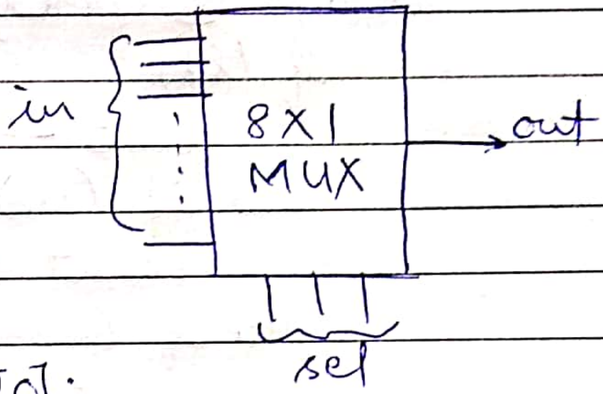
Lecture - 13

★ Recap: • Blocking statement (=)
• Non-blocking statement (<=)

*Example: 8:1 MUX using behavioral style

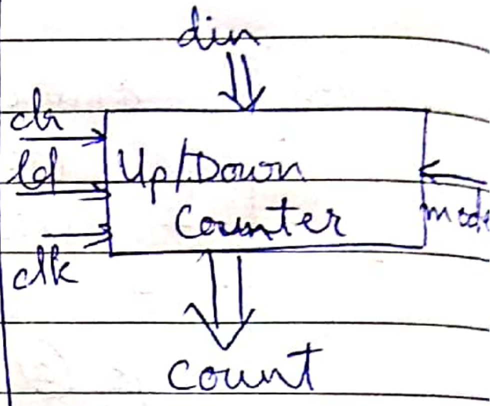
```
module  mux_8to1 (in, sel, out);
  input   [7:0] in;
  input   [2:0] sel;
  output  reg out;
  always @ (*)
  begin
      case (sel)
          3'b000: out = in[0];
          3'b001: out = in[1];
          3'b010: out = in[2];
          3'b011: out = in[3];
          3'b100: out = in[4];
          3'b101: out = in[5];
          3'b110: out = in[6];
          3'b111: out = in[7];
          default: out = 1'bX;
      endcase
  end
  ~~end~~
endmodule
```



→ if sel = xzx, this takes care

* Example: Synchronous UP/DOWN Counter

```
module counter (mode, clr, ld, d_in, clk, count);
    input mode, clr, ld, clk;
    input [7:0] din;
    output reg[0:7] count;
    always @(posedge clk)
        if (ld)
            count <= d_in;
        else if (clr)
            count <= 0;
        else if (mode)
            count <=count+1;
        else
            count <= count-1;
endmodule
```



* Example: An N bit counter

```
module counter(clear, clock, count);
    parameter N=8;
    input clear, clock;
    output reg[0:N] count;
    always @(negedge clock)
        if (clear)
            count <=0;
        else
            count <= count+1;
endmodule
```