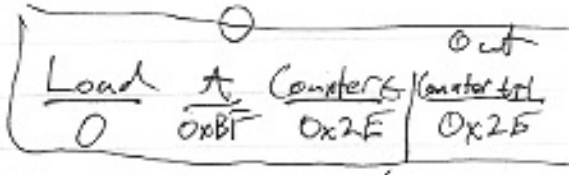
Elf Sobylak
A00314177

24-Nov-2014
Digital Logic: Hon 5

Problem set:

Chapter 5: 1-11

1) Counter 0x2E 0010 1110 | Amount 0xBF 1011 1111



The next state of the machine

time	counter	Amount	load	output	action
0	0x2E	0xBF	0	0x2E	inc(counter)
1	0x2F	–	–	0x2F	

2) DFF @ t+1 output:
time t or 1

Load	A	DFF$_t$	DFF$_{t+1}$ = Out
1	a	b	a

- Load value of 1 sams the input m to the DFF
- The DFF changes the state at the rising edge of a clock cycle

3) Input
A

* If Input A is 1, no matter what Nor, Nor2 together

6) The control code for the above
B

Control Code

Sel	OP	LA LB LC LD
11	11	0 1 1 1

7) and

time	Register Values A	B	C	D	Control Code Sel	OP	LALBLCLD	Action
t	0x2F	0xED	0x1F	0xA1	00	01	0111	Inc(A) → B, C, D
t+1	0x2F	0x30	0x30	0x30	01	01	0011	Inc(B) → C, D
t+2	0x2F	0x30	0x31	0x31	10	00	1100	C → A, B
t+3	0x31	0x31	0x31	0x31	–	–	–	–

8) Control Codes for above

time	Control Code Sel	OP	LALBLCLD
t	00	01	0111
t+1	01	01	0011
t+2	10	00	1100

9) See 7

10)

time	Register Values A	B	C	D	Control Code DMux	RMux	Sub	Action
t	0x2F	0xED	0x1F	0xA1	00	10	0	add(A, C) → A
t+1	0x4E	0xED	0x1F	0xA1	10	01	1	Sub(C, B) → C
t+2	0x4E	0xED	0xCE	0xA1	–	–	–	–

11)

time	Register Values A	B	C	D	Acc	Control Code RMux	DMux	Acc	Sub	Action
t	0x2F	0xED	0x1F	0xA1	–	11	1	1	0	0 → Acc
t+1	0x2F	0xED	0x1F	0xA1	0xA1	01	10	1	1	sub(Acc, B) → C
t+2	0x2F	0xED	0x4C	0xA1	0xA1	11	00	1	0	add(Acc, 0) → A
t+3	0x24	0xED	0x4C	0xA1	0xA1	–	–	–	–	–

!