Luke

Wizard Skate

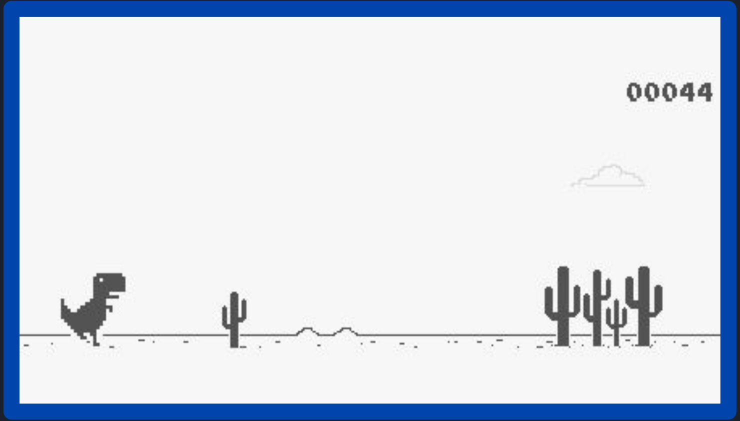
By Naeel Quasem, Luke McCarthy, Roger Brown and Angel Amaya

Luke

Goal/Motivation

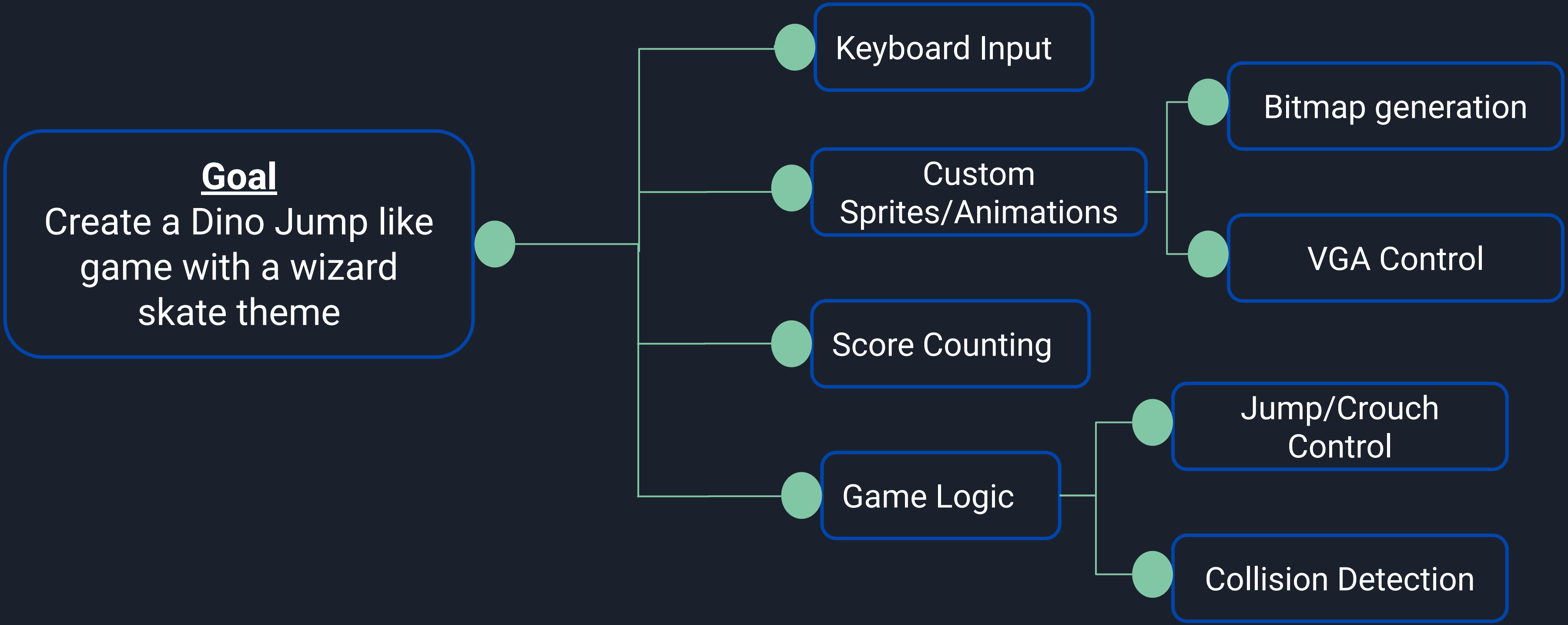
- Create a fun, new game, similar to Dino Jump, with a new theme

- Very epic game!



