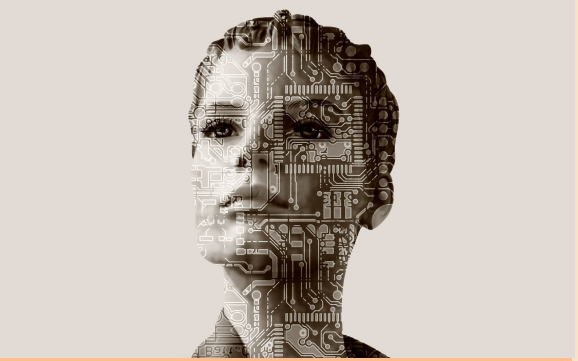
A web developer is someone who takes web design and makes it into a website. They do this by writing many lines of code using complex coding languages. Some include HTML and python.

BUT WHY IS WEB DEVELOPMENT IMPORTANT?

According to nova software, “Web development services help your company to increase product knowledge, maintain communication between you and potential clients, sell your products or services, generate leads for the business, and increase the popularity of your company and much more."

https://www.novasoftware.com/Articles/The-Importance-of-Website-Design-and-Web-Development-Services-for-a-Company.aspx#:~:text=Web%20development%20services%20help%20your,your%20company%20and%20much%20more.&text=At%20present%20the%20number%20of,the%20web%20is%20in%20millions.

https://www.bitdegree.org/tutorials/what-is-a-web-developer/



DATA SCIENTIST

A data scientist is responsible for collecting and analyzing extremely large amounts of data. “The data scientist role is an offshoot of several traditional technical roles, including mathematician, scientist, statistician and computer professional. This job requires the use of advanced analytics technologies.”

WHY IS DATA SCIENCE IMPORTANT?

Well, data science allows large amounts of data to be collected which helps in the business world allowing brands to understand customers. “data science can be used to help companies control the stories of their brands.” According to “Tech Target” “Data science plays a very important role in security and fraud detection, because the massive amounts of information allow for drilling down to find slight irregularities in data that can expose weaknesses in security systems.”

https://searchenterpriseai.techtarget.com/definition/data-scientist#:~:text=A%20data%20scientist%20is%20a,scientist%2C%20statistician%20and%20computer%20professional.

https://www.sciencedirect.com/topics/computer-science/data-architecture#:~:textData%20architecture%20is%20important%20for%20many%20reasons%2C%20including%20that%20it%3A&textHelps%20you%20gain%20a%20better%20understanding%20of%20the%20data&textProvides%20guidelines%20for%20managing%20data,information%20consumption%20by%20the%20business%20people&textProvides%20a%20structure%20upon%20which%20to%20develop%20and%20implement%20data%20governance

https://www.techopedia.com/definition/29452/data-architect

http://www.databaseanswers.org/role_of_data_architect.htm

DATA ARCHITECT

A data architect: designs data architectures, designs and builds relational databases,cleans and maintains the database by removing and deleting old data. Data architects defines how the data will be stored. Data architects are skilled in logical data modeling and identifying and selecting a system that is best for addressing data storage, retrieval and management.

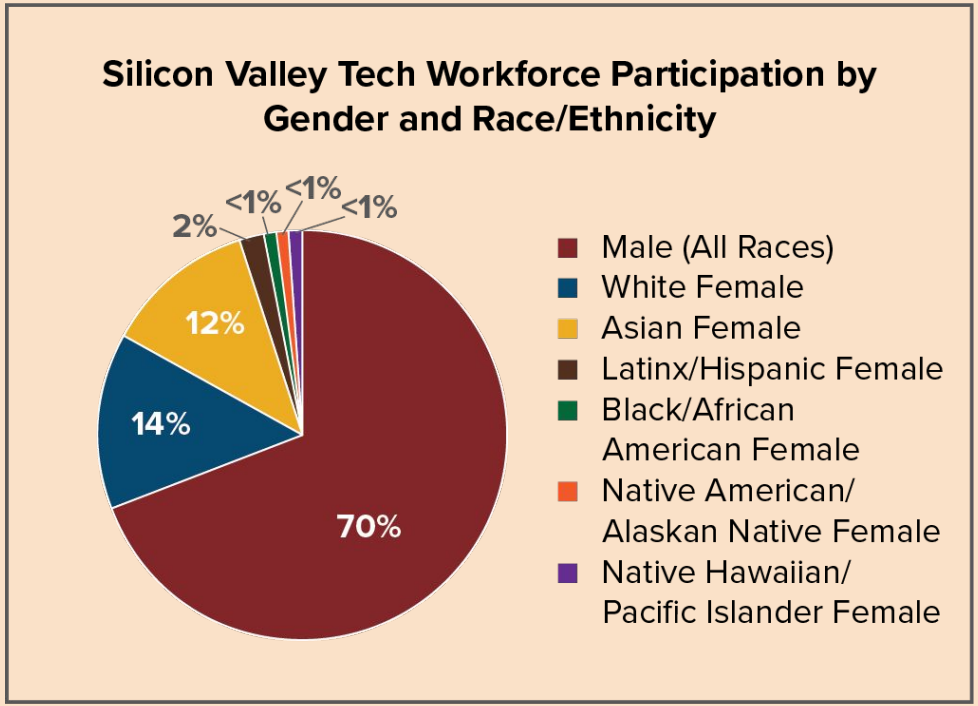
WHY IS DATA ARCHITECTURE IMPORTANT?

