Morse Code Workshop

A micro:bit makecode project (mentor guide)

Base character types:

morse_decoder

morse_encoder

morse_transmitter

morse_receiver

morse_transceiver

Mentor support characters:

morse_channel_admin

morse_echo_challenge

morse_messenger_challenge

morse_translator

morse_decoder

decodes user input morse signals into alphanumeric characters

<u>user input:</u>

button A == dot, button B == dash, tilt left == confirm inputs and decode

<u>LED output:</u>

count of morse signals input by user

listing of morse signals entered as zeros and ones (at development time only)

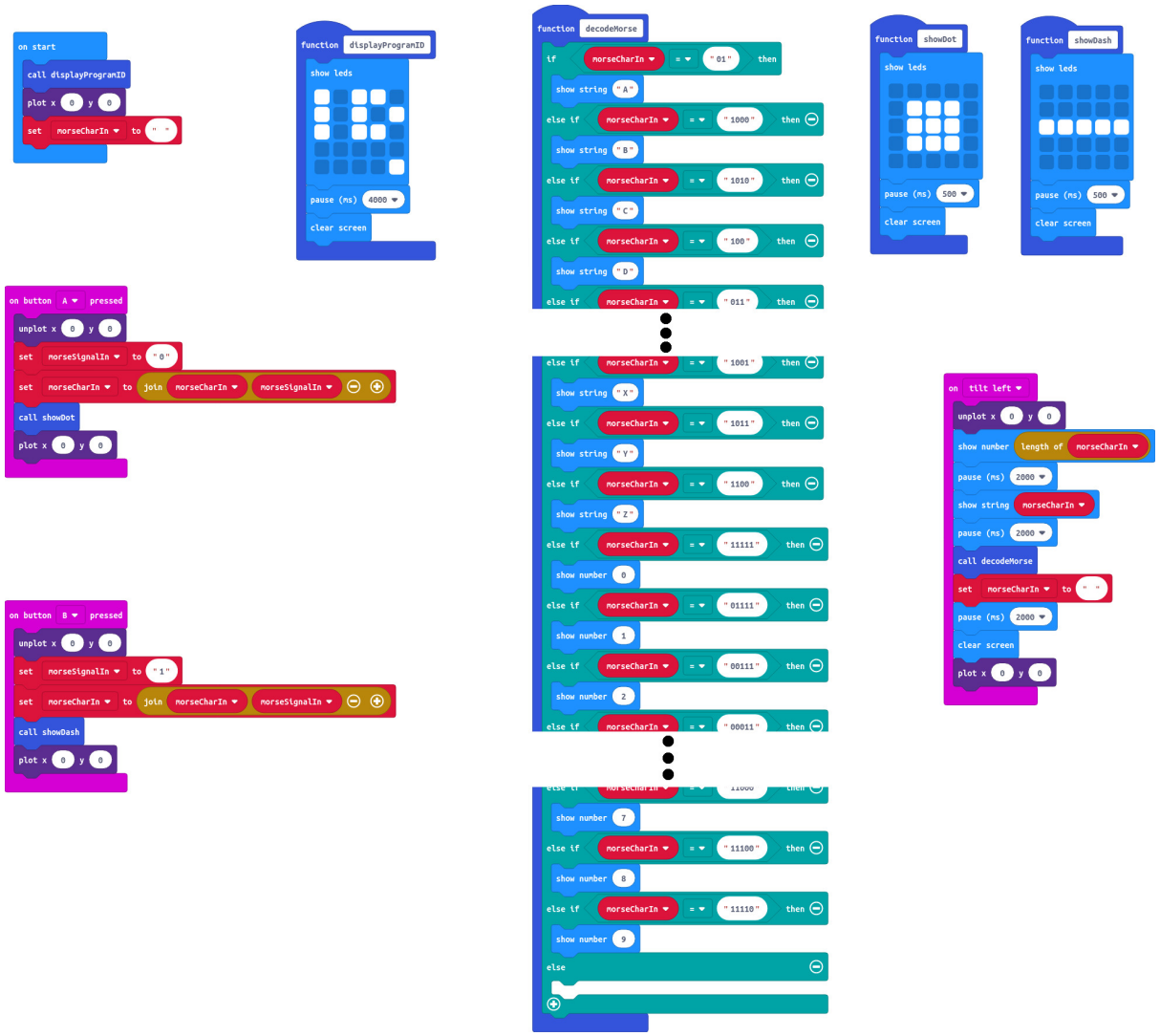
the decoded alphanumeric character

Program plots and unplots led 0,0 on start to indicate program running.

