

# EXPLORING COMPUTER SCIENCE

By: Momin Chaudhry

## EMERGING FIELDS

### CRYPTOGRAPHY



Cryptography is the process of converting messages into encrypted text which cannot be decrypted unless certain keys are possessed. This ensures the safe transportation of information across the internet or other platforms. In the future, more cryptographers will be needed to develop complex methods of encryption due to greater need for it as more advanced computers could potentially crack certain encryption methods.

Cryptography is used for all information sent over the internet, this includes: banking, messages, emails, passwords, confidential information, etc.

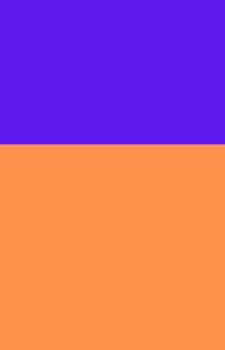
### NATURAL LANGUAGE PROCESSING (NLP)



Natural Language Processing is a branch of artificial intelligence that focuses on streamlining interactions between computers and humans through natural languages such as English. This process involves breaking down human speech into bytes which are processed by the computer. In the future NLP is anticipated to be implemented in all aspects of our lives through smart devices and other pieces of hardware and software.

NLP is used very frequently such as: Siri, Google Assistant, Amazon Alexa, spell check and autocomplete.

### QUANTUM COMPUTING



Quantum computing is a new type of computing that uses superposition. Traditional computers use bits which represent either 0 or 1, quantum computers use qubits which can take the value of 0, 1 or both simultaneously. Quantum computing will be used much more in the future due to how quickly it can solve problems and do complex tasks.

Quantum computing is used to solve complex problems, discover new elements and help optimize tasks such as scheduling and booking in the most efficient way possible.

## FUTURE CAREER

### SOFTWARE ENGINEER



Software engineering is the process of applying computer science principles in the real world by developing programs and softwares to be used by end users. Software engineering differs from computer science by being more application based rather than theoretical-based.

To become a software engineer, one needs a bachelor's degree in engineering or applied sciences and be apart of a Professional Engineering society (P.Eng.).

### COLLABORATION WITH FINTECH



Software engineering goes hand in hand with computer science as it uses its concepts and applies them. Due to every aspect of life now having technology implemented in them, software engineering links to almost everything, including fintech.

Fintech, also known as financial technology is the branch of finance that focuses on making programs with different purposes to help consumers and financial organizations.

These programs include mobile banking, e-transfers, algorithmic trading programs, cryptocurrencies, etc.

Due to the rise of fintech, some banks are completely online, such as Tangerine which has only 5 branches in all of Canada.

## PROBLEMS

### Computer Science on Different Levels



Computer science is being used to solve problems on different levels across the world due to how connected we all are. Issues that are faced by people in Europe have some sort of impact on us, as such, computer science research is being done all the time to relieve society of these problems.

Problems such as fake news, cyber crimes, malware, diseases, climate change have an effect on all of us and are being solved through computer science research as well as other research.

### Specific Problem



One specific problem that is being solved through the help of computer science is the current Coronavirus pandemic. Ever since its beginning and through its rapid expansion, Geographic Information Systems (GIS) have been used to monitor where cases are, which areas need heightened responses and what future predictions can be made. Through GIS modelling, it can be seen how effective certain lockdowns will be and whether or not they should take place to reduce the total case count. This issue affects everyone everywhere across the world and proves to us how important computer science research is in our lives. Careers which are being involved in solving this pandemic are epidemiologists, medical researchers (researching equipment that involves CS for medicine), GIS specialists and analysts, web developers, server technicians and everyone in the medical field.