# 1. INTRODUCTION

A Hardware Description Language (HDL) is a specialized computer language used to describe the structure and behavior of digital logic circuits. It allows for the synthesis of a HDL into a netlist, which can then be synthesized, placed and routed to produce the set of masks used to create an integrated circuit.

## 2. PROJECTS

- .1. module\_definitions
- .1.1. module\_items
- .1.1.1. data\_type\_declarations
- .1.1.2. module\_instances
- .1.1.3. primitive\_instances
- .1.1.4. generate\_blocks
- .1.1.5. procedural\_blocks
- .1.1.6. continuous\_assignments
- .1.1.7. task\_definitions
- .1.1.8. function\_definitions
- .1.1.9. specify\_blocks
- .1.2. port\_declarations
- .2. data\_type\_declarations
- .2.1. net\_data\_types
- .2.2. variable\_data\_types
- .2.3. other\_data\_types
- .2.4. vector\_bit\_selects\_and\_part\_selects
- .2.5. array\_selects
- .2.6. reading\_and\_writing\_arrays
- .3. module\_instances
- .4. primitive\_instances
- .5. generate\_blocks
- .6. procedural\_blocks
- .6.1. procedural\_time\_controls
- .6.2. sensitivity\_lists
- .6.3. procedural\_assignment\_statements (=continuous\_assignments)
- .6.4. procedural\_programming\_statements
- .6.4.1. if\_part
- .6.4.2. case\_part
- .6.4.3. casex\_part
- .6.4.4. casez\_part
- .6.4.5. for\_part
- .6.4.6. while\_part
- .6.4.7. repeat\_part
- .6.4.8. forever\_part

- .6.4.9. disable\_part
- .7. continuous\_assignments
- .8. operators
- .9. task\_definitions
- .10. function\_definitions
- .11. specify\_blocks
- .11.1. pin\_to\_pin\_path\_delays
- .11.2. path\_pulse\_detection
- .11.3. timing\_constraint\_checks
- .12. user\_defined\_primitives
- $. 13. \verb| common_system_tasks_and_functions|\\$
- .14. common\_compiler\_directives
- .15. configurations
- .16. synthesis\_supported\_constructs

## 3. WORKFLOW

```
source INSTALL-IT
```

cd test
source TEST-MSP430-IT
source TEST-RISCV-IT

# 4. CONCLUSION

## 4.1. FOR WINDOWS USERS!

- 1. Settings  $\to$  Apps  $\to$  Apps & features  $\to$  Related settings, Programs and Features  $\to$  Turn Windows features on or off  $\to$  Windows Subsystem for Linux
- 2. Microsoft Store  $\rightarrow$  INSTALL UBUNTU

Library type:

```
sudo apt update
sudo apt upgrade
```

sudo apt install bison cmake flex freeglut3-dev libcairo2-dev libgs1-dev  $\$  librcurses-dev libx11-dev m4 python-tk python3-tk swig tcl tcl-dev tk-dev tcsh

#### 4.1.1. Front-End

```
type:
sudo apt install verilator
sudo apt install iverilog
sudo apt install ghdl

cd /mnt/c/../sim/verilog/regression/wb/iverilog
source SIMULATE-IT
sudo apt install yosys

cd /mnt/c/../synthesis/yosys
source SYNTHESIZE-IT
```

#### 4.1.2. Back-End

```
type:
mkdir qflow
cd qflow

git clone https://github.com/RTimothyEdwards/magic
git clone https://github.com/rubund/graywolf
git clone https://github.com/The-OpenROAD-Project/OpenSTA
git clone https://github.com/RTimothyEdwards/qrouter
git clone https://github.com/RTimothyEdwards/irsim
git clone https://github.com/RTimothyEdwards/netgen
git clone https://github.com/RTimothyEdwards/qflow
cd /mnt/c/../synthesis/qflow
source FLOW-IT
```