計算機システム設計論　演習問題(5)
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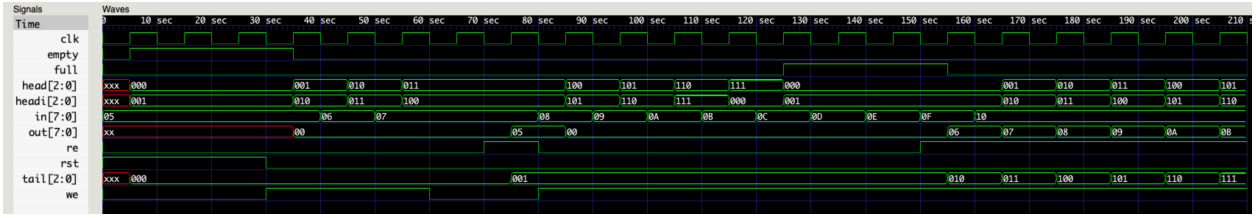
コードを以下に示す。

```
module fifo(in, we, full, out, re, empty, clk, rst);
	input [7:0] in;
	input we;
	output logic full;
	output [7:0] out;
	input re;
	output logic empty;
	input clk, rst;
	logic [7:0] mem[7:0];
	logic [2:0] head, tail, headi;
	logic [7:0] out;

	always_ff @(posedge clk) begin
		if(rst) begin
			head <= 0;
			tail <= 0;
		end else begin
			if(we && ~full) begin
				head <= head + 1;
				mem[head] <= in;
			end
			if(re && ~empty) begin
				tail <= tail + 1;
				out <= mem[tail];
			end else begin
				out <= 0;
			end
		end
	end

	always_comb begin
		headi = head + 1;
		if(head == tail) empty = 1'b1;
		else empty = 1'b0;
		if(headi == tail) full = 1'b1;
		else full = 1'b0;
	end

endmodule

module fifotest;
	logic [7:0] in, out;
	logic we, re;
	logic clk, rst;
	fifo fifo(in, we, full, out, re, empty, clk, rst);
	always #5 clk = ~clk;
initial begin
$dumpfile("fifo.vcd");
$dumpvars(0, fifotest);
rst = 1;
clk = 0;
we = 0;
re = 0;
in = 5;
```

```
#30;
rst = 0;
we = 1;
#10;
in = 6;
#10;
in = 7;
#10
we = 0;
#10
re = 1;
#10
re = 0;
we = 1;
in = 8;
#10
in = 9;
#10
in = 10;
#10
in = 11;
#10
in = 12;
#10
in = 13;
#10
in = 14;
#10
in = 15;
re = 1;
#10
in = 16;
#50
$finish;
end
endmodule
```

またシミュレーションの結果も示す。



このように FIFO をシミュレーションすることができた。