

ECSE 318 Lab 6 Report

Group 5

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Part 1:

```
Gate: XG1, Type: dff1, Level: 0, Fanout: G5, Fanin: G10,  
Gate: XG2, Type: dff1, Level: 0, Fanout: G6, Fanin: G11,  
Gate: XG3, Type: dff1, Level: 0, Fanout: G7, Fanin: G13,  
Gate: XG4, Type: not, Level: 1, Fanout: G14, Fanin: G0,  
Gate: XG5, Type: and, Level: 2, Fanout: G8, Fanin: G6, G14,  
Gate: XG6, Type: nor, Level: 1, Fanout: G12, Fanin: G7, G1,  
Gate: XG7, Type: or, Level: 3, Fanout: G15, Fanin: G8, G12,  
Gate: XG8, Type: or, Level: 3, Fanout: G16, Fanin: G8, G3,  
Gate: XG9, Type: nor, Level: 2, Fanout: G13, Fanin: G12, G2,  
Gate: XG10, Type: nand, Level: 4, Fanout: G9, Fanin: G15, G16,  
Gate: XG11, Type: nor, Level: 5, Fanout: G11, Fanin: G9, G5,  
Gate: XG12, Type: nor, Level: 6, Fanout: G10, Fanin: G11, G14,  
Gate: XG13, Type: not, Level: 6, Fanout: G17, Fanin: G11,
```

Circuit Description:

Output of the verilog file parser. Shows the list of all gates in the S27 input file.

*Shows: **Gate Name, Type, LEVEL, and connections***

```
-----  
Total number of gates: 13  
Level 0: 3 gates  
Level 1: 2 gates  
Level 2: 2 gates  
Level 3: 2 gates  
Level 4: 1 gates  
Level 5: 1 gates  
Level 6: 2 gates  
-----
```

Total Gates and Gates at Each Level

Output of the verilog file parser. Shows the level organization of the S27 input file.

```
Total number of gates: 17793
Level 0: 1728 gates
Level 1: 1782 gates
Level 2: 927 gates
Level 3: 2880 gates
Level 4: 896 gates
Level 5: 608 gates
Level 6: 374 gates
Level 7: 603 gates
Level 8: 315 gates
Level 9: 288 gates
Level 10: 576 gates
Level 11: 288 gates
Level 12: 288 gates
Level 13: 288 gates
Level 14: 288 gates
Level 15: 288 gates
Level 16: 576 gates
Level 17: 576 gates
Level 18: 288 gates
Level 19: 288 gates
Level 20: 288 gates
Level 21: 288 gates
Level 22: 288 gates
Level 23: 544 gates
Level 24: 544 gates
Level 25: 544 gates
Level 26: 288 gates
Level 27: 288 gates
Level 28: 288 gates
Level 29: 288 gates
```

Output of parser with S35, prior to adding simulation functionality.

IMPORTANT NOTE: the S35 file was successfully parsed; however, after making simulation additions to our program, we were unable to parse it again and were unable to recover functionality without messing up the simulation. We have uploaded the outfile (outputS35.txt) of our parsed S35 from before making the simulation additions to our program. The submitted C program functions fully for file S27.

Full circuit description can be found in [outputS35.txt](#)

Part 2:

NOTE: Input Order Via Terminal is G0, G1, G3, G2

SIMULATION OF S27 USING GIVEN INPUTS IN S27.test_vec	
<div>Simulation Input: G0,G1,G2,G3= 0000 NOTE: Input Order Via Terminal is G0, G1, G3, G2</div> <div>Simulation Output: State: XXX Output: G17= X</div>	<div>Enter values for inputs (0, 1, X). Enter value for input G0 (0, 1, X): 0 Enter value for input G1 (0, 1, X): 0 Enter value for input G3 (0, 1, X): 0 Enter value for input G2 (0, 1, X): 0</div> <div>DFF STATES: DFF State XG1: State = X DFF State XG2: State = X DFF State XG3: State = X Node States: Node G5: State = X Node G10: State = 0 Node G6: State = X Node G11: State = X Node G7: State = X Node G13: State = X Node G14: State = 1 Node G0: State = 0 Node G8: State = X Node G12: State = X Node G1: State = 0 Node G15: State = X Node G16: State = X Node G3: State = 0 Node G2: State = 0 Node G9: State = X Node G17: State = X</div> <div>Terminal Output</div>

