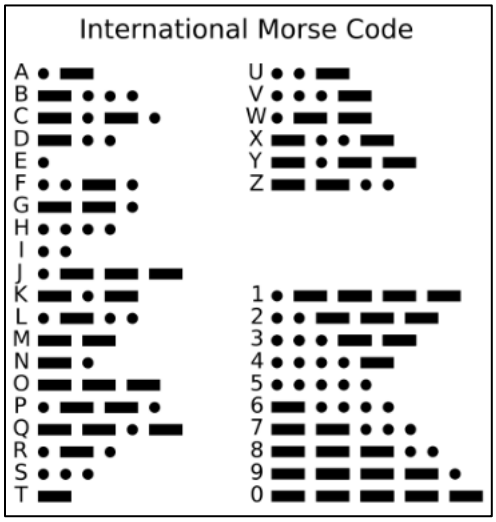
Ciphers in Our Life

1. **Morse Code**: is a secret language made of dots (·) and dashes (−). The dots and dashes can also be expressed using two sounds: a short "dit" and a long "dah"! It was invented in 1830s by Samuel Morse. Think of it like a secret code you can tap out, flash with a light, or even buzz with a sound! It's been used to send messages across oceans, guide airplanes, and even save people in trouble. With Morse Code, the world became more connected, long before Wi-Fi or phones. And now you get to explore how it all works!



Note that "." stand for dots, "_" stand for dashes, and "/" stand for spaces between words while writing a morse code message.

a) An airplane is sending a message to the control tower! What word are they spelling with this code?

... - --- .--.

b) Deep under the ocean, a submarine is sending a message through a special cable. Decode their message:

-.. .- -. --. . .-.

c) It's nighttime and you're sending a message to your friend in the house next door with a flashlight. A short flash is a 'dit', a long flash is a 'dah'. What word are you sending if you flash:

..-. .-. .. . -. -..

d) You're lost in the wilderness and you're trying to signal a rescue plane with a mirror! What important word are you trying to flash?

... --- ...

e) Imagine your computer could only speak in Morse Code! If a click is a 'dit' and a long hold is a 'dah', what number are you trying to type?

...--

f) Two ships are passing in the night and communicating with their signal lights! Ship A flashes:

.--. --- .-. —

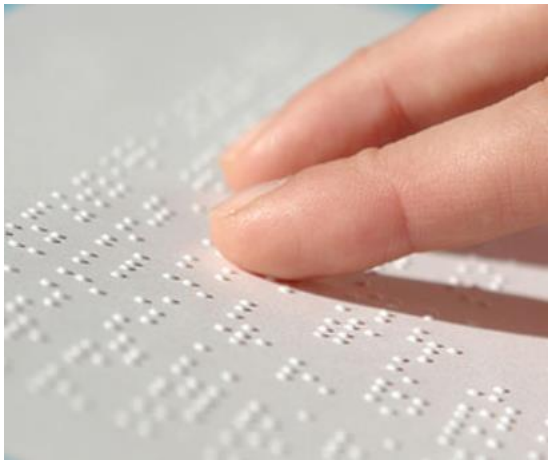
What word are they asking about?

g) I can be tapped, flashed, or beeped. I help people communicate across long distances. What am I?

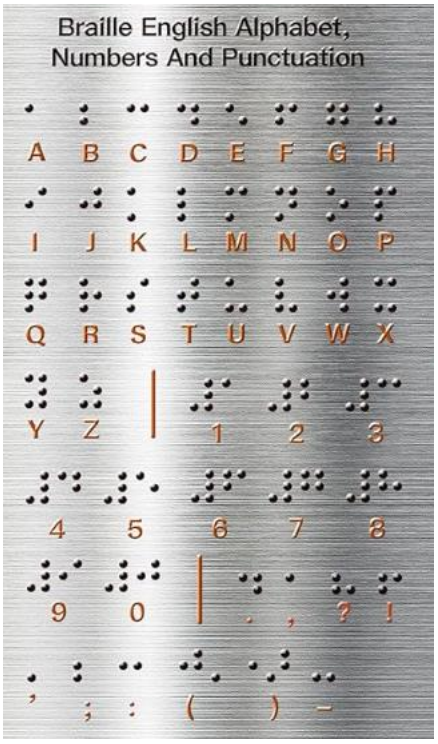
Decode: -- --- .-. ... . / -.-. --- -.. .

