EE 337: Microprocessors Laboratory (Spring 2021)
Indian Institute of Technology Bombay

Project: 20 points Date: March 8, 2021

Tap Code Tone Generator on Pt-51

1. [20 points] In this project, you will be writing a program to generate Tap code audio tones for a series of characters typed on a keyboard connected to the Pt-51 board via UART. For a description of the Tap code, see `https://en.wikipedia.org/wiki/Tap_code`.

   - When the program starts, the LCD displays the message `Input please`.
   - The user types a character on the keyboard which is one of the 26 letters.
   - If the user types a character other than these 26 letters, the LCD should display `Invalid input` for 2 seconds and go back to displaying `Input please`.
   - For a valid character input, the board should output the series of audio tones corresponding to the Tap code equivalent of the letter.
     - Use a tone of 1 second duration for a tap.
     - Use a 1 second silence between taps for the same letter and a 2 second silence between the pair of tap sequences for the same letter.
     - Use a 2 second silence between letters.
     - The LCD should be blank during the output of the Tap code for a character.
   - For example, if the character typed is H, then the Tap code equivalent is `2,3`. This will be output as follows:
     - An audio tone of 1 second duration
     - 1 second silence
     - An audio tone of 1 second duration
     - 2 seconds silence
     - An audio tone of 1 second duration
     - 1 second silence
     - An audio tone of 1 second duration
     - 1 second silence
     - An audio tone of 1 second duration
     - 2 seconds silence
     - The Tap code for the next letter.
   - Any characters typed during the output of the current letter will be ignored. This is indicated by the blank LCD screen.
   - Once the output of the Tap code for a character is complete, the LCD display again has the text `Input please`.