CS3101 - COMPTUATIONAL THINKING LAB

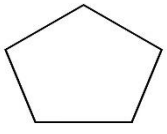
BATCH – Q

WEEK – 11 – 14.12.2023

SCRATCH & CIPHERING A SENTENCE

OBSERVATION

1. Using Scratch, design a script which would accomplishes your sprites to perform the following sequences.

a) Draw a Pentagon.	

EXECUTION & SPOT

1. **Activity 1 : Ciphering a Sentence**

Use the rules below to create ciphers.

Create two rules for mapping the alphabet.

Sample rules:

- The characters are divided into two groups: (1) characters for which the image of their uppercase form has an enclosed area (such as P or O) and (2) characters that do not have an enclosed area in in the image of their uppercase form (such as I or Z).
- Sort the two groups alphabetically, with group 1 first and then group 2.

Apply the rules.

Applying rule 1:
Group 1: {A, B, D, O, P, Q, R} Group 2: {C, E, F, G, H, I, J, K, L, M, N, S, T, U, V, W, X, Y, Z}

Applying rule 2:
A, B, D, O, P, Q, R, C, E, F, G, H, I, J, K, L, M, N, S, T, U, V, W, X, Y, Z

Place the letter sequence that resulted from Rule 2 in the second row of the following table beneath the number 1 to 26 (example completed below).

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

This table shows a one-to-one alphabet mapping (matching one letter with one number), Alphabet Mapping #1.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
A	B	D	O	P	Q	R	C	E	F	G	H	I	J	K	L	M	N	S	T	U	V	W	X	Y	Z

Now, invent a third rule and apply it to the above mapping to come up with another one-to-one alphabet mapping table. A third rule could be to place the even-number-mapped letters in alphabetical order followed by the odd-number-mapped letters in alphabetical order. Let's call that Alphabet Mapping #2.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
B	O	Q	C	F	H	J	L	N	T	V	X	Z	A	D	P	R	E	G	I	K	M	S	U	W	Y

Activity 2: Encode Sentences

Encode sentences using the mapping they developed in Activity 1.

a. **Think of a simple message you would like to send to your partner.**
b. **Encode it two times: first use just Alphabet Mapping #1, then use just Alphabet Mapping #2.**

1. **For example 1** , if the sentence is:

"We drove to the gym".

Using the Alphabet Mapping #1, we find each letter of the sentence in the second row of the table created in Activity 1. We replace the letter with the corresponding number in the first row.

Please note that one must place letter breaks (the character "_") and separate each word by a blank space. In this example, the encoded sentence is:
23_9 3_7_4_22_9 20_4 20_12_9 11_25_17

Find:

Mapping #2

2. Invent a **fourth rule from mapping #2** and apply it to the alphabet mapping #3 to come up with another one-to-one alphabet mapping table. A fourth rule could be placing the vowels at the first few positions followed by even-number-mapped letters in alphabetical order and then the odd-number-mapped letters in alphabetical order. And let it be **Alphabet Mapping #3.**

Example 1: We drove to the gym.

Example 2: I go to CT Lab today.

3. Perform deciphering of following sentence.

   a. 10_6_20_23 22_18_23_23_14_19_18 25_14_23 25_17_20_10_10_18_9 20_9 4_20_16_6_18_17 (Using Alphabet mapping #2)

   b. 20_14_22 14_1_8_18 18_2 4_20_16_6_18_17 10_6_20_23. (Using Alphabet mapping #3)