Helps you gain a better understanding of the data, helps with enforcement of security and privacy, and supports business intelligence.

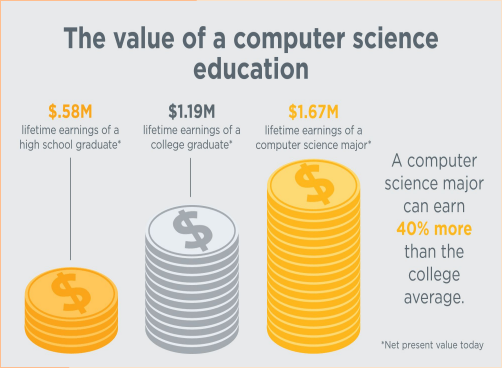
STATISTICS

ABOUT WOMEN IN STEM CAREERS

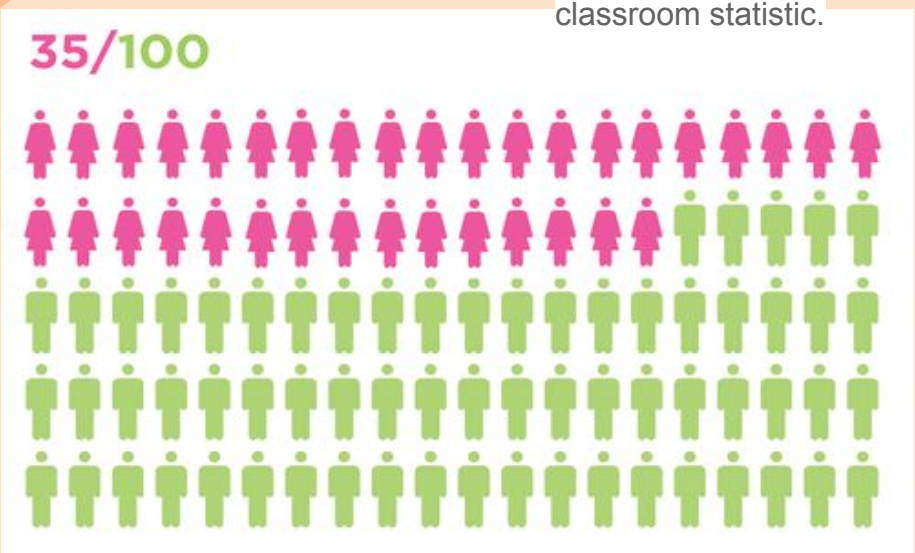
Shocking Statistics…..



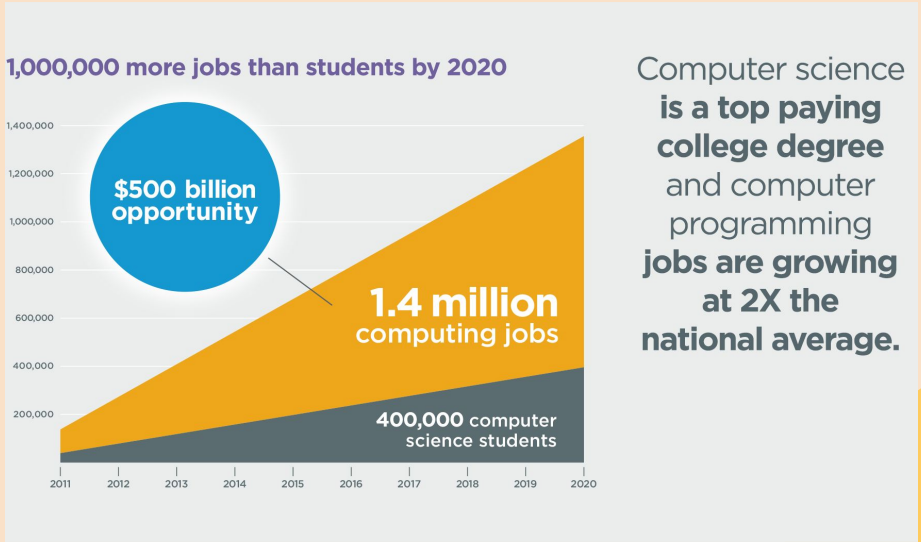
Source: EEOC, 2016; Hongsdusit & Rangarajan (2018); Includes EEOC category of "professionals."



Statistics about STEM careers and women in STEM.



https://www.stemwomen.co.uk/blog/2019/09/women-in-stem-percentages-of-women-in-stem-statistics



The Hidden Women of Stem

Empowering latina women through STEM and leadership

THANK YOU!