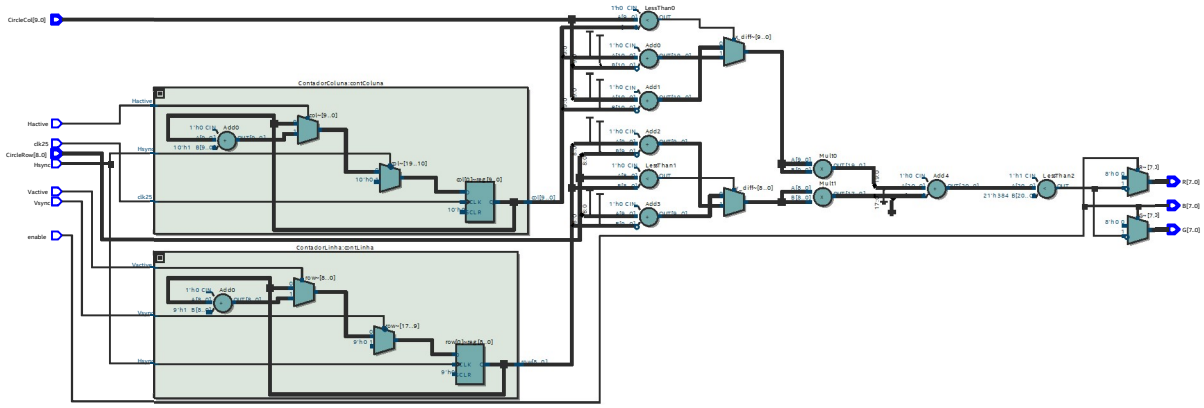
```
module GeradorImagem (
    input wire clk25,
    input wire Hsync, Hactive,
    input wire Vsync, Vactive,
    input wire enable,

    input wire[8:0] CircleRow,
    input wire[9:0] CircleCol,

    output reg[7:0] R,G,B
);

    wire[8:0] Row;
    wire[9:0] Col;
    ContadorLinha contLinha(Hsync, Vsync, Vactive, Row);
    ContadorColuna contColuna(Hsync, clk25, Hactive, Col);

    wire [8:0] RowInferior, RowSuperior;
    wire [9:0] ColInferior, ColSuperior;

    reg[9:0] DistanceToEnd;


    assign RowInferior = CircleRow - 9'd20;
    assign RowSuperior = CircleRow + 9'd20;
    assign ColInferior = CircleCol - 10'd15;
    assign ColSuperior = CircleCol + 10'd15;




    //teste

    reg [20:0] CircleEquation;
    reg [20:0] RadiusSquared;
    reg [9:0] x_diff;
    reg [8:0] y_diff;


    localparam [9:0] RADIUS = 10'd30;

    always @(enable,CircleRow,CircleCol,Row,Col) begin
        if( enable == 1'b1) begin

            x_diff = (Col > CircleCol) ? (Col - CircleCol) : (CircleCol - Col);
            y_diff = (Row > CircleRow) ? (Row - CircleRow) : (CircleRow - Row);

            CircleEquation = (x_diff * x_diff) + (y_diff * y_diff);
            RadiusSquared = RADIUS * RADIUS;

            if (CircleEquation <= RadiusSquared) begin
                // If pixel is within the circle
                R <= 8'h00;
                G <= 8'h00;
                B <= 8'hff;
            end

            else begin
                R <= 8'hff;
                G <= 8'hff;
                B <= 8'hff;
            end
        end
        else begin
            R <= 8'h00;
            G <= 8'h00;
            B <= 8'h00;
        end
    end
endmodule
```

```
1   module ContadorLinha (
2       input wire Hsync, Vsync, Vactive,
3       output reg[8:0] row
4   );
5
6       always @(posedge Hsync ) begin
7           if (Vsync == 1'b0) row <= 9'd0;
8           else if (Vactive == 1'b1) row <= row + 9'd1;
9       end
10
11  endmodule
```

```
1   module ContadorColuna (
2       input wire Hsync, clk25, Hactive,
3       output reg[9:0] col
4   );
5
6       always @(posedge clk25 ) begin
7           if (Hsync == 1'b0) col <= 10'd0;
8           else if (Hactive == 1'b1) col <= col + 10'd1;
9       end
10
11  endmodule
```


CircleCol[9..0]
Hactive
clk25
CircleRow[8..0]
Hsync
Vactive
Vsync
enable
ContadorColuna:contColuna
ContadorLinha:contLinha
LessThan0
Add0
Add1
Add2
LessThan1
Add3
diff[9..0]
Mult0
Mult1
Add4
LessThan2
R[7..0]
G[7..0]
B[7..0]

Simulation Waveform Editor - C:/Users/welly/Documents/GitHub/LT39A/pratica07/atv07 - atv07 - [atv07_20240907164617.sim.vwf (Read-Only)]

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Master Time Bar: 0 ps Pointer: 321.41 ns Interval: 321.41 ns Start: End:

Name	Value at 0 ps
B	U 0
CircleCol	U 125
CircleRow	U 175
G	U 0
Hactive	U 0
Hsync	U 0
R	U 0
Vactive	U 0
Vsync	U 0
clk25	U 0
enable	U 0