Program replots 0,0 after show... functions to indicate ready for next input

debugging data (confirmation of length of morseCharIn string and it's contents) left in for now. remove later to clean up, or leave in as useful feature?

The program can only decode single alphanumeric characters at a time at the moment because there is no way to recognise an inter-character pause. Therefore characters 'BE' (-... .) would not be distinguishable from the number '6' (-....)



morse_encoder

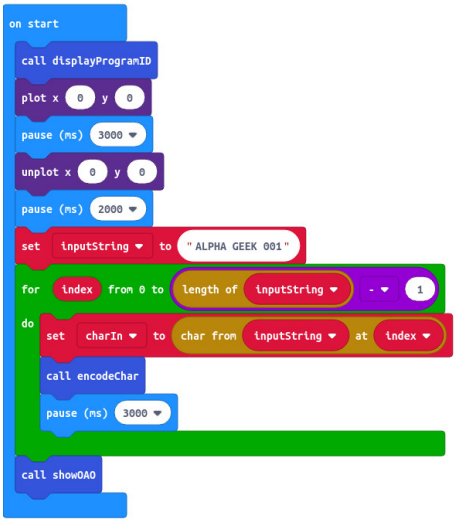
iterates though each character of a pre-defined input string, encoding each into morse code and outputting the morse signals on led display.

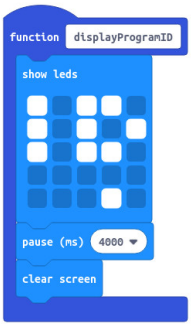
Program plots and unplots led 0,0 on start to indicate program running.

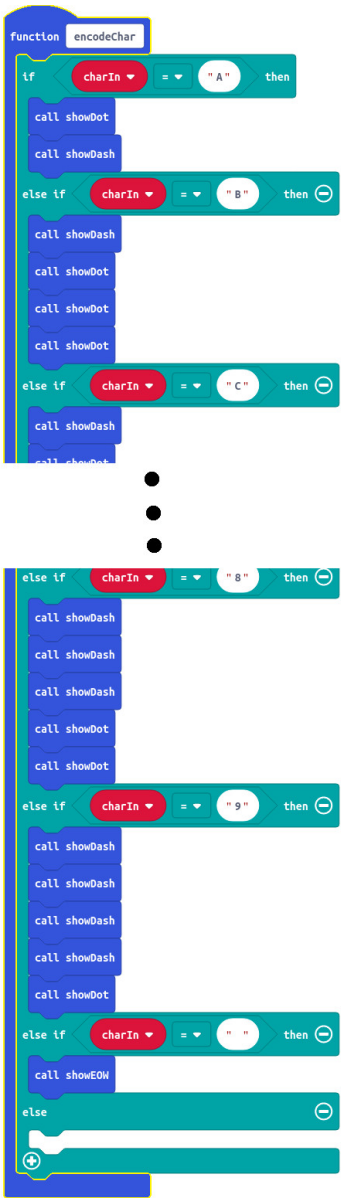
timing of dots and dashes, intra and inter character spaces, inter word spaces roughly adopted:

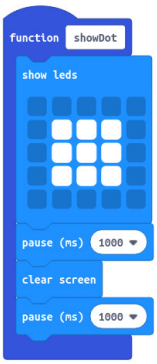
char 1, intra-char 1, inter-char 3, inter-word 7

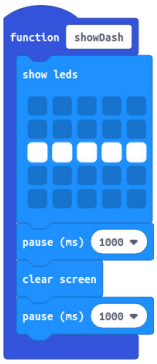
Further work:
ability to vary the speed of morse output
loop through a number of pre-defined strings
addition of buzzer output

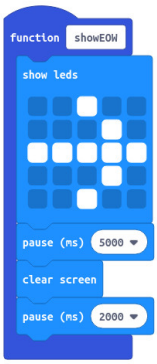


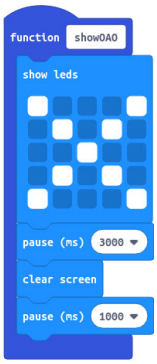












morse_transmitter

simply echoes morse signals corresponding to user input to the LED display, then transmits that morse signal

channel must be configured.

