

# Assignment 1

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### Question 1

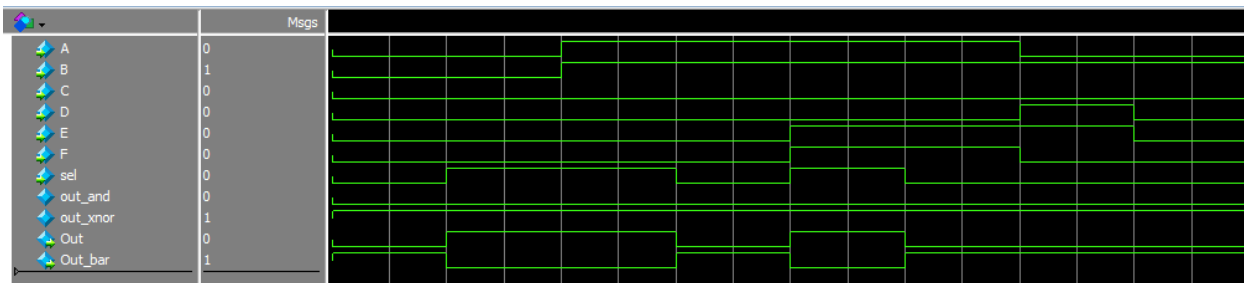
## Code

```

1  module q1
2      (
3          input A, B, C, D, E, F,
4          input sel,
5          output Out, Out_bar
6      );
7
8      wire out_and, out_xnor ;
9
10     assign out_and = A & B & C ;           // describes the AND gate
11     assign out_xnor = ~(D ^ E ^ F) ;       // describes the XNOR gate
12     assign Out = sel ? out_xnor : out_and; //describes the Multiplexer
13     assign Out_bar = ~Out ;                // describes the inverter
14
15 endmodule

```

## Simulation



### Question 2

## Code

```
1  module q2
2      (
3          input  [3:0] A, B,
4          output [3:0] C
5      );
6
7          assign C = A + B;
8
9  endmodule
```

## Simulation

		Msgs							
+	A	1100	0000	0001		1000	1011	1111	1100
+	B	1110	0000	0110	0100	0101	1000	1011	1110
+	C	1010	0000	0111	0101	1101	0011	1010	

### Question 3

#### Code

```
1 ▼ module q3
2 ▼   (
3     input [1:0] A,
4     output [3:0] D
5   );
6
7   assign D = (A==2'b00) ? 4'b0001 :
8              (A==2'b01) ? 4'b0010 :
9              (A==2'b10) ? 4'b0100 : 4'b1000;
10  endmodule
```

#### Simulation

		Msgs			
+ A	11	00	01	10	11
		0001	0010	0100	1000
+ D	1000				

#### Question 4

#### Code

```
1  module q4
2      (
3          input [7:0] A,
4          output [8:0] out_with_parity
5      );
6
7      wire parity_bit ;
8      assign parity_bit = ^A;
9      assign out_with_parity = {A,parity_bit};
10
11 endmodule
```

#### Simulation






	Msgs				
A	11111111	10000001	10100001	11111110	11111111
out_with_parity	111111110	100000010	101000011	111111101	111111110
parity_bit	St0				

## Question 5

### Code

```
1  module q5
2      (
3          input [3:0] A, B,
4          output A_greaterthan_B,
5          output A_equals_B,
6          output A_lessthan_B
7      );
8      assign A_greaterthan_B = A>B ? 1'b1 : 1'b0 ;
9      assign A_equals_B = A==B ? 1'b1 : 1'b0 ;
10     assign A_lessthan_B = A<B ? 1'b1 : 1'b0 ;
11
12 endmodule
```

### Simulation

	Msgs	
 A	1111	0001 1001 0010 1111
 B	1110	0010 1111 1110
 A_greaterthan_B	St1	
 A_equals_B	St0	
 A_lessthan_B	St0	