

Ozobot Evo Activity: The POW Tap Code

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Introduction

According to Wikipedia, a **prisoner of war (POW)** is a combatant or civilian who is held by an enemy power during or following an armed conflict. When held against their will, prisoners are often unable to communicate, either because of isolation or because they are not permitted to speak. The human need to communicate in such circumstances, never-the-less, is overwhelming. United States POWs of World War II and the Vietnam War often communicated with one another via a code known as a **tap code** or **knock code**. Unlike the more complicated Morse Code, each letter of the alphabet is given a unique and easy to remember series of taps. These codes could then be tapped out on jail bars and heard by other POWs. In situations where speaking was not allowed, these codes could be used by one POW tapping on the thigh of another. The tap code was significantly important for maintaining morale and chain of command when in isolation.

Figure 1 shows the details of this code. The letters of the alphabet are mapped to a 5x5 grid of rows and columns, essentially in alphabetic order. The letters C and K are assigned to the same cell since they are often similar in sound in pronouncing words, e.g., 'cold' and 'kind'. In addition, doing so makes it unnecessary to add a sixth row containing just one letter.

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

Figure 1

To tap out the letter S (in row 4 and column 3), a prisoner would tap 4 times, wait a short time interval, and then tap 3 times. The row number is tapped first and then the column number is tapped. After a longer time interval, the next letter in the message would be tapped out.

Working with the OzoBlockly Program

The OzoBlockly program will take any desired message of characters from the alphabet as input. When Evo is then placed on the OzoMap that accompanies this program, Evo will encode the message by using the tap code. While the message is tapped out, students will act as decoders to determine the actual content of the message. In addition to being fun, students will get practice in identifying coordinates as an ordered pair of numbers.

1. Open the program *TapCoder.ozocode* in OzoBlockly.
2. On the far left of the blocks making up this program, you will see functions called *Alphabet* and *My Message*. To create the message that **you** want Evo to encode, delete the blocks within the message *OZOBOTMYTINYROBOT* from the *My Message* function.
3. Now build the message that **you** want Evo to encode. As an example, suppose that you wanted to encode the short message EVO. To do this:
 - a. Right click on E in the *Alphabet* function.
 - b. Select *Duplicate* from the drop-down menu.
 - c. Drag the duplicate E into the *My Message* function.
 - d. Repeat steps a through c for the letter V, inserting the duplicate V right after the E in the *My Message* function.
 - e. In a similar manner, place the letter O right after the V.
4. You are now ready to load the program into Evo. Make sure that Evo is selected in the upper left corner of the OzoBlockly screen.
5. In the lower left corner of the OzoBlockly screen, click on the method you want to use to load the program into Evo and then follow the on-screen instructions for loading. It is a large program, so it may take about a minute to load into Evo when using Flashing.
6. With Evo turned off completely, click the button once to turn Evo on. Then when Evo's lights all turn blue, quickly double-click the button to start your program.
7. Evo's top light will turn white for three seconds, giving you a little time to place and center Evo at the start location on the OzoMap, facing the direction shown by the arrow. You will find the OzoMap on the last page of this document.
8. Evo will then encode the message one letter at a time as Evo moves from one intersection to the next. At each intersection, he will blink in red and make a tapping like tone for the row number, and then he will blink in green and make a tapping like tone for the column number. You can use the decoder chart in the center of the OzoMap as an aid in decoding the message. Once you are familiar with the decoding process, you can hide the decoder chart.
9. When Evo has encoded the entire message, he will move to the next intersection and turn off automatically.

Suggested Student Activity

Have each of the students or groups encode their own message, load the program into Evo, exchange Evo's, and then decode the message as Evo taps it out. To keep the message from taking too much classroom time to decode, you might want to set a limit on the number of message characters.

The Tap Code Decoder

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