To avoid that annoying transmission delay, we must send packets BEFORE we show LEDs!

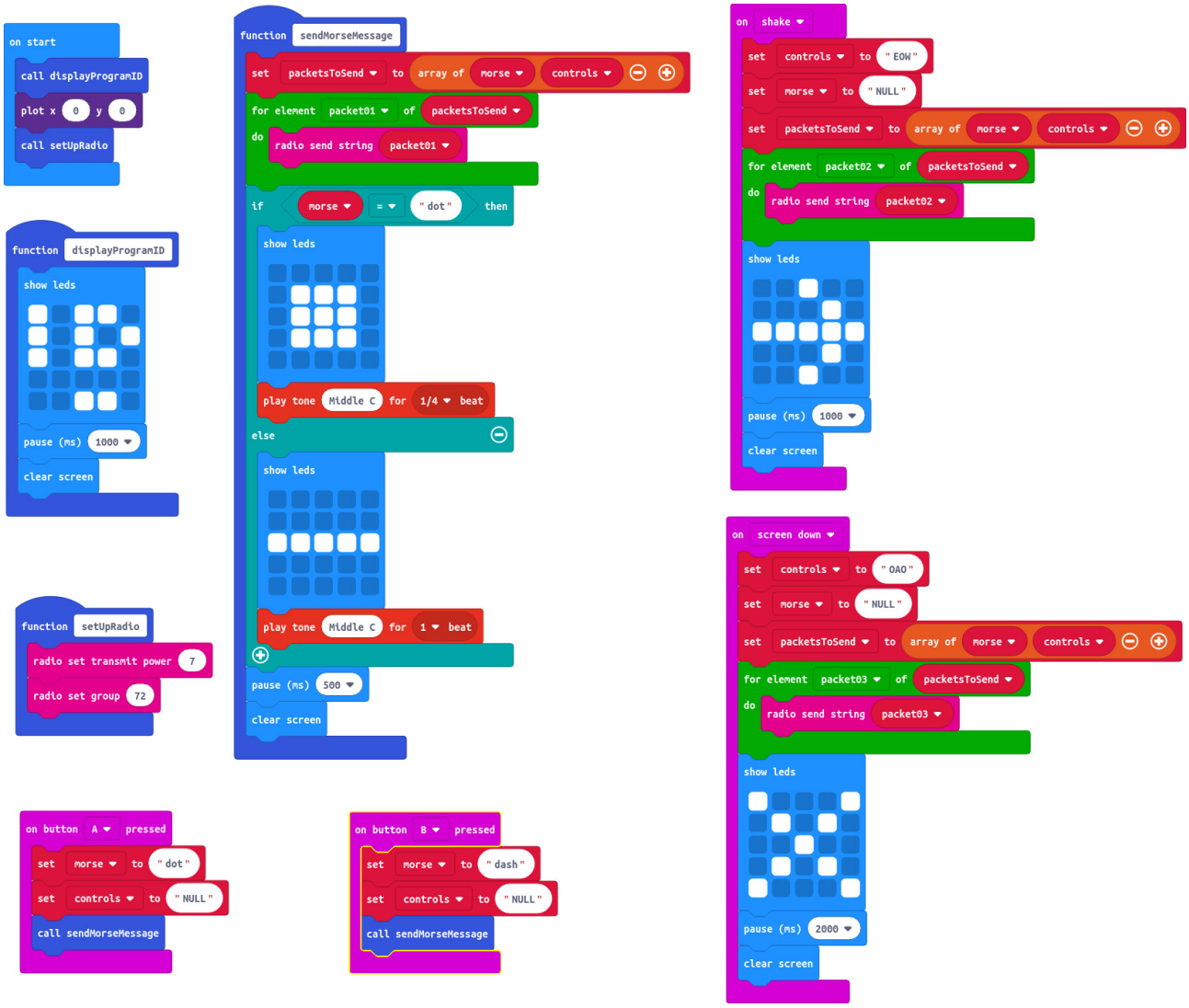
Program plots led 0,0 on start to indicate program running.

