

**Name: Farhan Akbor Khan**

**ID: 20301230**

**Section: 07**

**Lab Test - 05**

**CSE460 (Summer-23)**

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### ***Code for 20tk Vending - Machine:***

```
module lab5_20301230(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      state0= 2'b00, //0tk/final state
                   state1= 2'b01, //5tk state
                   state2= 2'b10, //10tk state
                   state3= 2'b11, //15tk state
                   n = 20, //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; //2'b00
        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 = state2;
            purchase = 0;
            cash_return = R0;
        end
    else if(cash_in == 2'b11) // 20 tk
        begin
            next_state = state0;
            purchase = 1;
            cash_return = R0;
        end
    end

state1: if(cash_in == 2'b00)
        begin
            next_state = state0;
            purchase = 0;
            cash_return = R5;
        end
    else if(cash_in == 2'b01)
        begin
            next_state = state2;
            purchase = 0;
            cash_return = R0;
        end
    end

```

```

        else if(cash_in == 2'b10)
            begin
                next_state=state3;
                purchase=0;
                cash_return = R0;
            end
        else if(cash_in == 2'b11)
            begin
                next_state = state0;
                purchase = 1;
                cash_return = R5;
            end
        end

state2: if(cash_in == 2'b00) // 0 tk
    begin
        next_state = state0;
        purchase =0;
        cash_return = R10; //2'b00
    end
    else if(cash_in == 2'b01) // 5 tk
        begin
            next_state = state3;
            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
    end

state3: if(cash_in == 2'b00) // 0 tk

```

```

begin
    next_state = state0;
    purchase = 0;
    cash_return = R15; //2'b00
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
endmodule

```

