

1) structural

```
module decoder_2x4_structural (
    output [0:3] out,
    input [0:1] in,
    input enable
);
    wire [0:2] w;
    not(w[0], in[0]);
    not(w[1], in[1]);
    not(w[2], enable);
    nand(out[0], w[0], w[1], w[2]);
    nand(out[1], w[0], in[1], w[2]);
    nand(out[2], in[0], w[1], w[2]);
    nand(out[3], in[0], in[1], w[2]);
endmodule
```

4y + ++

2) dataflow

```
module decoder_2x4_dataflow (
    output [0:3] out,
    input [0:1] in,
    input enable
);
    assign out[0] = ~(~in[0] & ~in[1] & ~enable);
    out[1] = ~(~in[0] & in[1] & ~enable);
    out[2] = ~(in[0] & ~in[1] & ~enable);
    out[3] = ~(in[0] & in[1] & ~enable);
endmodule
```

* behavioral modeling

```
module deroder_2x4_bh(  
    output reg[0:3] out,  
    input [0:1] in,  
    input enable  
);
```

```
always @(in, enable) ✓
```

```
case ({enable, in})
```

```
3'b000: out = 4'b1000; ✓
```

```
3'b001: out = 4'b0100;
```

```
3'b010: out = 4'b0010;
```

```
3'b011: out = 4'b0001;
```

```
default: out = 4'b0000;
```

```
end case
```

```
endmodule.
```