button A == send “dot” and display a dot

button B == send “dash” and display a dash

onShake ==

screenDown ==

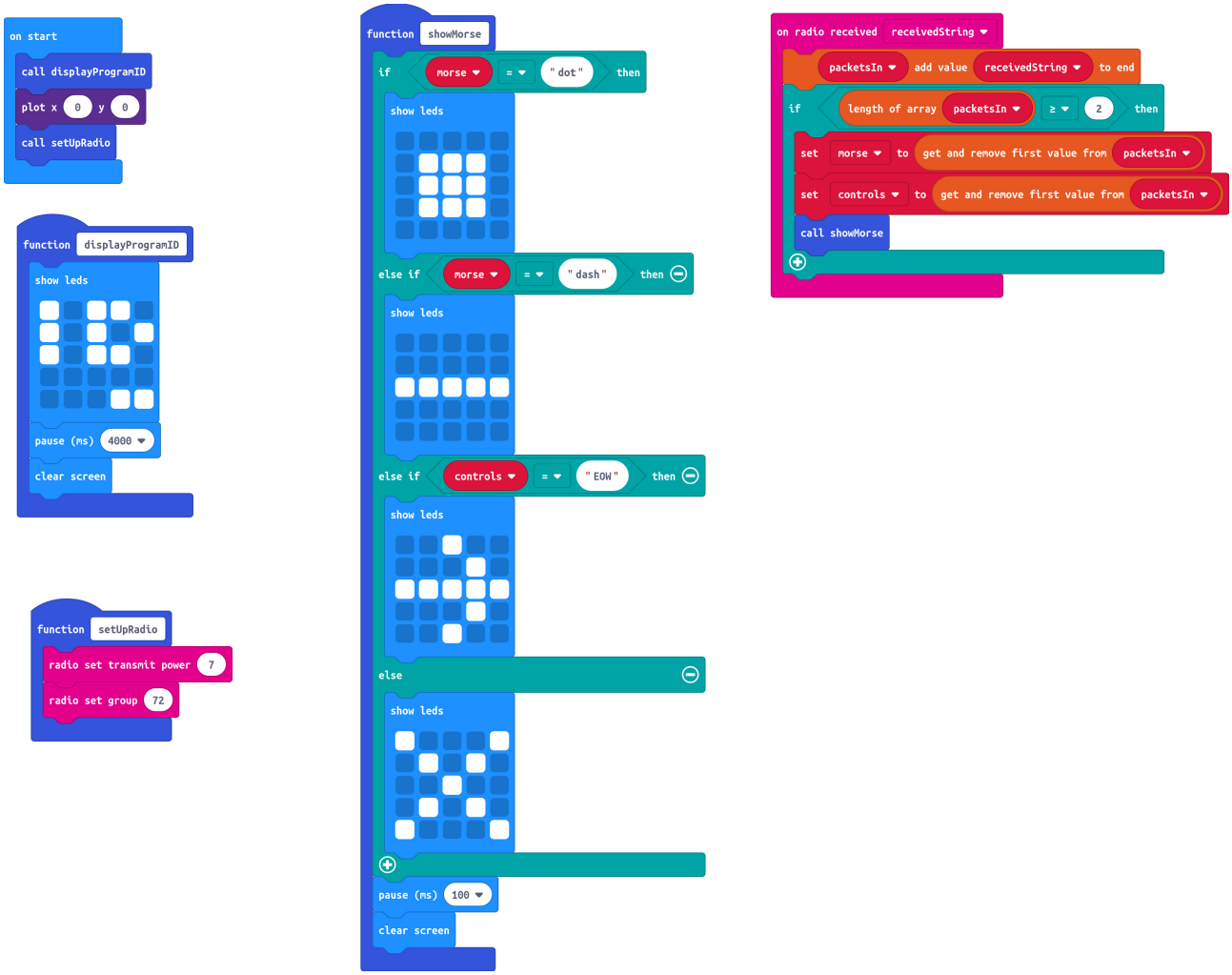


morse_receiver

simply receives morse signals and echoes each signal received to the LED display

channel must be configured.

