

if-else

- Choose a value when a certain situation exists

```
if (decision_signal = decision_value_X) then
```

```
    result_signal_1 <= result_value_1;
```

```
    result_signal_2 <= result_value_2;
```

```
    result_signal_3 <= result_value_3;
```

```
elsif (decision_signal = decision_value_Y) then
```

```
    result_signal_1 <= result_value_1a;
```

```
    result_signal_2 <= result_value_2b;
```

```
    result_signal_3 <= result_value_3c;
```

```
else
```

```
    result_signal_1 <= result_value_a;
```

```
    result_signal_2 <= result_value_b;
```

```
    result_signal_3 <= result_value_c;
```

```
end if;
```

Typically use the same decision signal
but not required

Limitation: Must be used in a process

if-else

- variations

Exhaustive List

```
if(inA = "00") then
  outW <= "1000";
elsif(inA = "01") then
  outW <= "0100";
elsif(inA = "10") then
  outW <= "0010";
elsif(inA = "11") then
  outW <= "0011";
else
  outW <= "0000";
end if;
```

Partial List

```
if(inA = "00") then
  outX <= "1000";
elsif(inA = "01") then
  outX <= "0100";
else
  outX <= "0000";
end if;
```

Partially Common Result

```
if(inA = "00") then
  outY <= "1000";
elsif(inA = "01") then
  outY <= "0100";
elsif((inA = "10") or (inA = "11")) then
  outY <= "0110";
else
  outX <= "0000";
end if;
```

Complex Selection

```
if((inA or inB) = "00") then
  outZ <= "1000";
elsif((inA or inB) = "01") then
  outZ <= "0100";
else
  outZ <= "0000";
end if;
```

if-else

- example

```
-- if_else.vhdl
-- created 7/5/2018
-- tj
-- rev 0
-----
-- if-else example
-----
-- Inputs: in
-- Outputs: out
-----
library ieee;
use ieee.std_logic_1164.all;

entity if_else is
  port (
    i_in:   in std_logic_vector(3 downto 0);
    o_out:  out std_logic_vector(3 downto 0)
  );
end entity;
```

architecture behavioral of if_else is
begin

```
  process(all)
  begin
    if(i_in = "0000") then
      o_out <= "0001";
    elsif(i_in = "0001") then
      o_out <= "0010";
    elsif(i_in = "0010") then
      o_out <= "0011";
    elsif(i_in = "0011") then
      o_out <= "0100";
    elsif(i_in = "0100") then
      o_out <= "0101";
    elsif(i_in = "0101") then
      o_out <= "0110";
    elsif(i_in = "0110") then
      o_out <= "0111";
    elsif(i_in = "0111") then
      o_out <= "1000";
    elsif(i_in = "1000") then
      o_out <= "1001";
    else
      o_out <= "0000";
    end if;
  end process;
```

end architecture;

