COM1031 – Group 1224 Coursework Report

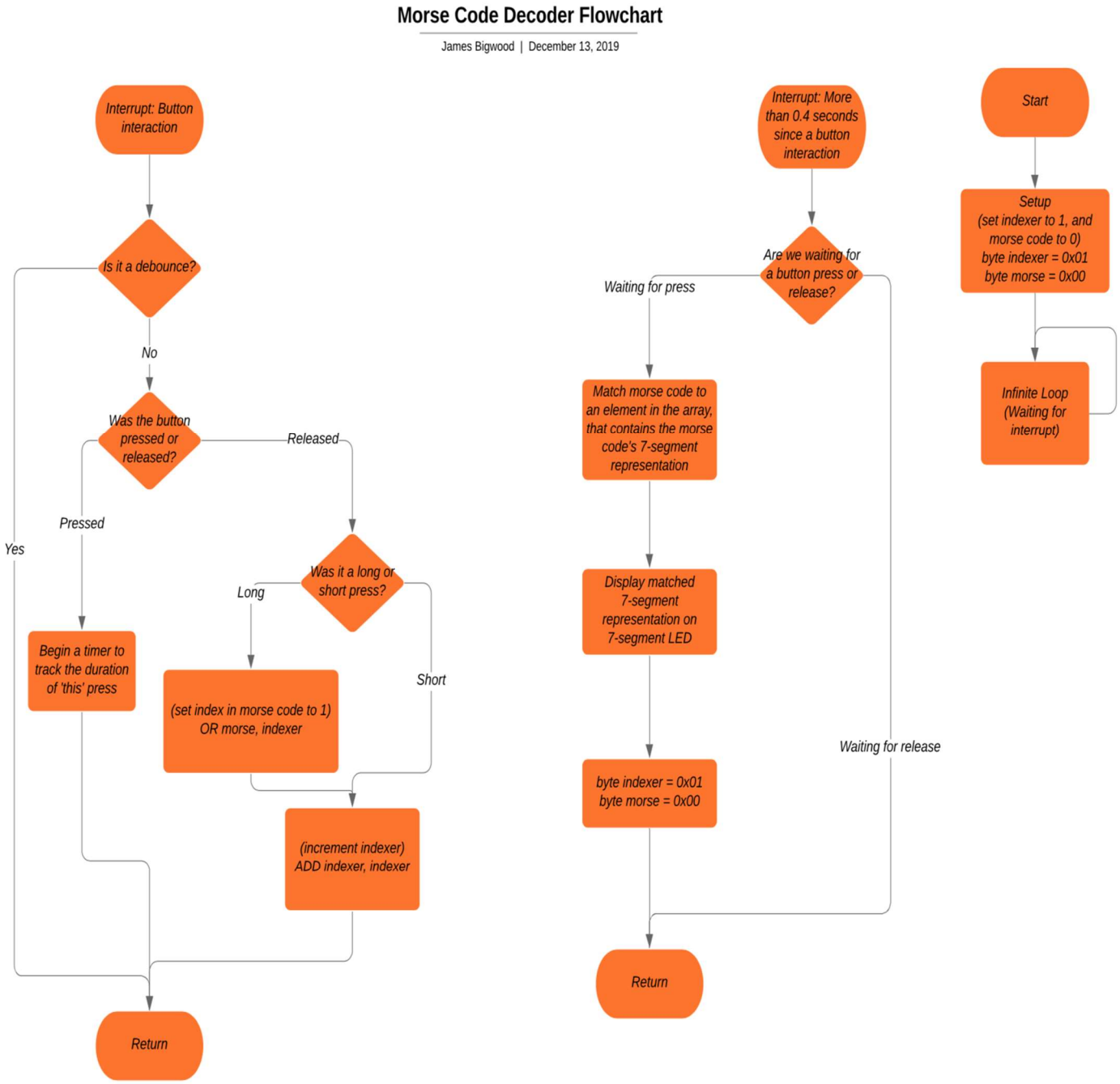
1 - The problem:

The problem we faced was to implement a Morse code decoder and encoder, for all the letters of the alphabet, in AVR assembler - our implementation would be compiled to machine code and executed by an Arduino Uno's ATmega328p chip.