Program plots led 0,0 on start to indicate program running.



morse_transceiver

“dot”, “dash”, “EOW” and “OAO” are preferred to something like 0,1,2,3 as values as they keep programs more readable and maintainable.

showing led output on both transmitter and receivers seem good as feedback to users.

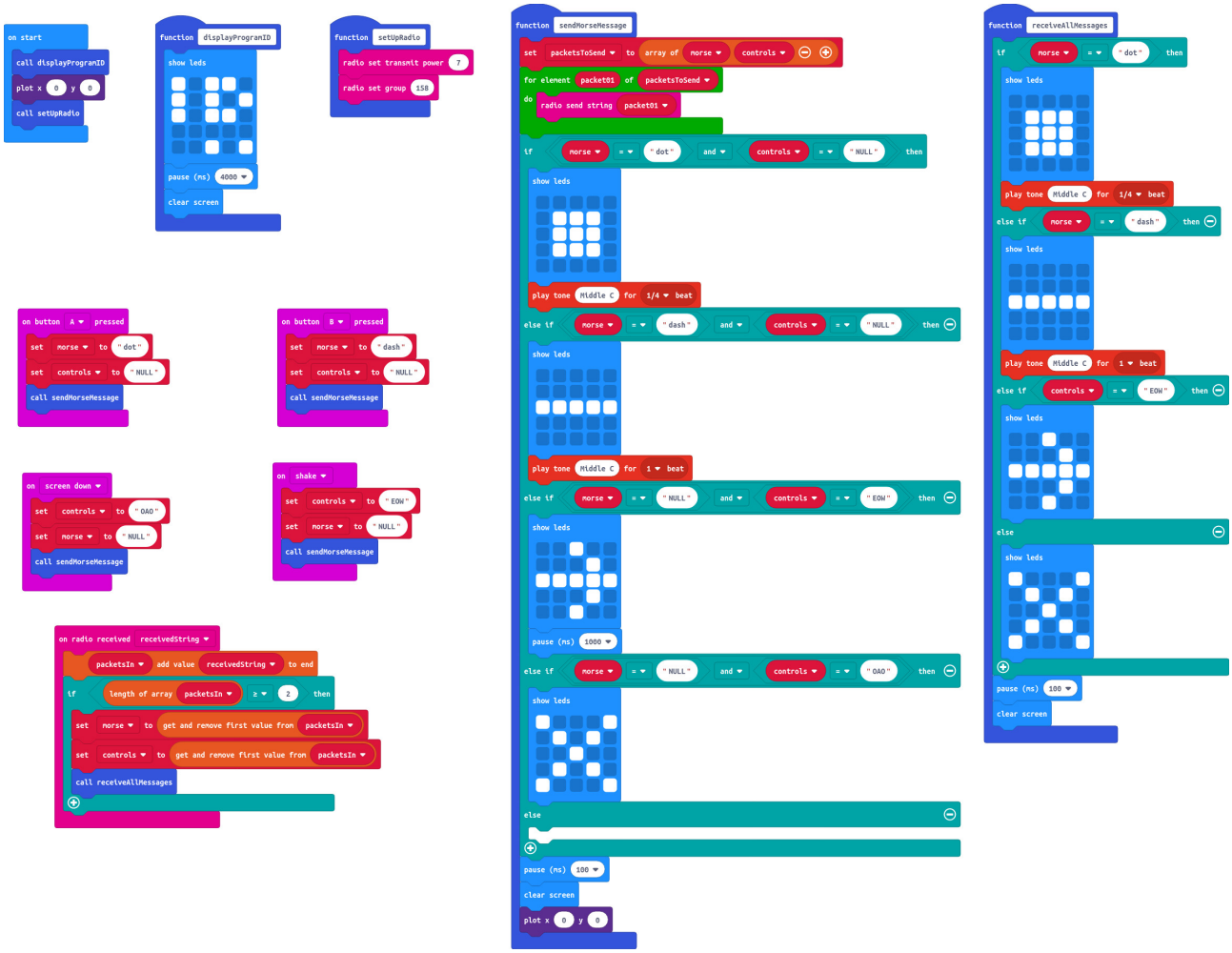
All transmitters must send packets BEFORE showing LEDs!

button A == send “dot” and display a dot

button B == send “dash” and display a dash

onShake ==

screenDown ==



morse_channel_admin

<u>description:</u>

a **transmitter** and number **decoder**

used to change the channel on which the echo_challenge character communicates. when a young coder wants to communicate with echo_challenge, we use the channel administrator to switch echo_challenge temporarily to their unique channel, switching back to the default when they've finished.