Roger

Functionality



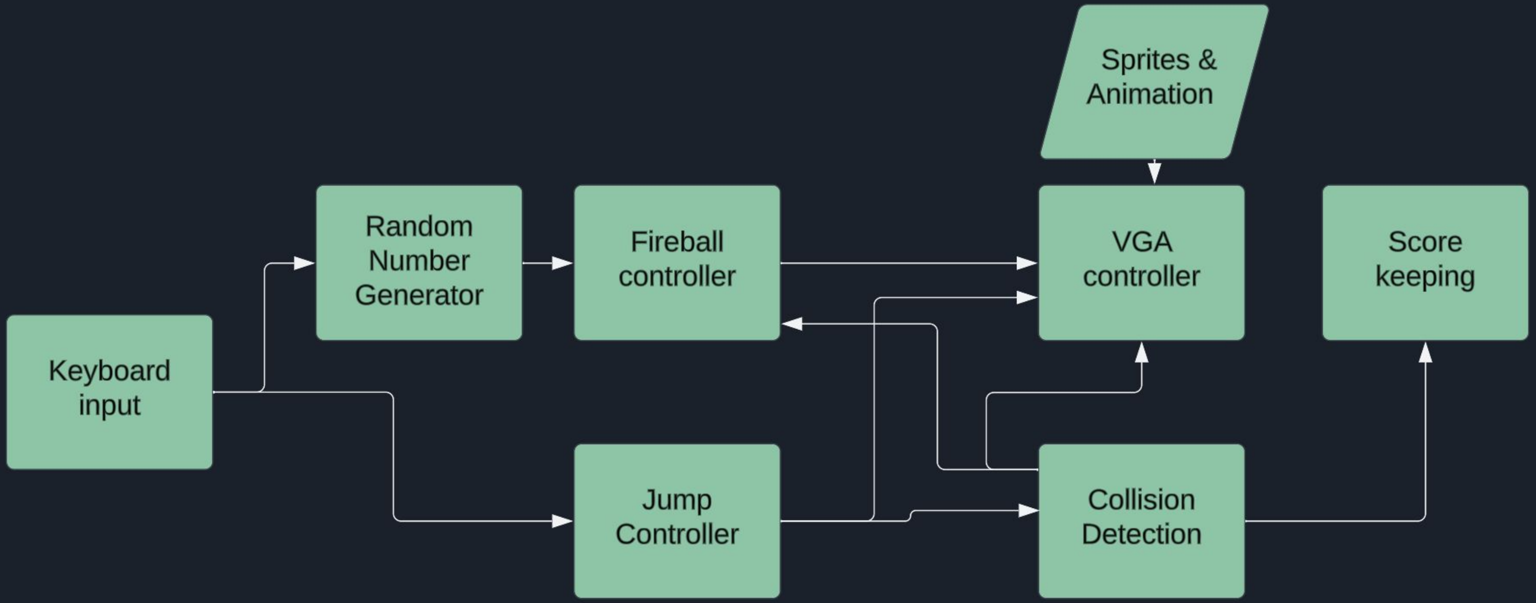
Naeel

Specification

Requirements	Constraints
● Keyboard inputs to control character ● Obstacles/Collision Detection ● Score-keeping ● Sprites/Animations ● VGA Display ● Progressive Difficulty	● Memory (for sprites) ● Deadline

