

Computer Science

Dua of the week

What does a computer do?

What is Computer Science?

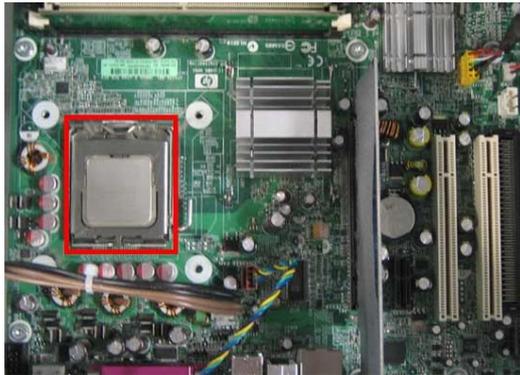
Computer science...

- A computer is a tool we program to carry out different operations.
- Computer science is based off of reasoning, logic, and math
- Computer science is designing algorithms that will solve complex problems, and create programs

Some parts of a computer

Central Processing Unit (CPU)

- The brain of the computer. It follows instructions on what to do and gets information from memory



Memory

- The memory tells the computer what step of an instruction its on



The Quran tells us to help one another, and to always do good.

“Goodness does not consist in turning your face towards East or West. The truly good are those who believe in God and the Last Day, in the angels, the Scripture, and the prophets; who give away some of their wealth, however much they cherish it, to their relatives, to orphans, the needy, travelers and beggars and to liberate those in debt and bondage; those who keep up the prayers and pay the prescribed alms; who keep pledges whenever they make them; who are steadfast in misfortune, adversity and times of danger. These are the ones who are true, and it is they who are aware of God. (Al Quran 2:177)”

The applications of computer science

Computer science can be used in many ways to help the world around us.

- We can make a zakat/sadaqah donation website, to help people around the world who are suffering from poverty etc.
- Computers can be used to help doctors cure patients
- We can connect with our family members and check up on them even if we are away from them
- Create a Quran app so that we can read the Quran anytime
- What are some other ways that you can use a computer to help the world around us?

- “Islam is a religion of reason and conscience”
 - We use reason and follow our conscience to understand God’s signs
- By using reason, we can avoid contradictions
- A contradiction is when things oppose each other.
- For example If I say that yesterday I was in Saskatoon all day, but then I say that I was in Calgary all day, then that is a contradiction.

- Q: Can you guys come up with some contradictions?

Algorithms

- When we write computer programs we have to make sure that there are no contradictions, otherwise the program will not work correctly.
- A computer program is an **algorithm**.
- An algorithm is a set of steps to do something or solve some problem
- When you follow a recipe to bake a cake, you are following an algorithm
- The program has to be written clearly and it has to make sense for the computer to follow it correctly.

Q: What is the algorithm to do wudu?

Conditional Statements

- Algorithms also make use of **conditional statements**.
- A conditional statement is a condition in the code that has to be checked and true before it can continue on to a certain part of the code
- Example:
 - ‘If it is sunny, then I will go outside” According to this statement, the only time I can go outside is if it is sunny
 - Q: Can you guess what some of the keywords of a conditional statement are?

Key Words in a Conditional Statement

If

Then

Else

Else if

Now let's talk about...

**01100010 01101001 01101110 01100001 01110010
01111001.....**

...Binary

How do we write programs

- What are some programming languages that you have heard of?
- Programmers write code in programming languages like Java, C++, Python...
- These programs are then converted to a language that the computer can understand...

- At the very low level, computers only understand 0's and 1's and the operations done on those 0's and 1's (like adding, multiplying etc)
- When you play a game or write an essay on any digital device, the computer does all of those things by only dealing with 0's and 1's!
- These 0's and 1's are called **bits**
- The bits are on(1) off(0) electrical signals. The value of a bit determines which part of the circuit the data flows through
- So, a computer uses the **binary** number system, which only contains the digits 0 and 1. We use the decimal number system in everyday life

Q: How many instructions does a computer perform per second?

A: Billions of instructions!!!!

English Alphabet → Binary

example : let's translate a name to binary!

ASCII BINARY ALPHABET

A	1000001	N	1001110
B	1000010	O	1001111
C	1000011	P	1010000
D	1000100	Q	1010001
E	1000101	R	1010010
F	1000110	S	1010011
G	1000111	T	1010100
H	1001000	U	1010101
I	1001001	V	1010110
J	1001010	W	1010111
K	1001011	X	1010111
L	1001100	Y	1011001
M	1001101	Z	1011010

Lets work with Binary!

- Were going to make a bracelet/necklace. You can make this for yourself, your mom, friend, or whoever you want
- The colors of the beads will represent either a 0 or 1
- **Algorithm:**
 - Write a name down on a piece of paper and convert your name to binary using the conversion chart
 - Choose two different colors of beads, for example I can have yellow represent 1 and purple represent 0
 - Choose a SINGLE separate color to mark the start of the name and another color bead to mark the end of the name
 - While the bracelet/necklace isn't completed
 - Use the name conversion you had made to create your binary name bracelet

Cryptography

- Cryptography is the study of secret codes.
- We take an ordinary message and **encrypt** it into something that looks different- called a ciphertext.
- The only way to **decrypt** the ciphertext is to know the secret keys that were used to encode the message.
- Cryptography is used in computer science - to secure websites and anything on the internet. When you want to log in to your bank account, you want that website to be secure so that only you are able to access your money.