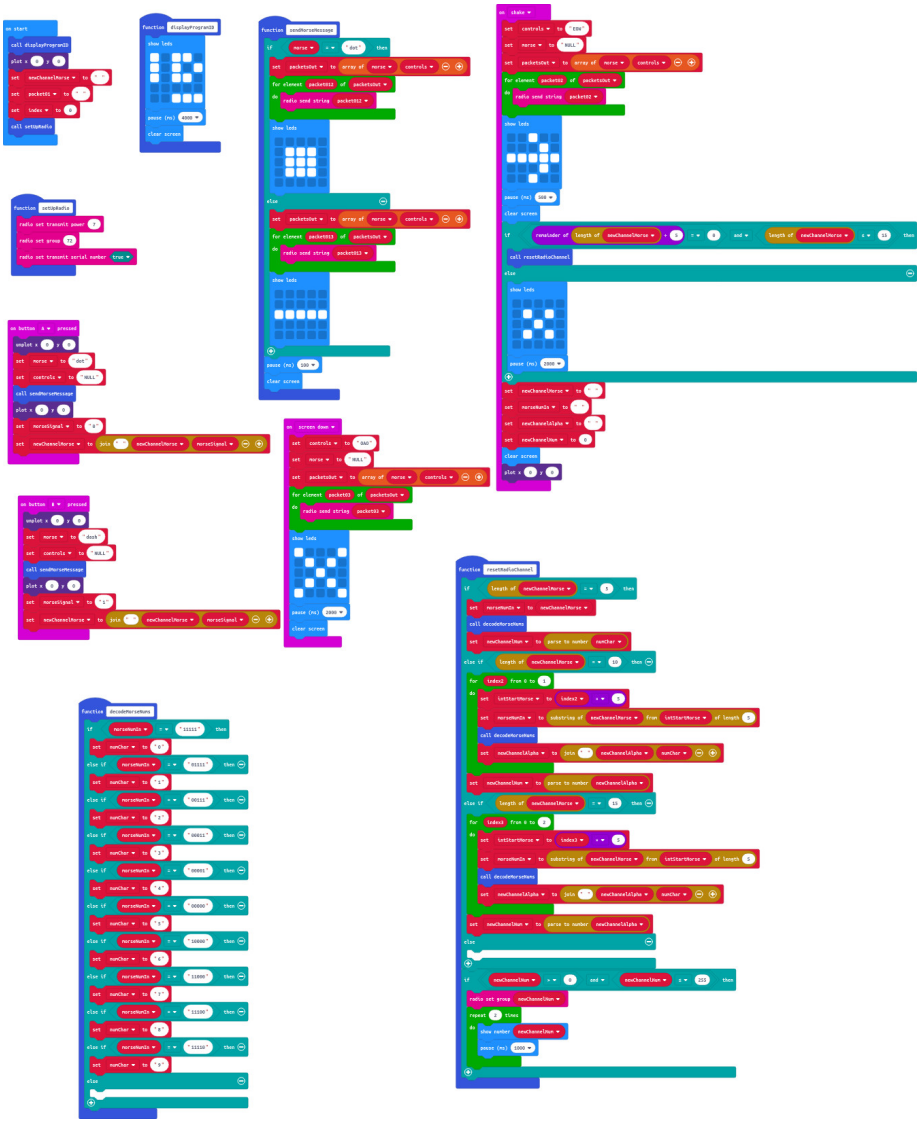
button A == send "dot" and display a dot

button B == send "dash" and display a dash

onShake == send "EOW" and display a "->" and reset radio channel to the number the which the morse input decoded

screenDown == send "OAO" and display "X"

defaults to channel 72 on start. all transmitters must send packets BEFORE showing LEDs!



