

EE2026: Digital Design Assignment 1

Complete as much as possible in **one working bitstream for this whole assignment**.

IMPORTANT CHARACTERS

In this assignment, we would be looking at your student identification. It would be in the format AXXXXXBC, as such:

A	XXXXX	B	C
Value A	Personal Password <ol style="list-style-type: none">5 characters consisting of either digits or the alphabet X<digits sorted in order><padding with X>eg. 135XX	Alphabet B	Value C






Example: 1135XXA0






- Value A = 1
- Personal Password = 135XX
- Alphabet B = A
- Value C = 0

We would be working on the Basys 3 Board.

INITIALISATION

When the program starts, all 16 active-high switches (SW0 to SW15) are in the OFF position. All 16 active-high LEDs (LD0 to LD15) are also OFF. The seven-segment displays must show the following patterns exactly, based on the Value A.

Value A	0	1	2	3	4
7 Segment displays					

Value A	5	6	7	8	9
7 Segment displays					

SUBTASK A

Consider the 10 (ten) switches SW0 to SW9. Whenever any of these 10 switches are ON, the corresponding LED LDX, where X is a number ranging from 0 to 9, must be ON. Examples:

- If SW0 is ON, then LD0 must be ON
- If SW3, SW7 and SW9 are ON, then LD3, LD7 and LD9 must be ON

SW0 to SW9, and LD0 to LD9, must all be constraint.

SW10 to SW15, and LD10 to LD14, must be ignored (Do not put a constraint to switches SW10 to SW15 and LEDs LD10 to LD14).














LD15 requires constraints for SUBTASK B onwards.

SUBTASK B

The five digits of the passwords (May be less than five digits if you have alphabet characters) will represent the switches that need to be ON, while all the other switches between SW0 to SW9 must be OFF, to be considered a correct password. If the password entered by the user is the correct password, then LED LD15 must turn ON. LD15 is OFF whenever the password is incorrect.

SUBTASK C

When the password is correct and LD15 is ON, it is also required to display alphabet B on some specific anodes of the 7-segment displays. The character must be displayed exactly as intended

Alphabet B	A	B	C	D	E	F	G	H	I	J	K	L	M
7 Segment													

The anode on which the character should be displayed is dependent on Value C, as shown in the table below

When the password from SUBTASK B is not correct, it is compulsory for the seven-segment displays to show the set of characters initiated in the INITIALISATION phase.

Value C	Anode AN3	Anode AN2	Anode AN1	Anode AN0
0				ON
1			ON	

2			ON	ON
3		ON		
4		ON		ON
5		ON	ON	
6		ON	ON	ON
7	ON			
8	ON			ON
9	ON		ON	