DAY-11

#100DAYSOFRTL

Aim:- Implementation of 8-Bit Carry Look Ahead Adder.

RTL CODE:-

```
////DATE:-11/01/2024
////Implementation of 8-BIT CarryLookAhead Adder
module CLAdder(input [7:0] A,B,
input Cin,output Cout,output  [7:0] Sum);
wire [7:0] G,P,C;

////For Carry Propagation
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];
assign P[4]=A[4]^B[4];
assign P[5]=A[5]^B[5];
assign P[6]=A[6]^B[6];
assign P[7]=A[7]^B[7];
////For Carry Generation
assign G[0]=A[0]&B[0];
assign G[1]=A[1]&B[1];
assign G[2]=A[2]&B[2];
assign G[3]=A[3]&B[3];
assign G[4]=A[4]&B[4];
assign G[5]=A[5]&B[5];
assign G[6]=A[6]&B[6];
assign G[7]=A[7]&B[7];
////Carry terms
  assign C[0] = Cin;
  assign C[1] = G[0] | (P[0] & C[0]);
  assign C[2] = G[1] | (P[1] & C[1]);
  assign C[3] = G[2] | (P[2] & C[2]);
  assign C[4] = G[3] | (P[3] & C[3]);
  assign C[5] = G[4] | (P[4] & C[4]);
  assign C[6] = G[5] | (P[5] & C[5]);

  assign C[7] = G[6] | (P[6] & C[6]);
///Sum Terms
assign Sum[0]=P[0]^C[0];
assign Sum[1]=P[1]^C[1];
assign Sum[2]=P[2]^C[2];
assign Sum[3]=P[3]^C[3];
assign Sum[4]=P[4]^C[4];
assign Sum[5]=P[5]^C[5];
assign Sum[6]=P[6]^C[6];
assign Sum[7]=P[7]^C[7];

assign Cout=G[7] | (P[7] & C[7]);
endmodule
```

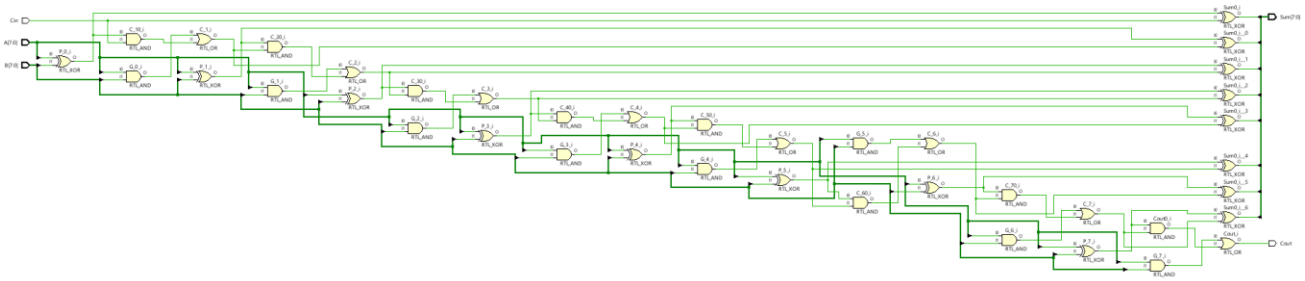
TESTBENCH:-

```
module CLAdder_tb();
reg [7:0] A,B;
reg Cin;
wire Cout;
wire [7:0] Sum;
CLAdder dut(.A(A),.B(B),.Cin(Cin),.Cout(Cout),.Sum(Sum));
initial begin
A=8'b0; B=8'b0; Cin=0;
#10;
$display("A=%d,B=%d,Cin=%b,Sum=%d",A,B,Cin,Sum);
A=8'b00001000; B=8'b01110000; Cin=1;
#10;
$display("A=%d,B=%d,Cin=%b,Sum=%d",A,B,Cin,Sum);
A=8'b01111000; B=8'b01100100; Cin=0;
#10;
$display("A=%d,B=%d,Cin=%b,Sum=%d",A,B,Cin,Sum);
 A=8'b00100101; B=8'b00010010; Cin=1;
#10;
$display("A=%d,B=%d,Cin=%b,Sum=%d",A,B,Cin,Sum);
 A=8'b00001111; B=8'b11111111; Cin=0;
#10;
$display("A=%d,B=%d,Cin=%b,Sum=%d",A,B,Cin,Sum);
 A=8'b01101010; B=8'b00011100; Cin=1;
#10;
$display("A=%d,B=%d,Cin=%b,Sum=%d",A,B,Cin,Sum);
$finish();
end
endmodule
```

OUTPUT:-

```
A=  0,B=  0,Cin=0,Sum=  0
A=  8,B=112,Cin=1,Sum=121
A=120,B=100,Cin=0,Sum=220
A= 37,B= 18,Cin=1,Sum= 56
A= 15,B=255,Cin=0,Sum= 14
A=106,B= 28,Cin=1,Sum=135
```

SCHEMATIC:-



WAVEFORMS:-