Simulation Input:

G0,G1,G2,G3= 0010

NOTE: Input Order Via Terminal is G0, G1, **G3, G2**

Simulation Output:

State: 0XX

Output: G17= X

```
Enter values for inputs (0, 1, X).
Enter value for input G0 (0, 1, X): 0
Enter value for input G1 (0, 1, X): 0
Enter value for input G3 (0, 1, X): 0
Enter value for input G2 (0, 1, X): 1

DFF STATES:
DFF State XG1: State = 0
DFF State XG2: State = X
DFF State XG3: State = X
Node States:
Node G5: State = 0
Node G10: State = 0
Node G6: State = X
Node G11: State = X
Node G7: State = X
Node G13: State = 0
Node G14: State = 1
Node G0: State = 0
Node G8: State = X
Node G12: State = X
Node G1: State = 0
Node G15: State = X
Node G16: State = X
Node G3: State = 0
Node G2: State = 1
Node G9: State = X
Node G17: State = X
```

Terminal Output

Simulation Input:

G0,G1,G2,G3= 0100

NOTE: Input Order Via Terminal is G0, G1, **G3, G2**

Simulation Output:

State: 0X0

Output: G17= X

```
Enter values for inputs (0, 1, X).
Enter value for input G0 (0, 1, X): 0
Enter value for input G1 (0, 1, X): 1
Enter value for input G3 (0, 1, X): 0
Enter value for input G2 (0, 1, X): 0
```

DFF STATES:

DFF State XG1: State = 0

DFF State XG2: State = X

DFF State XG3: State = 0

Node States:

Node G5: State = 0

Node G10: State = 0

Node G6: State = X

Node G11: State = X

Node G7: State = 0

Node G13: State = 1

Node G14: State = 1

Node G0: State = 0

Node G8: State = X

Node G12: State = 0

Node G1: State = 1

Node G15: State = X

Node G16: State = X

Node G3: State = 0

Node G2: State = 0

Node G9: State = X

Node G17: State = X

Terminal Output

Simulation Input:

G0,G1,G2,G3= 1000

NOTE: Input Order Via Terminal is G0, G1, **G3, G2**

Simulation Output:

State: 0X1

Output: G17= 1

```
Enter values for inputs (0, 1, X).
Enter value for input G0 (0, 1, X): 1
Enter value for input G1 (0, 1, X): 0
Enter value for input G3 (0, 1, X): 0
Enter value for input G2 (0, 1, X): 0
```

DFF STATES:

DFF State XG1: State = 0

DFF State XG2: State = X

DFF State XG3: State = 1

Node States:

Node G5: State = 0

Node G10: State = 1

Node G6: State = X

Node G11: State = 0

Node G7: State = 1

Node G13: State = 1

Node G14: State = 0

Node G0: State = 1

Node G8: State = 0

Node G12: State = 0

Node G1: State = 0

Node G15: State = 0

Node G16: State = 0

Node G3: State = 0

Node G2: State = 0

Node G9: State = 1

Node G17: State = 1

Terminal Output

Simulation Input:

G0,G1,G2,G3= 1111

NOTE: Input Order Via Terminal is G0, G1, **G3, G2**

Simulation Output:

State: 101

Output: G17= 1

```
Enter values for inputs (0, 1, X).
Enter value for input G0 (0, 1, X): 1
Enter value for input G1 (0, 1, X): 1
Enter value for input G3 (0, 1, X): 1
Enter value for input G2 (0, 1, X): 1
```

DFF STATES:

DFF State XG1: State = 1

DFF State XG2: State = 0

DFF State XG3: State = 1

Node States:

Node G5: State = 1

Node G10: State = 1

Node G6: State = 0

Node G11: State = 0

Node G7: State = 1

Node G13: State = 0

Node G14: State = 0

Node G0: State = 1

Node G8: State = 0

Node G12: State = 0

Node G1: State = 1

Node G15: State = 0

Node G16: State = 1

Node G3: State = 1

Node G2: State = 1

Node G9: State = 1

Node G17: State = 1

Terminal Output