


HW3 : 2.15 2.16 2.20

Farnam Adelpkhani
915815724



2.15 Given

```

wire a = 1'b1; // a = 1
wire [1:0] b = 2'b10; // b[1] = 1, b[0] = 0
wire [2:0] c = 3'b101; // c[2] = 1, c[1] = 0, c[0] = 1

```

evaluate

- i. {b, c}
- ii. {a, b, c, 2'b01}
- iii. {a, b[0], c[1]}

i. {} operator is used to concatenate two vectors to form a long vector
 $\{b, c\} = 10101$

ii. $\{a, b, c, 2'b01\} = 11010101$

iii. $\{a, b[0], c[1]\} = 100$

2.16 Given

```

wire a = 1'b0; // a = 0
wire [1:0] b = 2'b10; // b[1] = 1, b[0] = 0
wire [2:0] c = 3'b101; // c[2] = 1, c[1] = 0, c[0] = 1

```

evaluate

- i. {4{a}}
- ii. {4{a}, 2{b}}
- iii. {4{a}, c}

i. $\{4\{a\}\} = 0000$

ii. $\{4\{a\}, 2\{b\}\} = 00001010$

iii. $\{4\{a\}, c\} = 0000101$

2.20 Given

```
reg [7:0] C;  
reg signed [7:0] D;  
reg [7:0] A = 8'shD5; // A = 11010101
```

evaluate

- i. $C = A \gg 4$
- ii. $C = A \ggg 4$
- iii. $C = A \ll 4$
- iv. $C = A \lll 4$
- v. $D = A \gg 4$
- vi. $D = A \ggg 4$
- vii. $D = A \ll 4$
- viii. $D = A \lll 4$

Statements are blocking assignments

- RHS evaluated 1st then assignment

i. $C = A \gg 4$ (shift R. unsigned by 4, filled by 0)

hence the output is 00001101

ii. $C = A \ggg 4$ // Shift Right signed by 4, filled w/ signed bit
output is 11111101

iii. $C = A \ll 4$ // Shift Left unsigned by 4, filled w/ signed bit
output is 01010000

iv. $C = A \lll 4$ // Shift Right signed by 4, filled w/ 0 irrespective of rightmost bit
output is 01010000

v. $D = A \gg 4$ // Shift Right signed by 4, filled w/ signed bit
output is 00001101

vi. $D = A \ggg 4$ // Shift R. signed by 4, filled w/ signed bit
output is 11111101

vii. $D = A \ll 4$ // Shift L unsigned by 4, filled w/ 0
output is 01010000

viii. $D = A \lll 4$ // Shift R signed by 4, filled w/ 0 irrespective of R bit.
output is 01010000