ICS hw 03

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Question 1

(a) The number of state is $100 \times 100 \times 4 \times 4 \times 50 \times 51 \times 2 \times (15 \times 60 + 1) = 2912032000000$

We need 42 bits to store the state

(b)

Element	bits number
Scores	7*2
Down and Quarter	2*2
Yards to gain	7
Yardlines	7
Possesion	1
Time	2 bits for minutes and 6 bits for seconds
Total	43 bits

(c) Different parts will be decoded in an easier way

Question 2

(1) from left to right,the state will be encoded with 0,1,2,3,4

current state	input	next state	Output
0	T	0	0
0	H	1	0
1	T	2	0
1	H	1	0
2	T	0	0
2	H	3	0
3	T	2	0
3	H	4	0
4	T	2	1
4	H	1	1

(2) $2^3 > 5$ 3 bits

Question 3

Number of bits=$2^4 \times 2^3 = 2^7$

Question 4

state	input	nest state
0	00,01	0
0	10	1
0	11	2
1	01,10,11	1
1	00	0
2	10,11	2
2	01	2
2	00	0
3	00,01,10	3
3	11	2

Question 5

(a) A[1:0]=2'b11 We=1'b0

(b) Address line is 6 bits and Addressability is 3 bits

(c) 3 bits

Question 6

(a) 4

(b) 16 bits

(c) 8 bytes

(d)

We	A	Di	D	read/write
0	01	FADE	4567	READ
1	10	DEAD	DEAD	WRITE
0	00	BEEF	0123	READ
1	11	FEED	FEED	WRITE

Question 7

	PC	IR=62BE	MAR	MDR	Ri(modified)
Fetch	3004		3003	62BE	BOTH 3000
Decode	3004		3003	62BE	R2=3002
Evaluate address	3004		3003	62BE	
Fetch Operands	3004		3000	62BF	
Execute	3004		3000	62BF	
Store result	3004		3000	62BF	R1=62BF

Question 8

(a) $2^8 > 225$

(b) $2^7 > 120$

(c) 32-2*7+8=3

Question 9

Question 11

(R2>=R1)?R4=1:R4=0

Question 12

(R1%2==0)?R0=1:R0=0