Microwave Oven Controller

Write an assembly language program to utilize the PIC18F as a microwave oven controller. The program must assemble and run on the PIC18 Simulator with the input/output structure defined below.

Inputs:
- Matrix Keypad connected to PORTB
  - Single digit to set *Cooking Time* in 10s of seconds
  - Control switches for *Start* (F_H), *Stop* (A_H), and *Door* (B_H)

Outputs:
- *Time* - two digits (seconds) on 7-segment displays connected to PORTD and PORTC
- *Magnetron* - LED (RA1) that indicates whether the magnetron is active or inactive
- *Buzzer* - LED (RA0) that indicates whether the current cook cycle is finished or not

Normal Operation:

While waiting for user input, the controller monitors the input switches and displays the *Cook Time* as it is entered. The controller remains in this loop until the *Start* signal is received.

During cooking the *Magnetron* LED is lit to indicate activity. The controller counts down the seconds while monitoring the *Door* switch and pauses cooking if the *Door* is opened (cooking should resume when the *Door* is closed). The controller must also monitor the *Stop* switch and terminate the cooking cycle if a *Stop* signal is received.

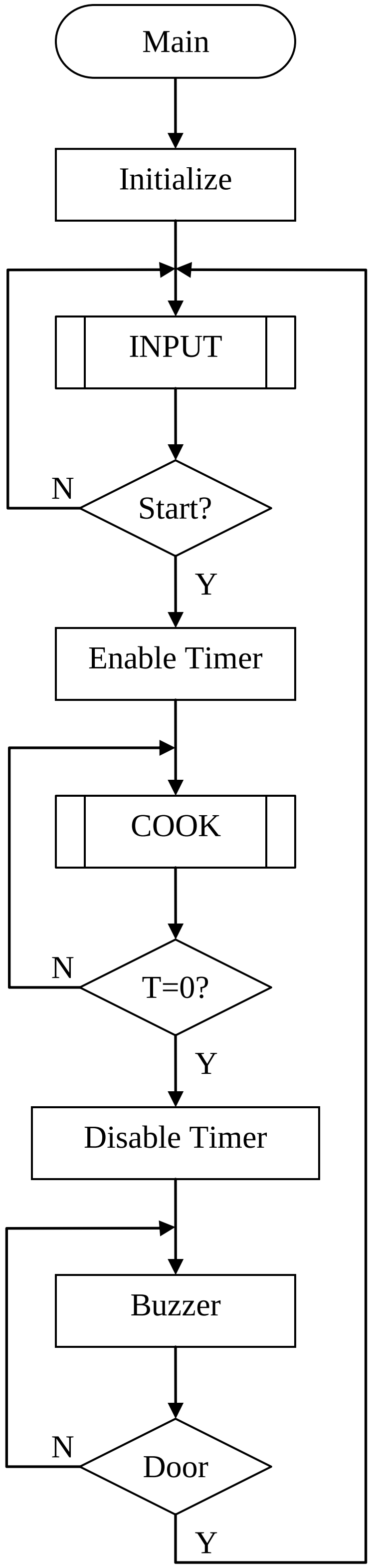
When the cook cycle is complete, the *Buzzer* LED should be lit. Opening the *Door* should turn off the *Buzzer* LED and return the controller to the input loop.

Deliverables:

1. Hand in a neat computer generated report including a cover sheet, top/down structured flowcharts, and your program listing (assembly language program and machine code generated by the PIC18 simulator). Ensure that your listing comments document the structure and function of the parts of the program.
2. Email me your .asm file, which I will assemble, and test.

THIS REPORT MUST REFLECT WORK OF THE ASSIGNED (2 PERSON) TEAM.
COLLABORATIVE WORK OUTSIDE THE TEAM WILL RECEIVE A GRADE OF ZERO.

Hints and Suggestions:
- Finish the flow charts before beginning programming. A top-level flowchart and program template are provided.
- Use the KEYCHK Subroutine (IP9-7) to interface with the matrix keypad for the input time and control switches.
- Use Timer0 (Ex11-2) to count seconds in an interrupt service routine. You'll need to adjust the (approximate) period based on the speed of the simulator.
- Count seconds in BCD, so they will be easier to display. Use the OUTLED Subroutine (IP9-3) to convert the BCD digits and output them to the 7-segment displays.


Main
Initialize
INPUT
N
Start?
Y
Enable Timer
COOK
N
T=0?
Y
Disable Timer
Buzzer
N
Door
Y