11 detection:

Moore :

```
module lab4(clk,res,w,z,y,Y);
input clk,res, w;
output reg [1:0] y,Y;
output reg z;
parameter [1:0] A = 0, B = 1, C = 2;
always @(posedge clk, posedge res)

begin
  if (res == 1)
    begin
    y = 0;
    Y=0;
    end

  else
     begin
     y=Y;
     case(y)
     A:      if (w) Y= B;
     else Y= A;
     B:  if (w) Y = C;
     else Y = A;
     C:  if (w) Y = C;
     else Y = A;

default: Y = 2'bxx;
endcase
end
end


always @(w, y)
begin
   case (y)
   A:  z =0;
   B:  z =0;
   C:  z =1;
   endcase
end
endmodule
```

Mealy :

```
module lab4(clk,res, w, z,y,Y);
input clk, res, w;
output reg z;
output reg  y,Y;
parameter  A = 0, B = 1;
always @(posedge clk, posedge res)
begin
  if (res == 1)
    begin
    y = 0;
    Y=0;
    z=0;
    end

else
    begin
    y=Y;
    case(y)

    A:     if (w)
    begin
    Y= B;
    z=0;
    end
    else
    begin
    Y= A;
    z=0;
    end

    B:     if (w)
    begin
    Y= B;
    z=1;
    end
    else
    begin
    Y= A;
    z=0;
    end

    default: Y = 1'bx;
    endcase
    end

end
endmodule
```

……

2 states

```
module nowshin(clock, reset, cash_in, purchase, present_state, next_state, cash_return);
input clock, reset;
input [1:0] cash_in;
output reg purchase;
output reg [1:0] cash_return, present_state, next_state;

parameter        [1:0] state0= 2'b00, //0tk/final state
state1= 2'b01, //5tk state
state2= 2'b10, //10tk state
state3= 2'b11, //15tk state
n = 10,//price of my product
R0= 2'b00, //0tk return
R5= 2'b01, //5tk return
R10= 2'b10, //10tk return
R15= 2'b11; //15tk return


always@(posedge clock)
begin

if(reset==1)
begin
present_state = state0;
next_state = state0;
end

else
begin
present_state = next_state;
case(present_state)


state0: if(cash_in == 2'b00) // 0 tk
  begin
  next_state = state0;
  purchase =0;
  cash_return = R0;
  end

  else if(cash_in == 2'b01) // 5 tk
  begin
  next_state = state1;
  purchase = 0;
  cash_return = R0;
  end
```

```
  else if(cash_in == 2'b10) // 10 tk
  begin
  next_state = state0;
  purchase = 1;
  cash_return = R0;
  end

  else if(cash_in == 2'b11) // 20 tk
  begin
  next_state = state0;
  purchase = 1;
  cash_return = R10;
  end


state1: if(cash_in == 2'b00)  // 0 tk
  begin
  next_state = state0;
  purchase =0;
  cash_return = R5;
  end

  else if(cash_in == 2'b01)  // 5 tk
  begin
  next_state=state0;
  purchase = 1;
  cash_return = R0;
  end

  else if(cash_in == 2'b10)  // 10 tk
  begin
  next_state=state0;
  purchase=1;
  cash_return = R5;
  end

  else if(cash_in == 2'b11)  // 20 tk
  begin
  next_state = state0;
  purchase = 1;
  cash_return = R15;
  end


endcase
end
end
endmodule
```

……

3 states

```
module labb(clock, reset, cash_in, purchase, present_state, next_state, cash_return);
input clock, reset;
input [2:0] cash_in;
output reg purchase;
output reg [2:0] cash_return, present_state, next_state;

parameter         [1:0] state0= 2'b00, //0tk/final state
state1= 2'b01, //100tk state
state2= 2'b10, //200tk state

n = 300,//price of my product
R0= 3'b000, //0tk return
R100= 3'b001, //100tk return
R200= 3'b010, //200tk return
R300= 3'b011, //300tk return
R400= 3'b100; //400tk return

always@(posedge clock)
begin

if(reset==1)
begin
present_state = state0;
next_state = state0;
end

else
begin
present_state = next_state;
case(present_state)


state0: if(cash_in == 3'b000) // 0 tk
  begin
  next_state = state0;
  purchase =0;
  cash_return = R0;
  end

  else if(cash_in == 3'b001) // 100 tk
  begin
  next_state = state1;
  purchase = 0;
  cash_return = R0;
```

```
  end

  else if(cash_in == 3'b010) // 200 tk
  begin
  next_state = state2;
  purchase = 0;
  cash_return = R0;
  end

  else if(cash_in == 3'b011) // 300 tk
  begin
  next_state = state0;
  purchase = 1;
  cash_return = R0;
  end

  else if(cash_in == 3'b100) // 500 tk
  begin
  next_state = state0;
  purchase = 1;
  cash_return = R200;
  end


state1: if(cash_in == 3'b000) // 0 tk
  begin
  next_state = state0;
  purchase =0;
  cash_return = R100;
  end

  else if(cash_in == 3'b001) // 100 tk
  begin
  next_state = state2;
  purchase = 0;
  cash_return = R0;
  end

  else if(cash_in == 3'b010) // 200 tk
  begin
  next_state = state0;
  purchase = 1;
  cash_return = R0;
  end

  else if(cash_in == 3'b011) // 300 tk
  begin
  next_state = state0;
  purchase = 1;
```

```
  cash_return = R100;
  end

  else if(cash_in == 3'b100) // 500 tk
  begin
  next_state = state0;
  purchase = 1;
  cash_return = R300;
  end


state2: if(cash_in == 3'b000) // 0 tk
  begin
  next_state = state0;
  purchase =0;
  cash_return = R200;
  end

  else if(cash_in == 3'b001) // 100 tk
  begin
  next_state = state0;
  purchase = 1;
  cash_return = R0;
  end

  else if(cash_in == 3'b010) // 200 tk
  begin
  next_state = state0;
  purchase = 1;
  cash_return = R100;
  end

  else if(cash_in == 3'b011) // 300 tk
  begin
  next_state = state0;
  purchase = 1;
  cash_return = R200;
  end

  else if(cash_in == 3'b100) // 500 tk
  begin
  next_state = state0;
  purchase = 1;
  cash_return = R400;
  end
```

```
endcase
end
end
endmodule
```