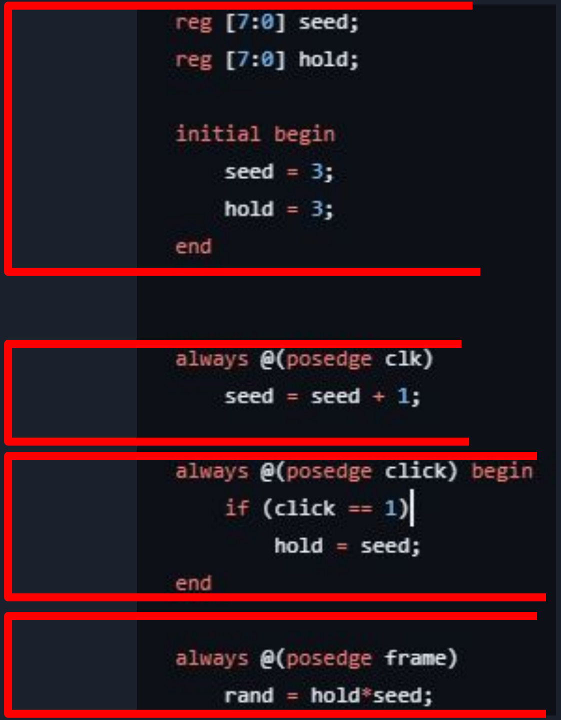
Naeel

Block Diagram



Roger

Code Snippet: PRNG



```
reg [7:0] seed;
reg [7:0] hold;

initial begin
    seed = 3;
    hold = 3;
end


always @(posedge clk)
    seed = seed + 1;
always @(posedge click) begin
    if (click == 1)
        hold = seed;
end

always @(posedge frame)
    rand = hold*seed;
```

