EXPERIMENT 1  "Simon" Game in Assembly Language

1. Store a sequence of 10 numbers of range [0..3] in memory.
   (or better: generate 10 random numbers, e.g. by using the LDR)

2. For sequence from 1 to 10 do the following:
   
   2.1 For step from 1 to sequence do the following:
       - Switch on LED corresponding to step no.
       - Play corresponding sound for about 0.5 s
         (200Hz, 400Hz, 600Hz, 800Hz)
       - Switch off LED

   2.2 For step from 1 to sequence do the following:
       - Read joystick presses and convert to data range [0..3]
       - Switch on corresponding LED
       - If joystick position matches sequence number for this step,
         then play corresponding sound (see above)
         else play the error sound (100Hz) and terminate loops
       - Switch off LED


Write the main program in C.
Write Assembly subroutines for:
- playing a tone (1 parameter)      void PlayTone(int frequency);
- switching on a LED (1 parameter)  void LEDon(int number);
- switching off an LED (1 parameter) void LEDoff(int number);

Note: You can also change the return type of all subroutines to int and return "0" for correct operation and "1" for error (e.g. trying to switch off an LED that was not switched on).
See flow chart for details and suggested subroutines.
Assembly subroutines

**SUBROUTINE PLAY(value)**

- **value = 0?**
  - YES: LED 0 + Tone(200)
  - NO: LED 3 + Tone(800)
- **value = 1?**
  - YES: LED 1 + Tone(400)
  - NO: RETURN FROM SUBROUTINE
- **value = 2?**
  - YES: LED 2 + Tone(600)
  - NO: RETURN FROM SUBROUTINE

**SUBROUTINE READCHECK(value)**

- **wait for key press**
- **transform key to [0..3]**
- **key = value?**
  - YES: play key
  - NO: play error
- **RETURN FROM SUBROUTINE**