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CSE460

Ans to the question no 1:

```
module number_two(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 = 120,//price  product
R0= 4'b0000,
R20= 4'b0001,
R40= 4'b0010,
R80= 4'b0011,
R100= 4'b0100,
R120= 4'b0101,
R180= 4'b0111,
R380= 4'b1000,
R420=  4'b1001,
R480= 4'b1010;



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) // 40 tk
  begin
  next_state = state1;
  purchase = 0;
  cash_return = R0;
  end

  else if(cash_in == 3'b010) // 100 tk
  begin
  next_state = state2;
  purchase = 0;
  cash_return = R0;
  end

  else if(cash_in == 3'b011) // 200 tk
  begin
  next_state = state0;
  purchase = 1;
  cash_return = R80;
  end

  else if(cash_in == 3'b100) // 500 tk
  begin
  next_state = state0;
  purchase = 1;
  cash_return = R380;
  end




state1: if(cash_in == 3'b000) // 0 tk
```

```
  begin
  next_state = state0;
  purchase =0;
  cash_return = R40;
  end

  else if(cash_in == 3'b001) // 40 tk
  begin
  next_state = state2;
  purchase = 0;
  cash_return = R0;
  end

  else if(cash_in == 3'b010) // 100 tk
  begin
  next_state = state0;
  purchase = 1;
  cash_return = R20;
  end

  else if(cash_in == 3'b011) // 200 tk
  begin
  next_state = state0;
  purchase = 1;
  cash_return = R120;
  end

  else if(cash_in == 3'b100) // 500 tk
  begin
  next_state = state0;
  purchase = 1;
  cash_return = R420;
  end




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

```
 cash_return = R100;
 end

 else if(cash_in == 3'b001) // 40 tk
 begin
 next_state = state0;
 purchase = 1;
 cash_return = R20;
 end

 else if(cash_in == 3'b010) // 100 tk
 begin
 next_state = state0;
 purchase = 1;
 cash_return = R80;
 end

 else if(cash_in == 3'b011) // 200 tk
 begin
 next_state = state0;
 purchase = 1;
 cash_return = R180;
 end

 else if(cash_in == 3'b100) // 500 tk
 begin
 next_state = state0;
 purchase = 1;
 cash_return = R480;
 end



endcase
end
end
endmodule
```

Ans to the question no 2:

```
module number_one(clk,res,w1,w2,w3,w4,z,y,Y);  //moore
input clk,res, w1,w2,w3,w4;
output reg [2:0] y,Y;
output reg z;
parameter [2:0] A = 0, B = 1, C = 2, D=3, E=4;
always @(posedge clk, posedge res)

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

 else
   begin
   y=Y;
   case(y)
   A:     if (w1) Y= B;

   else if (w2) Y= C;

   else if (w3) Y= B;

   else   if (w4) Y= C;


   B:     if (w1) Y= D;

   else   if (w2) Y= C;

   else   if (w3) Y= D;

   else   if (w4) Y= C;
```

```
    C:     if (w1) Y= B;

    else   if (w2) Y= E;

    else   if (w3) Y= B;

    else   if (w4) Y= E;


    D:     if (w1) Y= D;

    else   if (w2) Y= C;

    else   if (w3) Y= D;

    else   if (w4) Y= C;


    E:     if (w1) Y= B;

    else   if (w2) Y= E;

    else   if (w3) Y= B;

    else   if (w4) Y= E;



default: Y = 3'bxx;
endcase
end
end


always @(w1,w2,w3,w4, y)
begin
  case (y)
  A:  z =0;
  B:  z =0;
  C:  z =0;
  D:  z =1;
  E:  z =1;
```

```
  endcase
end
endmodule
```