VHDL Basics

- VHDL – Selection
  - with-select
    - Choose a value when a certain situation exists

```
with decision_signal select result_signal <=        -- exhaustive list
      result_value when decision_value,
      result_value when decision_value,
      result_value when decision_value,
      result_value when decision_value;
```

Limitation: Only one result signal

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Exhaustive List

with inA select outA <= "0100" when "01",
                          "0010" when "10",
                          "0001" when "11",
                          "1010" when "00",
                          "0000" when others;

Partial List

with inA select outA <= "0100" when "01",
                          "0010" when "10",
                          "0000" when others;

Partially Common Result

with inA select outA <= "0100" when "01",
                          "0010" when "10",
                          "0001" when ("11" or "00"),
                          "0000" when others;

Complex Selection

with (inA and inB) select outA <= "0100" when "01",
                                  "0010" when "10",
                                  "0001" when "00",
                                  "0000" when others;

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```
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--
-- with_select.vhdl
--
-- created 7/5/2018
-- tj
--
-- rev 0
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--
-- with-select example
--
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--
-- Inputs: inC
-- Outputs: outV
--
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library ieee;
use ieee.std_logic_1164.all;

entity with_select is
    port (
            inC:    in std_logic_vector(3 downto 0);
            outV:   out std_logic_vector(3 downto 0)
    );
end entity;
```
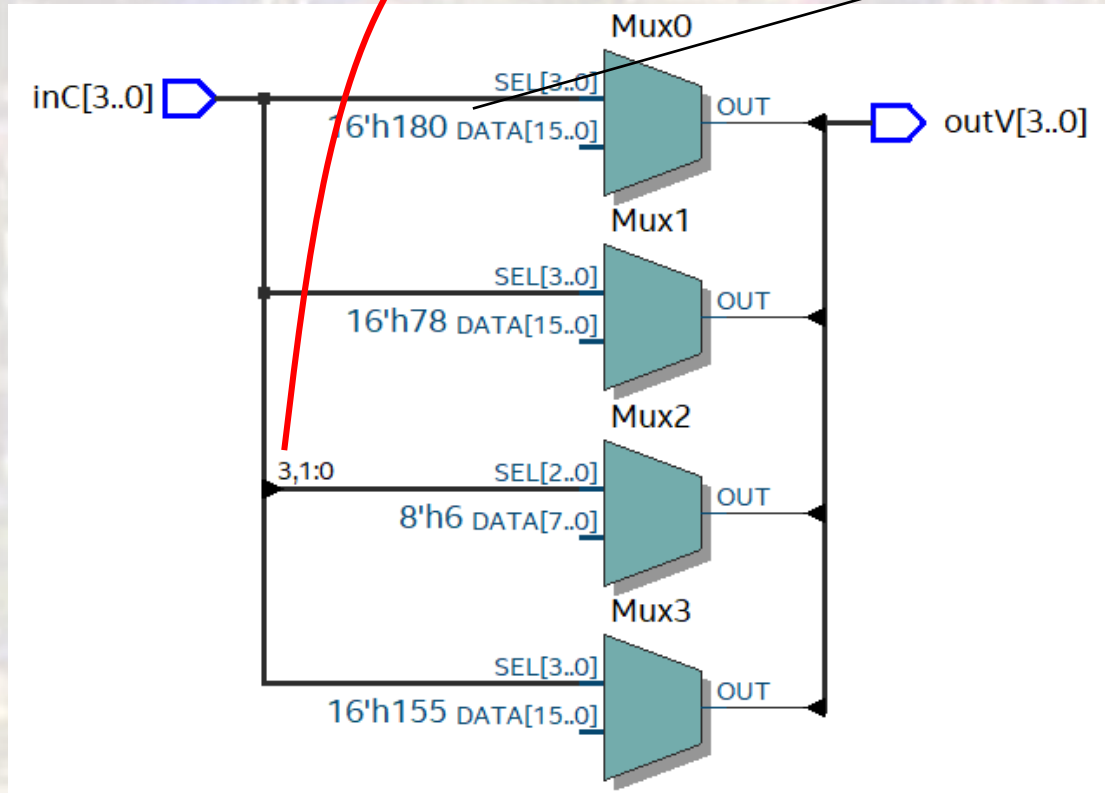
```
architecture behavioral of with_select is

begin
    with inC select outV <=
        "0001" when "0000",
        "0010" when "0001",
        "0011" when "0010",
        "0100" when "0011",
        "0101" when "0100",
        "0110" when "0101",
        "0111" when "0110",
        "1000" when "0111",
        "1001" when "1000",
        "0000" when others;

end behavioral;
```

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Mux3 0000 0001 0101 0101
      0000 0000 0110 0110
      0000 0000 0111 1000
Mux0 0000 0001 1000 0000

inC = 1111

inC = 0111

inC = 0000

outV

"0111" when "0110",
"1000" when "0111",