

VLSI Verification Simulation Software Documentation

Sid Upreti

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Dependencies & Installation

The simulation workflow requires only:

- Python 3.6+
- Graphviz (the `dot` command-line tool)

Ubuntu / Debian

Unset

```
sudo apt update
sudo apt install -y python3 python3-pip graphviz
```

macOS (Homebrew)

Unset

```
brew update
brew install python3 graphviz
```

Windows (Chocolatey)

Unset

```
choco install python3 graphviz
```

Full-Design Hierarchical Simulation

Goal: Simulate the entire design hierarchy, annotate I/O values, and produce `hierarchy.dot` + `hierarchy.pdf`.

1. Prepare an input file

Create a plain-text file (e.g. `inputs_full.txt`) containing a single bit-string whose length equals the number of inputs of your top-level module.

Unset

```
# inputs_full.txt
01011001... ← (no spaces or commas)
```

2.

Run the simulation

Unset

```
$ python3 main.py H 4_mapped.v
```

3.

Example session

Unset

```
$ python3 main.py H 4_mapped.v
Load inputs from .txt? (y/n): y
file name: inputs_full.txt
Loaded from file.
Simulation complete. DOT file generated as 'hierarchy.dot'.
Converting hierarchy.dot to PDF...
✓ Generated 'hierarchy.pdf'.
```

Local Gate-Only Simulation

Goal: Drive a single primitive gate in isolation (no full-design sim).

1. Prepare a gate-input file

For a gate with, say, 3 inputs (**A**, **B**, **CI**), make `gate_inputs.txt`:

Unset

```
# gate_inputs.txt  
011
```

2.

Run the local-gate path

Unset

```
$ python3 main.py H 4_mapped.v --gate g52
```

3.

Example session

Unset

```
$ python3 main.py H 4_mapped.v --gate g52  
Simulate gate locally only? (y/n): y  
Load gate inputs from .txt? (y/n): y  
file name: gate_inputs.txt  
Loaded from file.
```

```
Converting g52_FA.dot to PDF...
```

```
✓ Generated 'g52_FA.pdf'.
```

Global Gate Extraction (Full-Design + Gate)

Goal: Simulate the full design to collect real signal values, then extract a single instance diagram.

1. Prepare an input file

Use the same `inputs_full.txt` from the full-design step.

2. Run with `--gate` and decline local-only

Unset

```
$ python3 main.py H 4_mapped.v --gate g52
```

3.

Example session

Unset

```
$ python3 main.py H 4_mapped.v --gate g52
```

```
Simulate gate locally only? (y/n): n
```

```
Load inputs from .txt? (y/n): y
```

```
file name: inputs_full.txt
```

```
Loaded from file.
```

```
Converting g52_AND.dot to PDF...
```

```
✓ Generated 'g52_AND.pdf'.
```