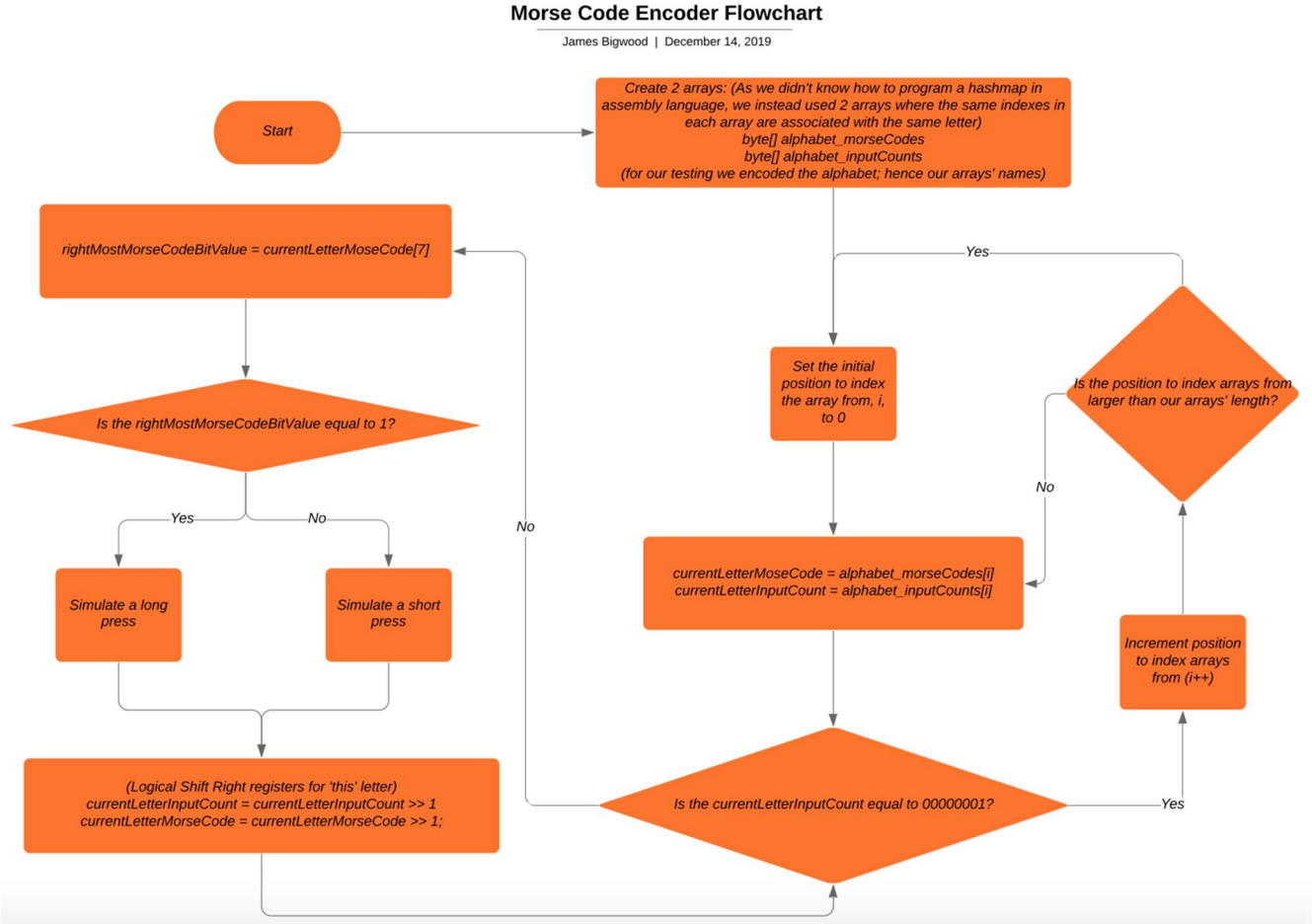
2 - Overview of implementation:

A. Morse Code Decoder:

Our Morse code decoder can decode all the letters in the alphabet (A-Z). A high-level overview of our implementation is best explained by the flowchart below:



B. Morse Code Encoder:
Our Morse code encoder can encode any sequence of any letters in the alphabet. A high-level overview of our implementation is best explained by the flowchart below:



3 - The main challenge we faced

- The problem - Within our Morse code decoder solution, if we released the button more than 7 times then our 'indexer' register (labelled in the flowchart) would overflow. As a result, the output to signify an invalid input wasn't displayed.
- The solution - We setup a register that would act as a boolean variable. This register would be initialised as 0, and if the user had released the button more than 7 times, the register would be set to 1. We could then test to see if this register had been set to 1 before reading out the Morse code and, if it was, we output a display to signify an invalid input.

4 - Work-load distribution

- Daniel Jezeph - Implemented Morse code decoder. Focused on the implementation of the button interaction interrupt and assisted with other areas.
- James Bigwood - Implemented Morse code decoder. Team lead primarily working on the interrupt for more than 0.4 seconds and assisting with other tasks and encoder.
- Athanasia Hadjichristou - Implemented Morse code decoder. Focused on much of the main start-up of the program and assisted with other areas.
- Hrithik Udae Lacximicant - Implemented Morse code encoder. Deputy lead, assisted with much of the decoder as well. Focused on the set up and implementation and interaction of the arrays.
- Liam Errington - Implemented Morse code encoder. Error checking and solution to overflow problem and assisted with decoder.
- Isayah Wedderburn - Implemented Morse code encoder. Implemented the simulation of short and long presses on the encoder and assisted with decoder.