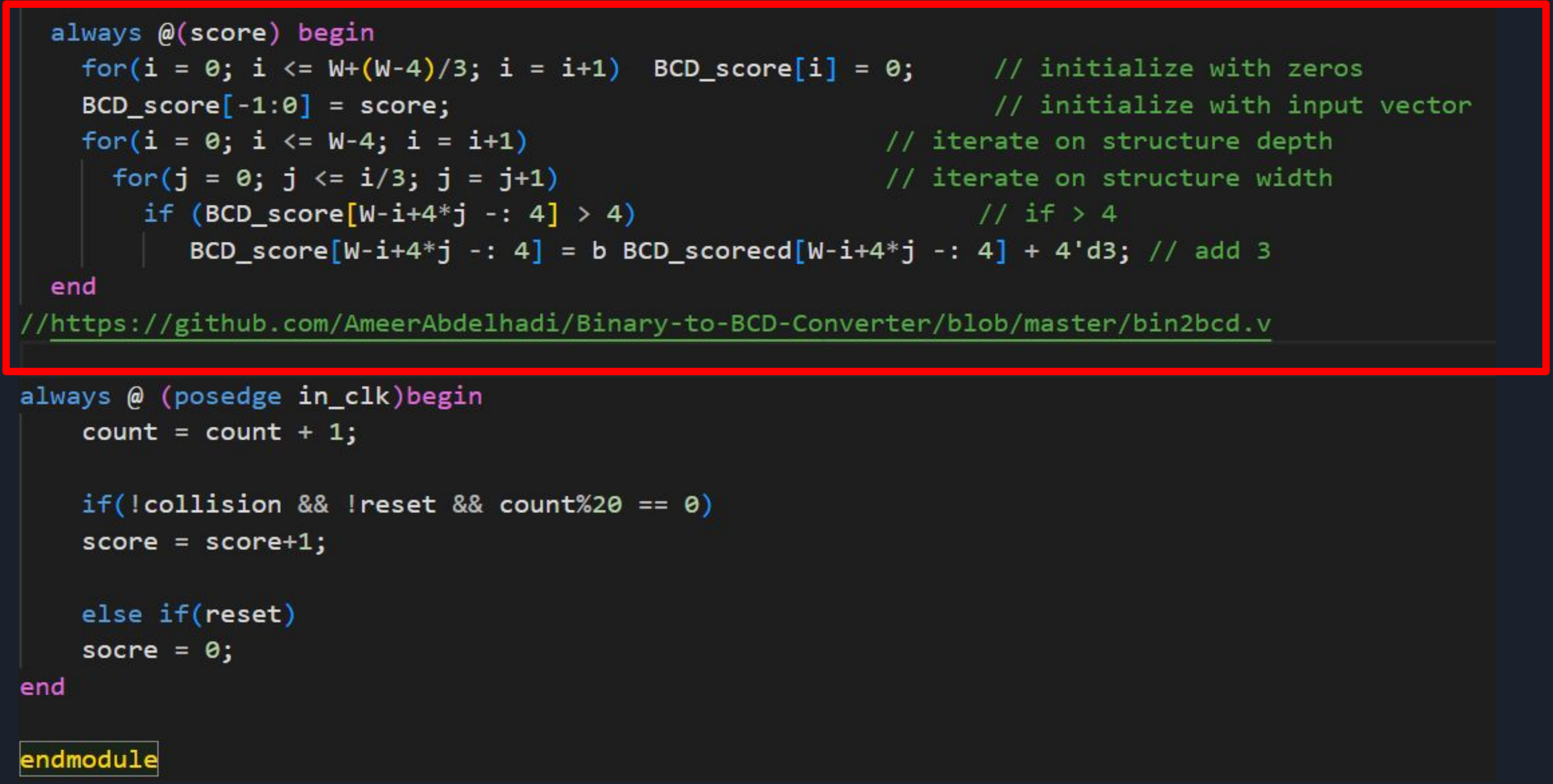
Initialize two 8-bit registers

Increment seed every clock cycle

Set hold equal to seed when the jump button is pressed

Multiplies hold by seed every frame for use by other modules

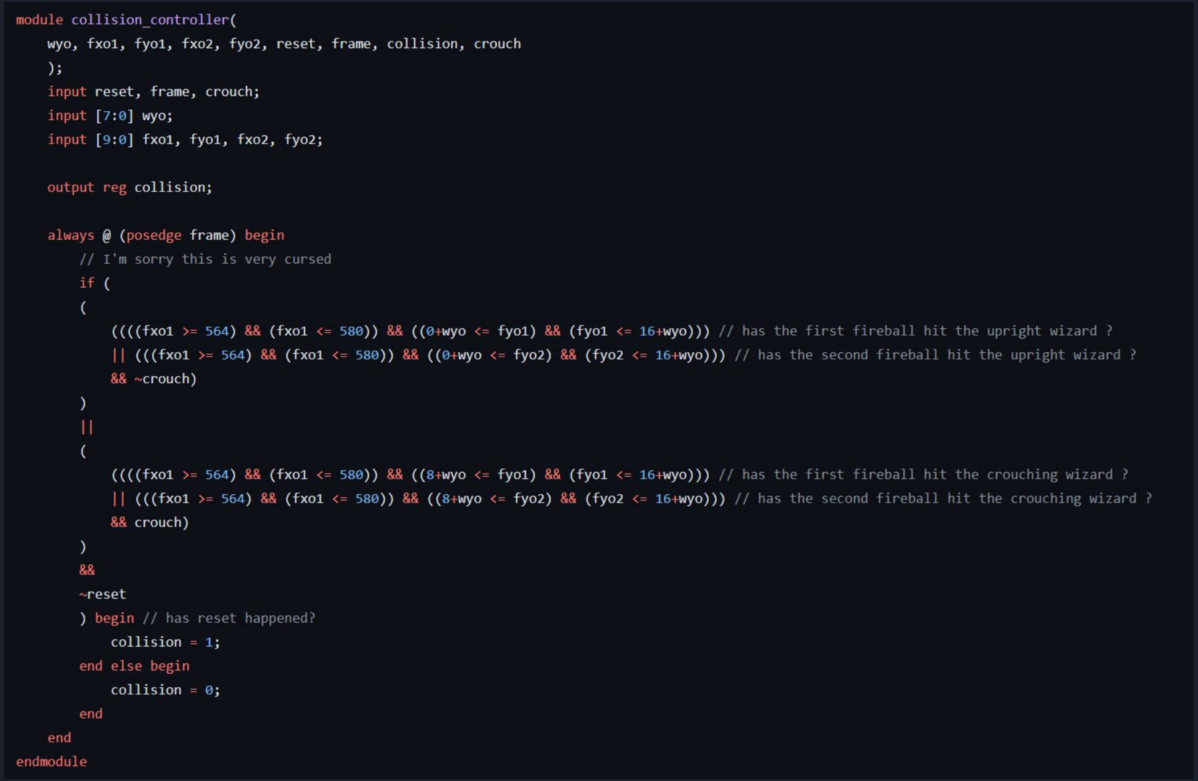
Code Snippet



```
  always @(score) begin
    for(i = 0; i <= W+(W-4)/3; i = i+1)  BCD_score[i] = 0;     // initialize with zeros
    BCD_score[-1:0] = score;                                   // initialize with input vector
    for(i = 0; i <= W-4; i = i+1)                            // iterate on structure depth
      for(j = 0; j <= i/3; j = j+1)                          // iterate on structure width
        if (BCD_score[W-i+4*j -: 4] > 4)                          // if > 4
          BCD_score[W-i+4*j -: 4] = b BCD_scorecd[W-i+4*j -: 4] + 4'd3; // add 3
  end
//https://github.com/AmeerAbdelhadi/Binary-to-BCD-Converter/blob/master/bin2bcd.v

always @ (posedge in_clk)begin
    count = count + 1;

    if(!collision && !reset && count%20 == 0)
    score = score+1;

    else if(reset)
    socre = 0;
end

endmodule
```