Example of a cipher

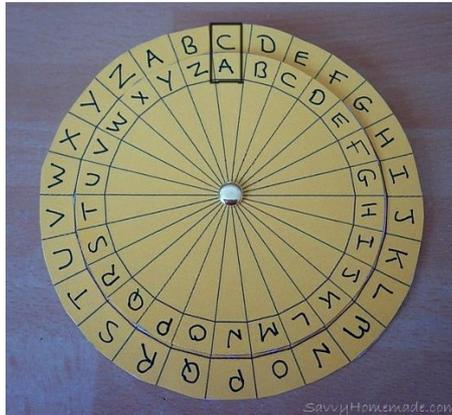
Ciphertext: “aol jvbuayf dpao aol opnozta tbspt wvwbshapvu pz pukvulzph”

The original text is.....

Plaintext: “The country with the highest muslim population is Indonesia”

The Caesar Cipher

- There are many different types of ciphers, some more secure than others
- The caesar cipher is a simple cipher that was used by Julius Caesar.
- It's very simple to use.
- We will use a cipher wheel to encrypt and decrypt messages
 - The outer wheel is the ciphertext, the inner wheel tells us the regular text.
 - Example: Let's encode this message together. We will have C in the outer wheel correspond to A in the inner wheel. So your wheel should be positioned like this:

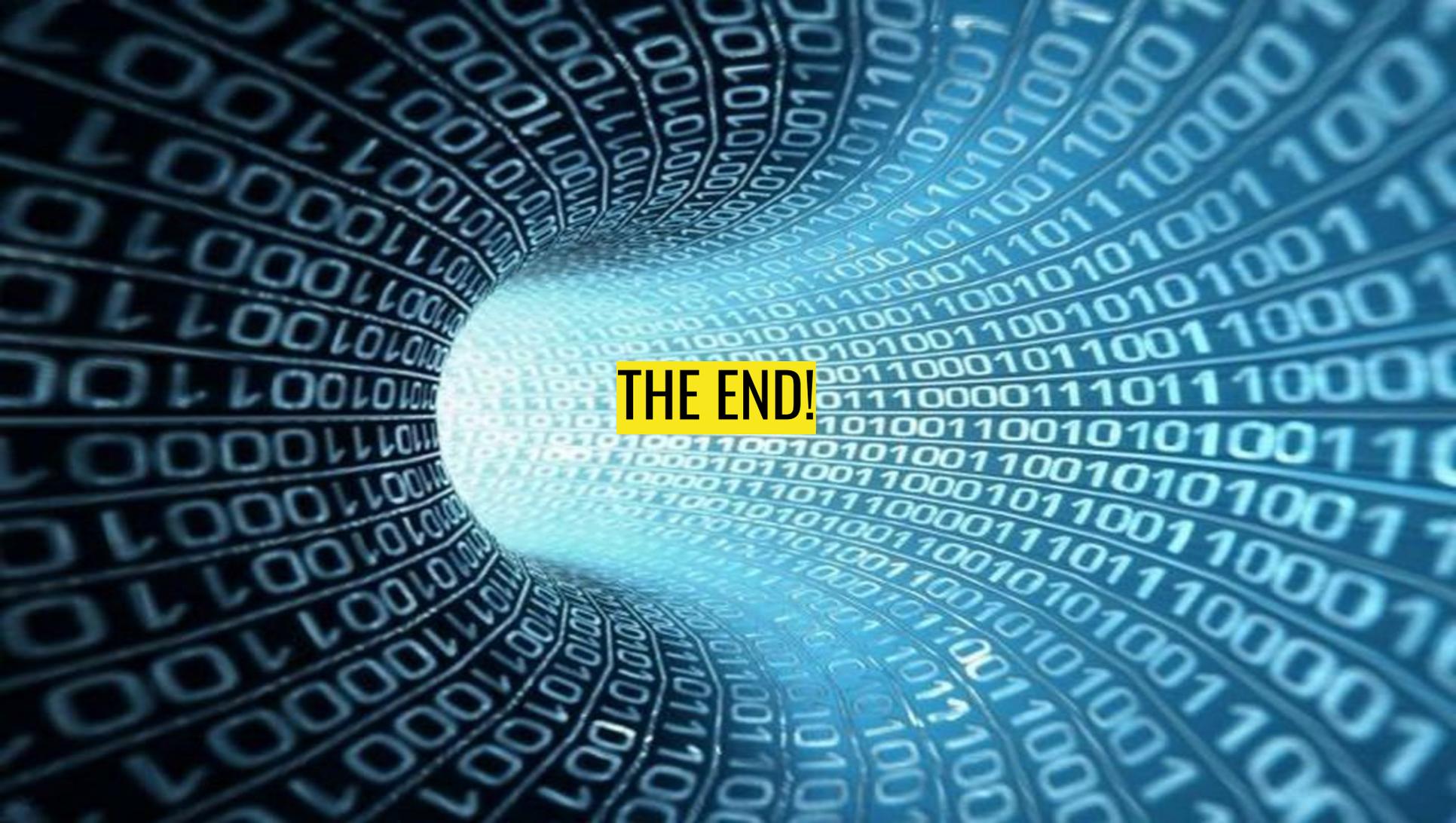


Message to encode:

This is a secret message"

Cipher activity

Let's decode some messages! You can work in groups or on your own.



THE END!