

9312617

KWAKU EGYIR BINEY (ELECTRICAL ENGINEERING)

**DEDICATED MICROPROCESSOR ASSIGNMENT**

**Algorithm:**

largest=0

second=0

INPUT n

WHILE (n !=0 {

    if (n> largest) then

        second = largest

        largest = n

    else if (n>second) then

        second = n

    END IF

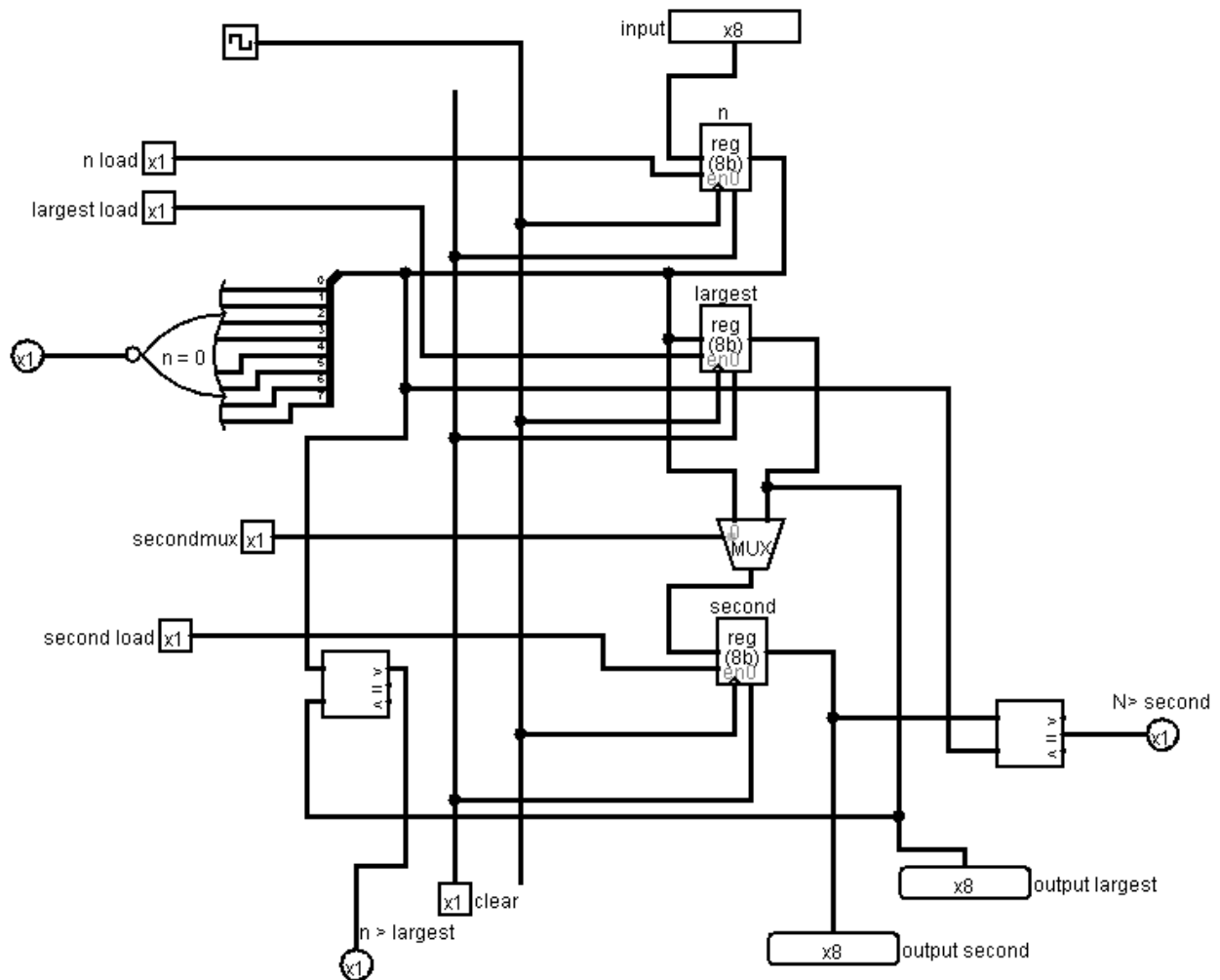
    OUTPUT Largest

    OUTPUT Second

    INPUT n

}

**DATAPATH:**



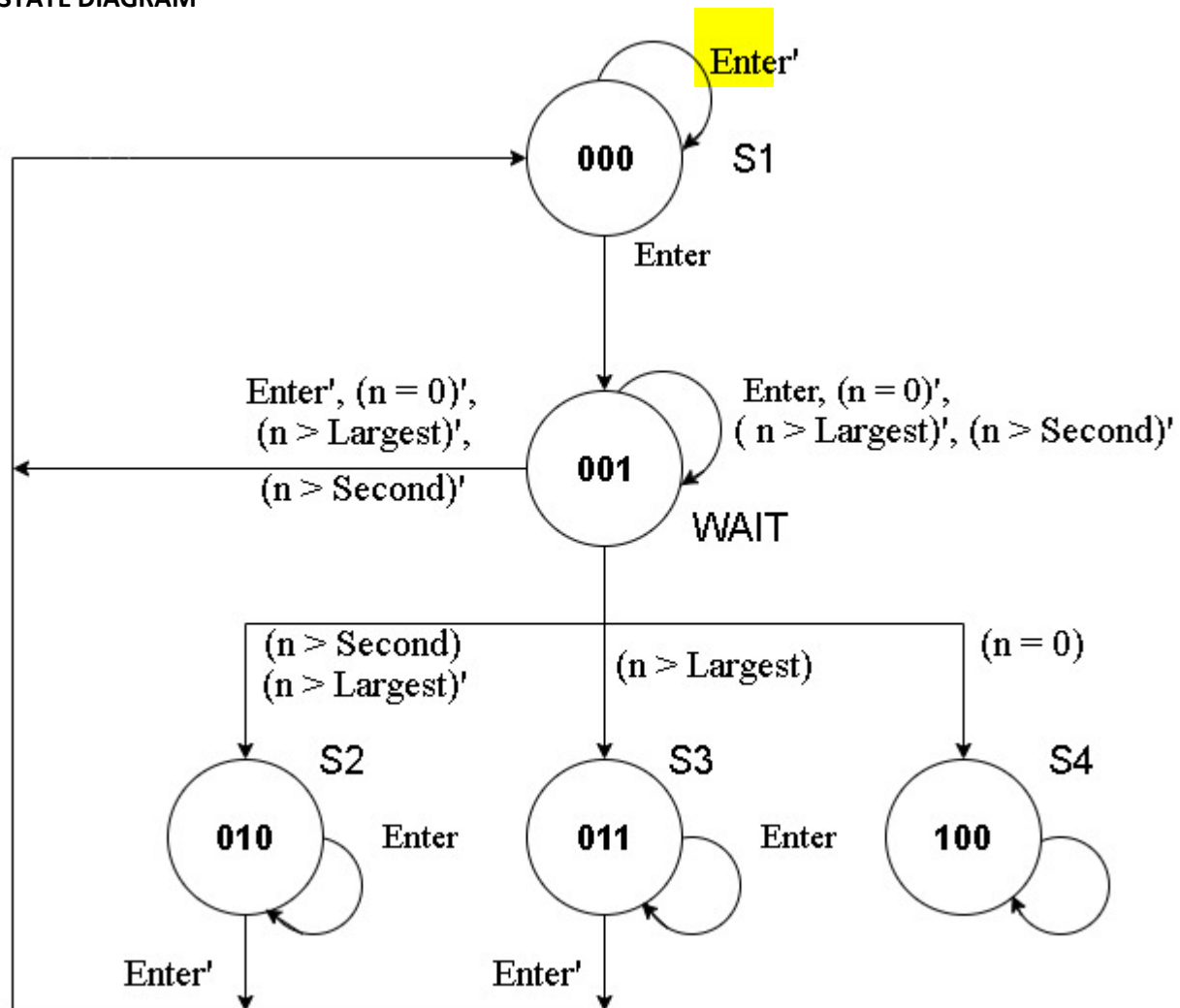
$$N \text{ load} = Q_2' Q_1' Q_0'$$

$$\text{LargestLoad} = \text{SecondMUX} = Q_2$$

$$\text{Second Load} = Q_1$$

Q2Q1Q0	CONTROL WORD	INSTRUCTION	nLoad	Largest Load	Second Mux	Second Load
000	1	Input n	1	0	0	0
001		WAIT	0	0	0	0
010	2	Second=n	0	0	0	1
011	3	Second=Largest, Largest=n	0	1	1	1
100	4	OUTPUT Largest, OUTPUT Second	0	0	0	0

#### STATE DIAGRAM



Current State $Q_2Q_1Q_0$	Next State (Implementation) $Q_2next, Q_1next, Q_0next$ (D2 D1 D0)															
	Enter, (n= 0), (n> Largest), (n> Second)															
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
000	000	000	000	000	000	000	000	000	001	001	001	001	001	001	001	001
001	000	010	011	011	100	100	100	100	001	010	011	011	100	100	100	100
010	000	000	000	000	000	000	000	000	010	010	010	010	010	010	010	010
011	000	000	000	000	000	000	000	000	011	011	011	011	011	011	011	011
100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

$$D_2 = Q_1'Q_0(n=0) + Q_2$$

$$D_1 = Q_1'Q_0(n=0)'(n>largest) + Q_1'Q_0(n=0)'(n>second) + Q_1enter'$$

$$D_0 = Q_2'Q_1'Q_0'Enter + Q_1Q_0Enter + Q_1'Q_0(n>largest)'(n>second) + Q_1'Q_0Enter(n=0)'(n>second)'$$

CONTROL UNIT

