2) The figure below shows Verilog code for a n-bit adder. Assume that `x`, `y`, `s` are n-bit 2's complement numbers and $n = 4$.

(a) If `x=4'b0111`, `y=4'b1011`, and `cin=0`, determine `s`, `a`, `b`, and `c`.

(b) If `x=4'b0010`, `y=4'b0101`, and `cin=1`, determine `s`, `a`, `b`, and `c`.

(c) What are the functions of `a`, `b`, and `c`?

```
Ln#
1   module addern_003(a,b,c,s,x,y,cin);
2     parameter n;
3     output reg a,b;
4     output c;
5     output reg [n-1:0] s;
6     input [n-1:0] x,y;
7     input cin;
8
9     always @(x,y,cin) begin
10      {a,s} = x + y + cin;
11      b = s[n-1]^x[n-1]^y[n-1];
12    end
13    assign c = a^s[n-1]^x[n-1]^y[n-1];
14  endmodule  // addern_003
```