

課題10-2

プログラム

function.v

```
module kadai10_2(  
    input a,b,c,  
    output z  
);  
  
    function MDC;  
        input a,b,c;  
        MDC = (a & b) | (b & c) | (c & a);  
    endfunction  
  
    assign z = MDC(a, b, c);  
endmodule
```

実行結果

```
VCD info: dumpfile gate3_test.vcd opened for output.  
a = 0, b = 0, c = 0, z = 0  
a = 0, b = 0, c = 1, z = 0  
a = 0, b = 1, c = 0, z = 0  
a = 0, b = 1, c = 1, z = 1  
a = 1, b = 0, c = 0, z = 0  
a = 1, b = 0, c = 1, z = 1  
a = 1, b = 1, c = 0, z = 1  
a = 1, b = 1, c = 1, z = 1
```

課題10-4(1)

プログラム

mux4.v

```
module kadai10_4_1 (  
    input [1:0] s,  
    input [7:0] a,b,c,d,  
    output [7:0] z  
);  
  
    function [7:0] mux4;  
        input [1:0] s;  
        input [7:0] a,b,c,d;  
        if (s == 2'b00) mux4 = a;  
        else if (s == 2'b01) mux4 = b;  
        else if (s == 2'b10) mux4 = c;  
        else if (s == 2'b11) mux4 = d;  
    endfunction  
  
    assign z = mux4(s, a, b, c, d);  
endmodule
```

実行結果

```
a: 00000000  
b: 00001111  
c: 11110000  
d: 11111111  
s: 00 z: 00000000  
s: 01 z: 00001111  
s: 10 z: 11110000  
s: 11 z: 11111111
```

課題10-4(2)

プログラム

mux4.v

```
module kadai10_4_2 (  
    input [1:0] s,  
    input [7:0] a,b,c,d,  
    output [7:0] z  
);  
  
    function [7:0] mux4;  
        input [1:0] s;  
        input [7:0] a,b,c,d;  
        case (s)  
            2'b00: mux4 = a;  
            2'b01: mux4 = b;  
            2'b10: mux4 = c;  
            2'b11: mux4 = d;  
        endcase  
    endfunction  
  
    assign z = mux4(s, a, b, c, d);  
endmodule
```

実行結果

```
a: 00000000  
b: 00001111  
c: 11110000  
d: 11111111  
s: 00 z: 00000000  
s: 01 z: 00001111  
s: 10 z: 11110000  
s: 11 z: 11111111
```

課題10-6

プログラム

dff.v

```
module DFF (  
    input CK, D,  
    output Q  
);  
    reg Q;  
    always @(posedge CK) begin  
        Q <= D;  
    end  
endmodule
```

波形



波形