A combination lock is installed on the entrance door of a room to ensure that only authorized persons can enter. This lock is microprocessor controlled and its circuit is shown below. The red LED used in the circuit is used to give the user a wait signal to log in. The green LED is used to indicate that the entered password is correct. The solenoid used in the lock is connected to the PC2 port. A four-digit password is used. The password is entered by pressing four keys in sequence. Assume that the password information is stored in 4 consecutive addresses starting from the PASSWORD address. The debounce time of the keys is 15 ms. Assume that the DEBOUNCE subroutine, which provides a delay of this duration, is ready.

ADDRESS	PASSWORD DIGIT
PASSWORD	DIGIT-1
PASSWORD+1	DIGIT-2
PASSWORD+2	DIGIT-3
PASSWORD+3	DIGIT-4

a) Design the address decoder circuit suitable for the memory and I/O Map design you choose. Use the minimum number of switching elements for the decoder circuit. The 8155 onboard memory will be used to store the necessary variables. The stack region will also be in the same RAM.

b) Write the command words required to program the 8155 PIA. 0 0 0 0 1 1 0 0

c) Write a program named FIND_BUTTON that returns the code of the pressed button in register 8085 A.

d) Write an 8085 program that compares the 4-digit password information entered using the keypad with the four-digit password information stored in memory starting from the PASSWORD address, and when the correct password is entered, turns on the green LED and sends the necessary signal to the solenoid driver.

D1, D2: Germanium or small signal silicon diode