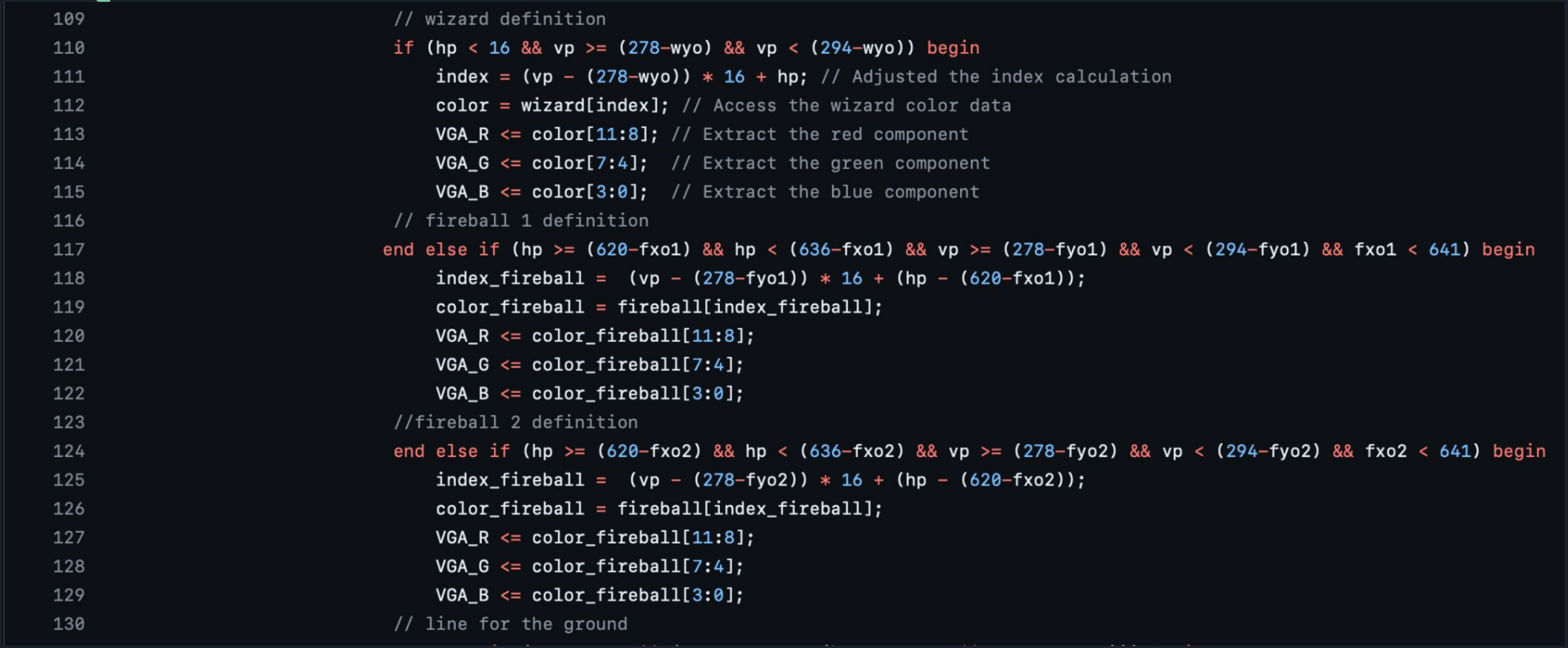
Luke

Code Snippet: Collision



```
module collision_controller(
    wyo, fxo1, fyo1, fxo2, fyo2, reset, frame, collision, crouch
    );
    input reset, frame, crouch;
    input [7:0] wyo;
    input [9:0] fxo1, fyo1, fxo2, fyo2;

    output reg collision;

    always @ (posedge frame) begin
        // I'm sorry this is very cursed
        if (
        (
            ((((fxo1 >= 564) && (fxo1 <= 580)) && ((0+wyo <= fyo1) && (fyo1 <= 16+wyo))) // has the first fireball hit the upright wizard ?
            || (((fxo1 >= 564) && (fxo1 <= 580)) && ((0+wyo <= fyo2) && (fyo2 <= 16+wyo))) // has the second fireball hit the upright wizard ?
            && ~crouch)
        )
        ||
        (
            ((((fxo1 >= 564) && (fxo1 <= 580)) && ((8+wyo <= fyo1) && (fyo1 <= 16+wyo))) // has the first fireball hit the crouching wizard ?
            || (((fxo1 >= 564) && (fxo1 <= 580)) && ((8+wyo <= fyo2) && (fyo2 <= 16+wyo))) // has the second fireball hit the crouching wizard ?
            && crouch)
        )
        &&
        ~reset
        ) begin // has reset happened?
            collision = 1;
        end else begin
            collision = 0;
        end
    end
endmodule
```

Code Snippet



```
    // wizard definition
    if (hp < 16 && vp >= (278-wyo) && vp < (294-wyo)) begin
        index = (vp - (278-wyo)) * 16 + hp; // Adjusted the index calculation
        color = wizard[index]; // Access the wizard color data
        VGA_R <= color[11:8]; // Extract the red component
        VGA_G <= color[7:4];  // Extract the green component
        VGA_B <= color[3:0];  // Extract the blue component
    // fireball 1 definition
   end else if (hp >= (620-fxo1) && hp < (636-fxo1) && vp >= (278-fyo1) && vp < (294-fyo1) && fxo1 < 641) begin
        index_fireball =  (vp - (278-fyo1)) * 16 + (hp - (620-fxo1));
        color_fireball = fireball[index_fireball];
        VGA_R <= color_fireball[11:8];
        VGA_G <= color_fireball[7:4];
        VGA_B <= color_fireball[3:0];
    //fireball 2 definition
    end else if (hp >= (620-fxo2) && hp < (636-fxo2) && vp >= (278-fyo2) && vp < (294-fyo2) && fxo2 < 641) begin
        index_fireball =  (vp - (278-fyo2)) * 16 + (hp - (620-fxo2));
        color_fireball = fireball[index_fireball];
        VGA_R <= color_fireball[11:8];
        VGA_G <= color_fireball[7:4];
        VGA_B <= color_fireball[3:0];
    // line for the ground
```

Angel

Successes

- Jumping and obstacle movement work perfectly.
- Bitmap generation, sprite implementation works as expected.
- Implementation of collision.

Failures

- Code is working as expected, but sometimes has minor glitches.
- That is it.
- Thank you.