



## ELEX 7660: Pre-lab 1

### *7-Segment LED Decoder*

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# 1 Modules

## 1.1 Decode2

```
// decode2.sv - ELEX 7660 - 2 to 4 decoder. Selects which digit of the 7-segment
// LED Display to enable.
// Nicholas Huttemann 2018-01-12
module decode2 ( input logic [1:0] digit,
                 output logic [3:0] ct );

always_comb
    case(digit)
        0 : ct = 4'b0001;
        1 : ct = 4'b0010;
        2 : ct = 4'b0100;
        3 : ct = 4'b1000;
    endcase
endmodule
```

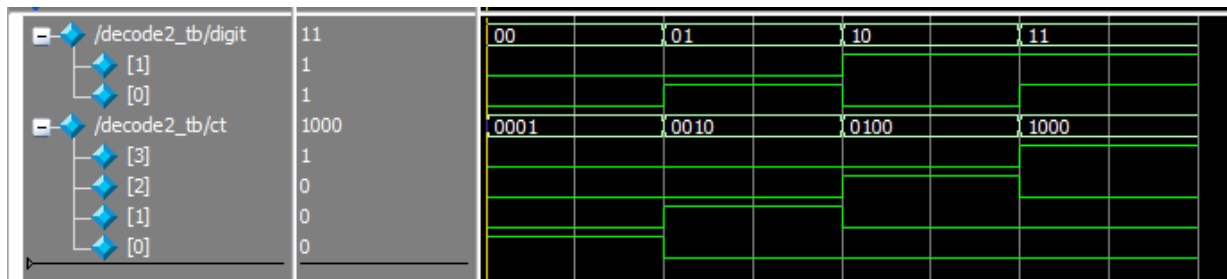


Figure 1: Decode2 Waveform

## 1.2 Bcidid

```
// bcidid.sv - ELEX 7660 - Module that selects and stores the last 4 digits of my
// student ID
// Nicholas Huttemann 2018-01-12
module bcidid ( input logic [1:0] digit,
                output logic [3:0] idnum );

always_comb
    case(digit)
        0 : idnum = 0;
        1 : idnum = 4;
        2 : idnum = 3;
        3 : idnum = 9;
    endcase
endmodule
```

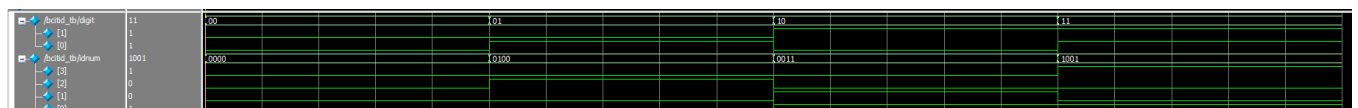


Figure 2: Bcidid Waveform

### 1.3 Decode7

// decode7.sv - ELEX 7660 - Converts 'num', a decimal integer 0 - 9 (10 for DP), into an 8-bit vector 'leds' that will light up corresponding segments on a 7-segment LED.

// Nicholas Huttemann 2018-01-12

```
module decode7 ( input logic [3:0] num,
                 output logic [7:0] leds);
```

```
always_comb
```

```
case (num)
```

```
0 : leds = 8'b11000000;
```

```
1 : leds = 8'b11111001;
```

```
2 : leds = 8'b10100100;
```

```
3 : leds = 8'b10110000;
```

```
4 : leds = 8'b10011001;
```

```
5 : leds = 8'b10010010;
```

```
6 : leds = 8'b10000010;
```

```
7 : leds = 8'b11111000;
```

```
8 : leds = 8'b10000000;
```

```
9 : leds = 8'b10011000;
```

```
10: leds = 8'b01111111;
```

```
endcase
```

```
endmodule
```

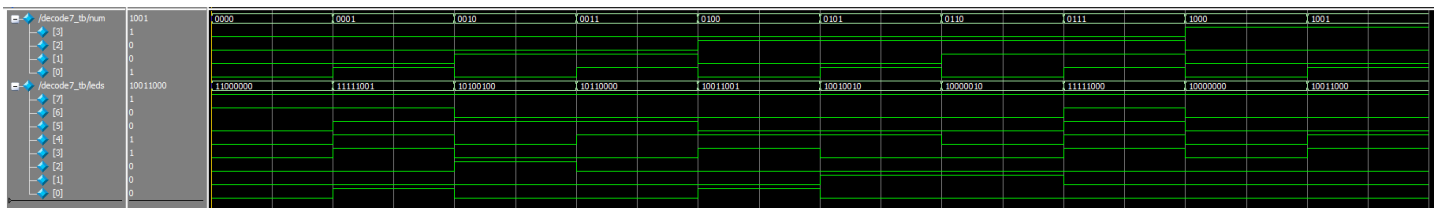


Figure 3: Decode7 Waveform