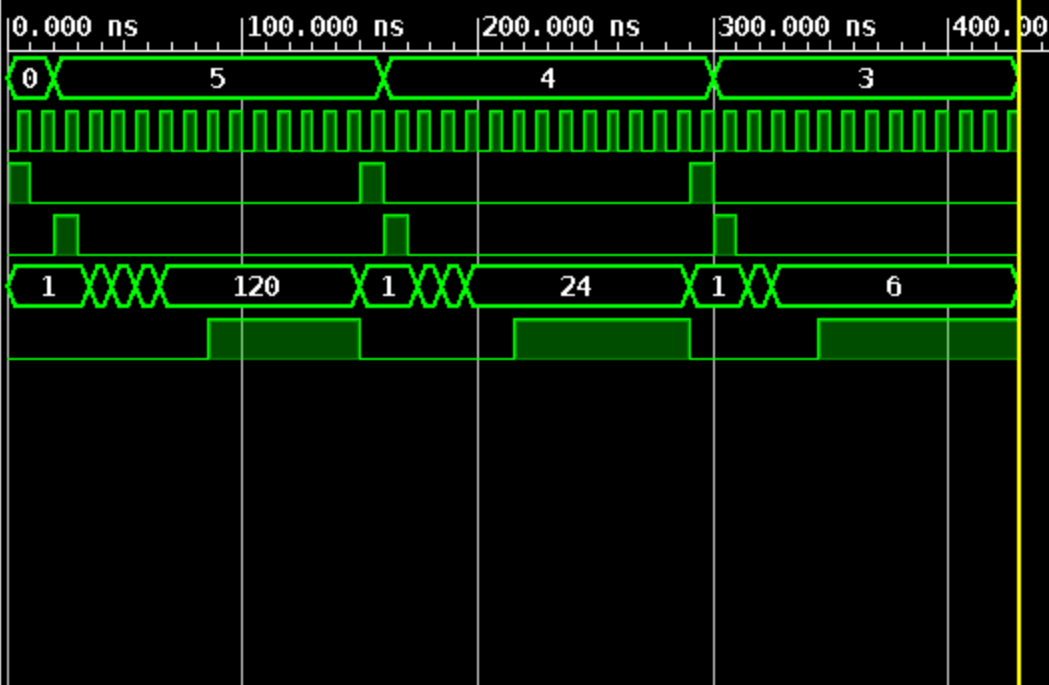




Name	Value
------	-------

> num[4:0]	3
clk	1
reset	0
start	0
> factorial[31:0]	6
done	1



Tcl Console x Messages Log



```
# }
# run 1000ns
Factorial of 5 is 120 (done=1)
Factorial of 4 is 24 (done=1)
Factorial of 3 is 6 (done=1)
$finish called at time : 430 ns : File "/home/itzzinfinity/Cozy Drive/100daysofRTL/day_08
INFO: [USF-XSim-96] XSim completed. Design snapshot 'tb_factorial_calculator_behav' loaded
INFO: [USF-XSim-97] XSim simulation ran for 1000ns
launch_simulation: Time (s): cpu = 00:00:05 ; elapsed = 00:00:05 . Memory (MB): peak = 91
```

Type a Tcl command here

/home/itzzinfinity/Cozy Drive/100daysofRTL/day\_081/project\_1/project\_1.srscs/sources\_1/new/factorial\_calculator.



```
1  `timescale 1ns / 1ps
2  //////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
3  // Engineer: Anjan Prasad
4  // Create Date: 12/11/2024 11:17:26 AM
5  // Module Name: factorial_calculator
6  //////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////
7
8  module factorial_calculator (
9      input [4:0] num,
10     input clk, reset, start,
11     output reg [31:0] factorial,
12     output reg done
13 );
14     reg [4:0] count;
15     reg calculating;
16
17     always @(posedge clk or posedge reset) begin
18         if (reset) begin
19             factorial <= 1;
20             count <= 0;
21             done <= 0;
22             calculating <= 0;
23         end else if (start && !calculating) begin
24             factorial <= 1;
25             count <= num;
26             done <= 0;
27             calculating <= 1;
28         end else if (calculating) begin
29             if (count > 0) begin
30                 factorial <= factorial * count;
31                 count <= count - 1;
32             end else begin
33                 calculating <= 0;
34                 done <= 1;
35             end
36         end
37     end
38 endmodule
39
```

```

1 timescale 1ns / 1ps
2 //////////////////////////////////////
3 // Engineer: Anjan Prasad
4 // Create Date: 12/11/2024 11:19:00 AM
5 // Module Name: tb_factorial_calculator
6 //////////////////////////////////////
7
8 module tb_factorial_calculator;
9     reg [4:0] num;
10    reg clk, reset, start;
11    wire [31:0] factorial;
12    wire done;
13    factorial_calculator DUT (
14        .num(num), .clk(clk), .reset(reset),
15        .start(start), .factorial(factorial), .done(done));
16
17    always #5 clk = ~clk;
18
19    initial begin
20        clk = 0;
21        reset = 1;
22        start = 0;
23        num = 0;
24        #10 reset = 0;
25
26        #10 num = 5;
27        start = 1;
28        #10 start = 0;
29        #100;
30        $display("Factorial of %0d is %0d (done=%0d)", num, factorial, done);
31
32        #20 reset = 1; #10 reset = 0;
33        num = 4;
34        start = 1;
35        #10 start = 0;
36        #100;
37        $display("Factorial of %0d is %0d (done=%0d)", num, factorial, done);
38
39        #20 reset = 1; #10 reset = 0;
40        num = 3;
41        start = 1;
42        #10 start = 0;
43        #100;
44        $display("Factorial of %0d is %0d (done=%0d)", num, factorial, done);
45
46        #20 $finish;
47    end
48 endmodule
49
50

```