2. **Braille**: Braille is a special way of reading and writing using raised dots that blind or visually impaired people can feel with their fingers. It was invented in 1824 by Louis Braille, a blind French boy who wanted a better way to read books.

   Each Braille letter, number, and even music note is made up of six tiny dots arranged in two columns. Today, Braille is everywhere—on restaurant menus, medicine labels, and public signs—helping blind people stay independent. Let's explore how Braille works.



   Each braille character is written within a tiny box called "braille cell" consisting of 3 rows and 2 columns. A dot represents a raised bump. Braille English alphabets, numbers and punctuations are represented as below:

A Braille Cell

a)

The letter “a” is written with only dot 1.

The letter “d” has dots 1, 4, and 5.

d

The letter “y” has dots ___ , ___ , ___ , ___ , and ___

b) A “period” **.** is written with dots 2, 5, and 6. (Do you see how it is the same shape as the letter “d,” only lower in the cell?). Hence its also called as a “dropped d”

What punctuation mark is denoted by a “dropped f”?

c) All the Braille numbers are made using the first ten letters of the alphabet, “a” through “j”.

Select True or False

d) There is always a special sign before each number. Select True or False

e) Write your first name in Braille below:

3. **ASCII Code**: Did you know computers don't understand letters or numbers the way we do? Instead, they use a special code called ASCII (pronounced ASK-ee) to turn every letter, number, and symbol into a number that the computer can understand! For example:
   - The capital letter A = 65
   - The lowercase a = 97
   - A space = 32

   Invented in the 1960s, ASCII (American Standard Code for Information Interchange) helps computers send messages, display text, and even play games. Whenever you type, press a key, or send a message, your computer quietly changes your words into ASCII numbers behind the scenes!

   a) Find the ASCII code for the capital letter B.
   (Hint: It's one after A = 65)

   b) What letter is represented by ASCII number 67?

   c) Decode this ASCII sentence:
   72 73

   d) What is the ASCII code for the SPACEBAR?

   e) Rearrange these ASCII codes to make a word: 76 79 79 72

4. **ASCII Code to Binary**: Here's an even bigger secret: Computers don't actually understand regular numbers like 1, 2, or 3 and hence don't even understand ASCII numbers. They only understand two things: ON and OFF similar to dot and dash of Morse Code! Think of it like a light switch – it's either on or off. So, how do computers talk to each other if they only understand ON and OFF? They convert the ASCII number of the character to Binary! Binary is a number system that only uses two digits: 0 and 1.
   1 means ON (like the light switch is on!)
   0 means OFF (like the light switch is off!)

   When you type a letter, your computer first turns that letter into its ASCII number. Then, it takes that ASCII number and turns that into its Binary which it understands.

   a) Find the ASCII number of the capital letter C? Now convert this ASCII code to Binary which computer understands:

ASCII Number	**Basic Binary Numbers**							
	128	**64**	**32**	**16**	**8**	**4**	**2**	**1**

   b) A computer understands the binary number B 01100001. What English alphabet it denotes?

c) Write your first name in binary digits which computer can understand.

5. **Minecraft: How To Read Enchantment Table Language**: One thing that remains a mystery to many Minecraft players is the language that appears on the enchantment table when you interact with it. So, what is the enchantment table language and how can you read it?

The text displayed on the Minecraft enchanting table is the Standard Galactic Alphabet (SGA).

Use the above table to find the enchanting message 1,2,3 on the Minecraft screen above.

Final Problem: Number and Points: Decode (also called decrypt) the message below:

	1	2	3	4	5
1	A	B	C	D	E
2	F	G	H	I/J	K
3	L	M	N	O	P
4	Q	R	S	T	U
5	V	W	X	Y	Z

.	3	.	5	1
4	3	3	.	.
1	.	4	2	4
2	4	.	.	3
1	.	4	2	.

References:

1. Round 1, Problem 1 International Olympiad in Cryptography NSUCRYPTO 2022, https://nsucrypto.nsu.ru/archive/
2. Refer https://morsle.fun/ to experience morse code sound signals
3. https://www.reddit.com/r/StandardGalactic/comments/fwzndv/the_standard_galactic_alphabet_minecraft/