morse_echo_challenge

a **decoder** and **receiver**

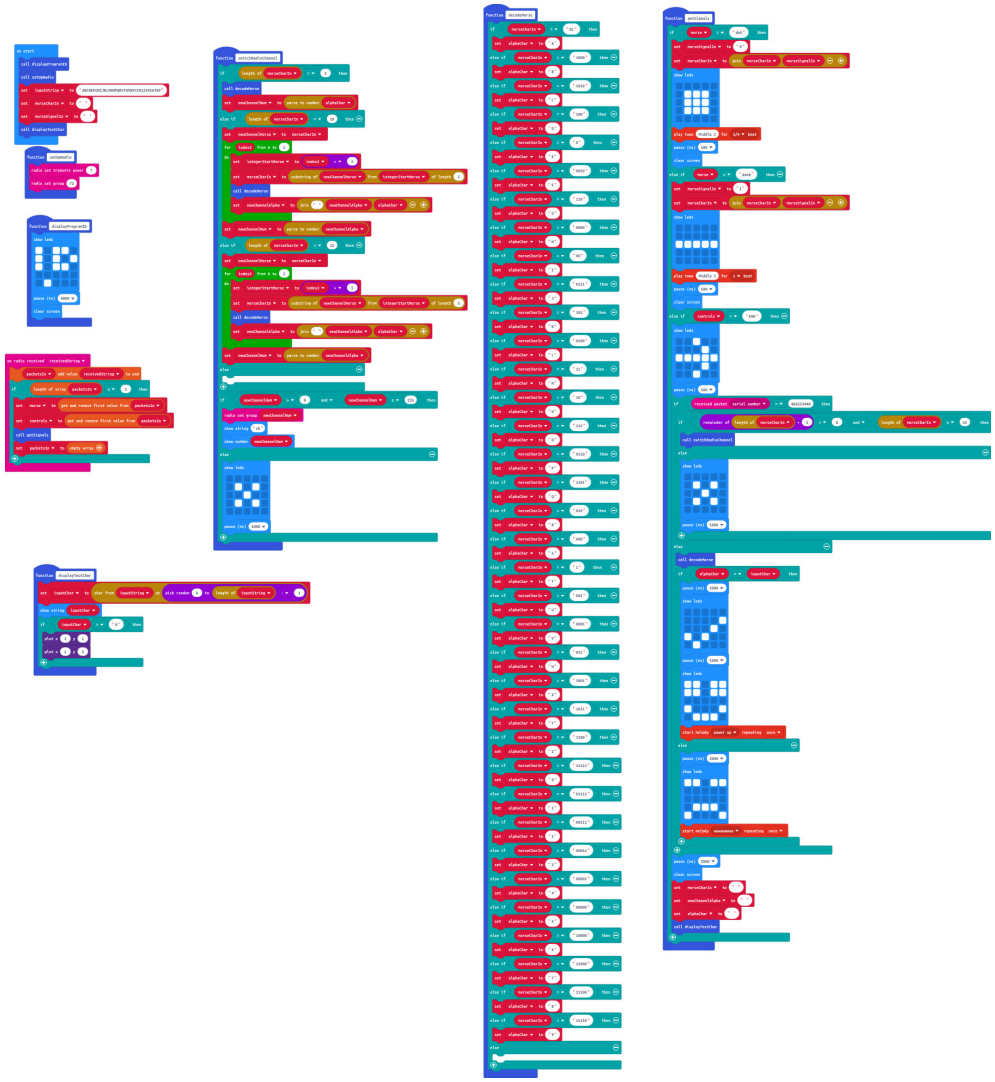
on radio received (dot or dash) == build a morse string of zeros and ones

on radio received (EOW) == either reset channel (if talking to channel administrator) or decode morse to alphanumeric character (if not talking to channel administrator).

displays random alphanumeric characters to LED.

receives morse signals from a transmitter-type device, which it decodes and compares with the displayed alphanumeric character

accepts channel switch instruction from channel_administrator device (based on packet serial number field)



the serial number of the channel administrator is hard coded and checked against received_packet serial_number, so echo challenge knows when it's being asked to switch radio channels rather than decode morse.

morse_messenger_challenge

an **encoder**

iterates though each character of a pre-defined (hard coded) input string, encoding each into morse code and outputting the morse signals on led display.

iterates through each string of a pre-defined array of strings, sending the OAO signal at the end of each one.

timing of dots and dashes, intra and inter character spaces, inter word spaces roughly adopted:

char 1, intra-char 1, inter-char 3, inter-word 7