

```
timescale 1ns / 1ps
////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
// Company:
// Engineer:
//
// Create Date: 05/23/2022 08:26:21 PM
// Design Name:
// Module Name: cactus
// Project Name:
// Target Devices:
// Tool Versions:
// Description:
//
// Dependencies:
//
// Revision:
// Revision 0.01 - File Created
// Additional Comments:
//
////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
```

```
module cactus(
    input [10:0] Hpixel,
    input [10:0] Vpixel,
    input pause,
    input reset,
    input clk,
    input new_frame,
    input [15:0] defaultWhore, //i am in pain
    input [3:0] rng,

    output [3:0] cactus,
    output scored,
    output [15:0] xpos,
    output [10:0] ypos
);
    wire [10:0] width, height;
    wire [10:0] startH, startV;
    wire [15:0] resetVal;
    wire [10:0] shift;
    wire [10:0] new_Vert;
    wire [10:0] resetV;

    assign resetVal = reset ? defaultWhore : 16'd681;
    assign width = 11'd40; //40
```

```

assign height = 11'd96; //96
//assign startV = 11'd240;

assign shift = {rng[2:0], 2'b00}; //should be getting the value in multiples of 7

assign new_Vert = rng[3] ? (11'd192 + shift) : (11'd192 - shift);


wire [15:0] cactRight; //x position

//starts at 680 and goes to 0
countUD16L frogcount (.clk(clk), .Up(1'b0), .Dw(new_frame & ~pause),
.LW((cactRight <= 16'd3) | reset), .d(resetVal), .q(cactRight));

// assign resetV = reset ? 16'd240 : startV;

assign startV = ((cactRight <= 16'd3)) ? new_Vert: startV; //11'd240
//assign startV = (cactRight <= 16'd3) ? new_Vert: resetV;

assign cactus[3:0] = (Vpixel >= (startV)) & (Vpixel <= (startV + height)) &
(Hpixel <= (cactRight)) & (Hpixel >= (cactRight - width) | (cactRight < 16'd40)) ?
(4'hf) : 4'b0;

assign scored = (cactRight == 16'd119) ? 1:0;

assign xpos =cactRight;
assign ypos = startV;

/*

Vpixel is going to be 3 postions determined from the random number
3 horizontal postions
    each horizontal postion while in the running state
    is going to decrament by 3 each frame
    gotta figure out a way to find out when a new postions starts and decrament
the h postion when that happens

TODD BEST WAY
    find out when Vpixel and Hpixel are 0 (make sure it does it once during
one clk cycle, synchronize with clock somehow?)

    800 * 525 is one frame

*/
endmodule

```