# Verilog - Signal Objects

- There are two types of signal object, *net* and *variable*

### Nets

- Model connections (wires and busses) in structural descriptions
- Defaults to 4-state data type
- Has conflict resolution with multiple drivers
- `wire [7:0] mybus;`

### Variables

- Stores values assigned in initial, always, task and function blocks
- Used to describe logic behavorial modeling
- `logic [4:0] nibble_en;`

- Use `wire` to connect modules
- Use `logic` to create logic

# signal objects

## net

models connections (wires, busses) in structural descriptions. Can also be target of cont. Assignment

net types:

- wire
- uwire (unresolved wire, only one driver)
- wand
- wor
- tri
- triand
- trior
- tri0
- tri1
- trireg
- supply0 supply strength (Vss)
- supply1 supply strength (VDD)

defaults to 4-state logic data type
wire can be explicitly defined as 4-state
- wire logic [2:0] data

conflict resolution for wire or tri

|   | 0 | 1 | X | Z |
|---|---|---|---|---|
| 0 | 0 | X | X | 0 |
| 1 | X | 1 | X | 1 |
| X | X | X | X | X |
| Z | 0 | 1 | X | Z |

## variable

variables store values assigned in initial, always, task and function blocks. Used in behavorial modeling.

data type

|  |  |  |  |  |
|---|---|---|---|---|
| 4-state<br>0,1,X,Z | logic | user defines size | unsigned | init to 'X' |
|  | reg | user defined size | unsigned | init to 'X' |
|  | integer | 32-bit | signed | init to 'X' |
|  | time | 64-bit | unsigned | init to 'X' |
| 2-state<br>0,1 | bit | user defined size | unsigned | init to 0 |
|  | byte | 8-bit | signed | init to 0 |
|  | shortint | 16-bit | signed | init to 0 |
|  | int | 32-bit | signed | init to 0 |
|  | longint | 64-bit | signed | init to 0 |

🟨 = synthesizible
implicity variables
"logic" and "bit" are unsigned, remainder are signed
"logic" used by itself implies its a variable (var logic [2:0] data)
"var" by itself implies "logic"

Use logic to describe logic
Use int for loop variables
declare all nets at top of module

`default_nettype none
outlaw implicit declarations