





/home/itzzinfinity/Cozy Drive/100daysofRTL/day_018/project_1/project_1.srsc/sources_1/new/carry_save_adder.v



```

1 ///////////////////////////////////////////////////
2 // Engineer: Anjan Prasad
3 // Create Date: 10/09/2024 09:59:34 AM
4 // Module Name: carry_save_adder
5 ///////////////////////////////////////////////////
6
7
8
9 module carry_save_adder(
10 input [3:0] a,b,c,
11 output [5:0] sum,
12 output cout
13 );
14     wire [3:0] s,c1,c2;
15
16
17     full_adder FA1(a[0],b[0],c[0],s[0],c1[0]);
18     full_adder FA2(a[1],b[1],c[1],s[1],c1[1]);
19     full_adder FA3(a[2],b[2],c[2],s[2],c1[2]);
20     full_adder FA4(a[3],b[3],c[3],s[3],c1[3]);
21
22
23     assign sum[0] = s[0];
24     assign sum[5] = cout;
25     // assign c2 = {s[1],s[2],s[3],0};
26     // ripple_carry_adder_4bit RCA (c1,c2,0,sum[4:1],cout);
27
28     full_adder FA5( c1[0], s[1],    0,  sum[1], c2[0]);
29     full_adder FA6( c1[1], s[2],  c2[0], sum[2], c2[1]);
30     full_adder FA7( c1[2], s[3],  c2[1], sum[3], c2[2]);
31     full_adder FA8( c1[3],    0,  c2[2], sum[4], cout);
32
33     endmodule

```

/home/itzzinfinity/Cozy Drive/100daysofRTL/day_018/project_1/project_1.srscs/sim_1/new/carry_save_adder_tb.v



```
1 `timescale 1ns / 1ps
2 //////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
3 // Engineer: Anjan Prasad
4 // Create Date: 10/09/2024 10:29:12 AM
5 // Module Name: carry_save_adder_tb
6 //////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
7
8 module carry_save_adder_tb;
9     reg [3:0] a, b, c;
10    wire [5:0] sum;
11    wire cout;
12
13    carry_save_adder DUT (.a(a), .b(b), .c(c), .sum(sum), .cout(cout));
14
15    initial begin
16        $monitor("Time = %0t | a = %d, b = %d, c = %d | sum = %d, cout = %b", $time, a, b, c, sum, cout);
17        a = 4'b0001; b = 4'b0010; c = 4'b0100;
18        #10;
19        a = 4'b1010; b = 4'b0111; c = 4'b0011;
20        #10;
21        a = 4'b1111; b = 4'b1111; c = 4'b1111;
22        #10;
23        a = 4'b0000; b = 4'b0000; c = 4'b0001;
24        #10;
25        a = 4'b1001; b = 4'b0110; c = 4'b0010;
26        #10;
27        a = 4'b0000; b = 4'b1111; c = 4'b1111;
28        #10;
29        a = 4'b1111; b = 4'b0000; c = 4'b1111;
30        #10;
31        a = 4'b1111; b = 4'b1111; c = 4'b0000;
32        #10;
33        $finish;
34    end
35 endmodule
36
```



```
# run 1000ns
```

```
Time = 0 | a = 1, b = 2, c = 4 | sum = 7, cout = 0
```

```
Time = 10000 | a = 10, b = 7, c = 3 | sum = 20, cout = 0
```

```
Time = 20000 | a = 15, b = 15, c = 15 | sum = 45, cout = 1
```

```
Time = 30000 | a = 0, b = 0, c = 1 | sum = 1, cout = 0
```

```
Time = 40000 | a = 9, b = 6, c = 2 | sum = 17, cout = 0
```

```
Time = 50000 | a = 0, b = 15, c = 15 | sum = 30, cout = 0
```

```
Time = 60000 | a = 15, b = 0, c = 15 | sum = 30, cout = 0
```

```
Time = 70000 | a = 15, b = 15, c = 0 | sum = 30, cout = 0
```

```
$finish called at time : 80 ns : File "/home/itzzinfinity/Cozy Drive/1000ns" : 0
```

```
INFO: [USF-XSim-96] XSim completed. Design snapshot 'carry_save_adder_tb' : 0
```

```
INFO: [USF-XSim-97] XSim simulation ran for 1000ns
```

```
Launch simulation: Time (s): cpu = 00:00:11 : elapsed = 00:00:00 : Memory (KB):
```

