

## Homework 5

Thomas Murphy (*trm70*)  
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### Problem 1. ISCAS Benchmark Circuit Description Processor

The input format processor is implemented in `src/main.cpp`. It should be compiled using the provided `Makefile` to ensure the correct compiler configuration is used. This program makes heavy use of C++11 features. The two provided inputs are located in `inputs/`.

An example output for the `inputs/s27.txt` input circuit description is as follows.

Total processed gates, inputs, and outputs: 27

Level 0: 7

Level 1: 2

Level 2: 4

Level 3: 2

Level 4: 2

Level 5: 2

Level 6: 1

Level 7: 1

Level 8: 3

Level 9: 2

Level 10: 1

Gate: BUF-G12-G13

  Type: BUF

  Inputs: G12

  Outputs: G13

  Level: 2

Gate: G5

  Type: DFF

  Inputs: G10

  Outputs: G11

  Level: 0

Gate: BUF-G11-G6

  Type: BUF

  Inputs: G11

  Outputs: G6

  Level: 8

Gate: G17

  Type: NOT

  Inputs: BUF-G11-G17

  Outputs: G17\_out

  Level: 9

Gate: BUF-G11-G10

  Type: BUF

  Inputs: G11

  Outputs: G10

  Level: 8

Gate: G14

  Type: NOT

  Inputs: G0

  Outputs: BUF-G14-G10 BUF-G14-G8

  Level: 1

Gate: G9

Type: NAND  
Inputs: G15 G16  
Outputs: G11  
Level: 6  
Gate: G16  
Type: OR  
Inputs: G3 BUF-G8-G16  
Outputs: G9  
Level: 5  
Gate: BUF-G8-G15  
Type: BUF  
Inputs: G8  
Outputs: G15  
Level: 4  
Gate: G15  
Type: OR  
Inputs: BUF-G12-G15 BUF-G8-G15  
Outputs: G9  
Level: 5  
Gate: G0  
Type: INPUT  
Inputs:  
Outputs: G14  
Level: 0  
Gate: G6  
Type: DFF  
Inputs: BUF-G11-G6  
Outputs: G8  
Level: 0  
Gate: G10  
Type: NOR  
Inputs: BUF-G11-G10 BUF-G14-G10  
Outputs: G5  
Level: 9  
Gate: G8  
Type: AND  
Inputs: G6 BUF-G14-G8  
Outputs: BUF-G8-G15 BUF-G8-G16  
Level: 3  
Gate: BUF-G12-G15  
Type: BUF  
Inputs: G12  
Outputs: G15  
Level: 2  
Gate: G3  
Type: INPUT  
Inputs:  
Outputs: G16  
Level: 0  
Gate: G1  
Type: INPUT  
Inputs:  
Outputs: G12  
Level: 0

Gate: BUF-G14-G8  
Type: BUF  
Inputs: G14  
Outputs: G8  
Level: 2

Gate: BUF-G14-G10  
Type: BUF  
Inputs: G14  
Outputs: G10  
Level: 2

Gate: BUF-G11-G17  
Type: BUF  
Inputs: G11  
Outputs: G17  
Level: 8

Gate: BUF-G8-G16  
Type: BUF  
Inputs: G8  
Outputs: G16  
Level: 4

Gate: G13  
Type: NOR  
Inputs: BUF-G12-G13 G2  
Outputs: G7  
Level: 3

Gate: G17\_out  
Type: OUTPUT  
Inputs: G17  
Outputs:  
Level: 10

Gate: G7  
Type: DFF  
Inputs: G13  
Outputs: G12  
Level: 0

Gate: G2  
Type: INPUT  
Inputs:  
Outputs: G13  
Level: 0

Gate: G12  
Type: NOR  
Inputs: G7 G1  
Outputs: BUF-G12-G13 BUF-G12-G15  
Level: 1

Gate: G11  
Type: NOR  
Inputs: G5 G9  
Outputs: BUF-G11-G10 BUF-G11-G6 BUF-G11-G17  
Level: 7