



DAY-12

#100DAYSOFRTL

Aim:- Implementation of 4-Bit Carry Skip Adder.

RTL CODE:-

```
//////DATE:-12/01/2024
//////Carry Skip Adder using Full Adders and Mux
module Fadder(input A,B,C,
output Sum,Carry);
) assign Sum=A^B^C;
) assign Carry=A&B|B&C|C&A;
endmodule

module Mux(input A,B,sel,
output reg y);
) always @(*)
begin
) if(sel==1)
y=A;
else
y=B;
end
endmodule

module CarrySkipAdder(input [3:0] A,B,
input Cin,
output [3:0] Sum,
output Cout);
wire [3:0] P;
wire w1,w2;
wire [3:0] C;
//////Instantiating FULL ADDERS
Fadder M1(.A(A[0]),.B(B[0]),.C(Cin),.Sum(Sum[0]),.Carry(C[0]));
Fadder M2(.A(A[1]),.B(B[1]),.C(C[0]),.Sum(Sum[1]),.Carry(C[1]));
Fadder M3(.A(A[2]),.B(B[2]),.C(C[1]),.Sum(Sum[2]),.Carry(C[2]));
Fadder M4(.A(A[3]),.B(B[3]),.C(C[2]),.Sum(Sum[3]),.Carry(C[3]));

) assign P[0]=A[0]^B[0];
) assign P[1]=A[1]^B[1];
) assign P[2]=A[2]^B[2];
) assign P[3]=A[3]^B[3];
) and g1(w1,P[0],P[1],P[2],P[3]);
//////Instantiating Multiplexer
Mux M5(.A(Cin),.B(C[3]),.sel(w1),.y(Cout));
endmodule
```

TESTBENCH:-

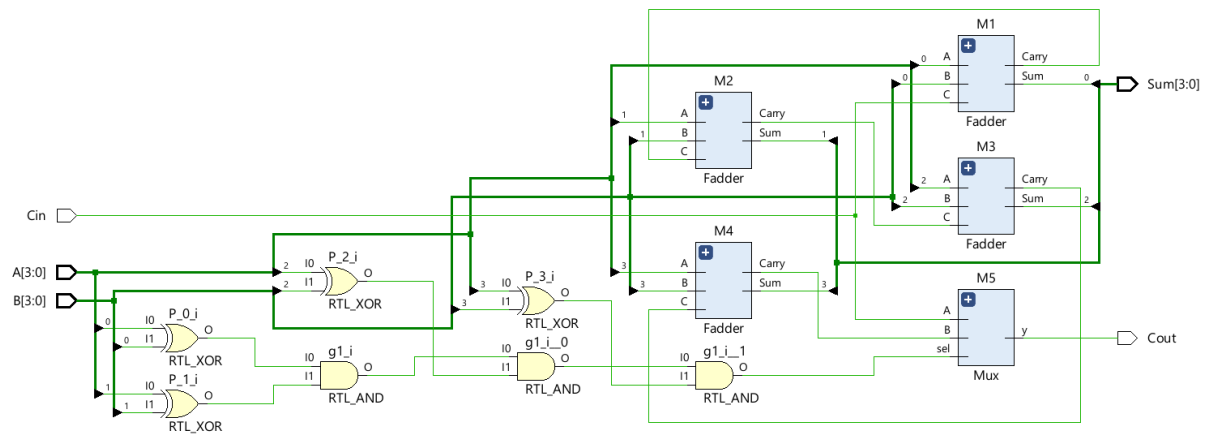
```
module CarrySkipAdder_tb();
reg [3:0] A,B;
reg Cin;
wire [3:0] Sum;
wire Cout;
CarrySkipAdder dut(.A(A),.B(B),.Cin(Cin),.Sum(Sum),.Cout(Cout));
initial begin
A=4'b0000; B=4'b0000;
Cin=0;
#10;
$display("A=%d,B=%d,Cin=%d,Cout=%b,Sum=%d",A,B,Cin,Cout,Sum);
A=4'b0001; B=4'b0010;
Cin=1;
#10;
$display("A=%d,B=%d,Cin=%d,Cout=%b,Sum=%d",A,B,Cin,Cout,Sum);
A=4'b0011; B=4'b1000;
Cin=0;
#10;
$display("A=%d,B=%d,Cin=%d,Cout=%b,Sum=%d",A,B,Cin,Cout,Sum);
A=4'b1010; B=4'b0101;
Cin=1;
#10;
$display("A=%d,B=%d,Cin=%d,Cout=%b,Sum=%d",A,B,Cin,Cout,Sum);
A=4'b0111; B=4'b0100;
Cin=0;
#10;
$display("A=%d,B=%d,Cin=%d,Cout=%b,Sum=%d",A,B,Cin,Cout,Sum);
A=4'b0110; B=4'b0110;
Cin=1;
#10;
$display("A=%d,B=%d,Cin=%d,Cout=%b,Sum=%d",A,B,Cin,Cout,Sum);
A=4'b1010; B=4'b1111;
Cin=0;

Cin=0;
#10;
$display("A=%d,B=%d,Cin=%d,Cout=%b,Sum=%d",A,B,Cin,Cout,Sum);
$finish();
end
endmodule
```

OUTPUT:-

```
A= 0,B= 0,Cin=0,Cout=0,Sum= 0
A= 1,B= 2,Cin=1,Cout=0,Sum= 4
A= 3,B= 8,Cin=0,Cout=0,Sum=11
A=10,B= 5,Cin=1,Cout=1,Sum= 0
A= 7,B= 4,Cin=0,Cout=0,Sum=11
A= 6,B= 6,Cin=1,Cout=0,Sum=13
A=10,B=15,Cin=0,Cout=1,Sum= 9
```

SCHEMATIC:-



WAVEFORMS:-

