На второй лабе будем организовывать взаимодействие комп-ПЛИС через UART для судя по всему управления переходами по автомату на ПЛИСе
Сегодня реализуем трансмиттер
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^ Автомат работы

```
module uart_tx (parameter data_width = 8)(
    input clk, rst, clk_en, data_valid,
    input [data_width - 1:0] data_in,
    output reg tx,
    output data_ready)
)
    localparam idle = 3b000;
    localparam start = 3'b001;
    localparam trn = 3'b010;
    localparam stop = 3'b011;
    localparam ready = 3'b100;
    reg [2:0] state, next_state;
    assign data_ready = (state == ready);

    // Counter - up to 8
    reg [2:0] count;
    always @(posedge clk) begin
        if (rst) count <= 3'b000;
        else if (state == trn) begin
            if (clk_en) count = count + 1;
        end else count <= 0;
    end

    always @(posedge clk) begin
        if (rst) state = idle;
        else if (clk_en) state <= next_state;
    end

    always @(*) begin
        case(state):
            idle: begin if (valid) next_state <= start;
                        else next_state <= valid;
                        tx = '1;
                  end
            start: begin
                        if (clk_en) next_state = trn;
                        tx = '0;
                  end
            trn:   begin
                        if (en & count == 7) begin
                            next_state = stop;
                            tx = '0;
                        end else begin
                            next_state = trn;
                  end
            stop: begin
                        if (clk_en) next_state = ready;
                        else next_state = stop;
                  end
            ready: next_state = idle;
    end
```