2023 Digital IC Design Homework 1

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Functional Simulation Result

Stage 1	Pass/Fail	Stage 2	Pass/Fail	Stage 3	Pass/Fail	Stage 4	Pass/Fail

Stage 1

```
# -------------Stage 1 : Maximum selection with 4-input MMS-------------
#
# -------------Stage 1 :              Pass!                 -------------
```

Stage 2

```
# -------------Stage 2 : Minimum selection with 4-input MMS-------------
#
# -------------Stage 2 :              Pass!                 -------------
#
```

Stage 3

```
# -------------Stage 3 : Maximum selection with 8-input MMS-------------
#
# -------------Stage 3 :              Pass!                 -------------
#
```

Stage 4

```
# -------------Stage 4 : Minimum selection with 8-input MMS-------------
#
# -------------Stage 4 :              Pass!                 -------------
#
```

Description of your design

MMS_4num.v

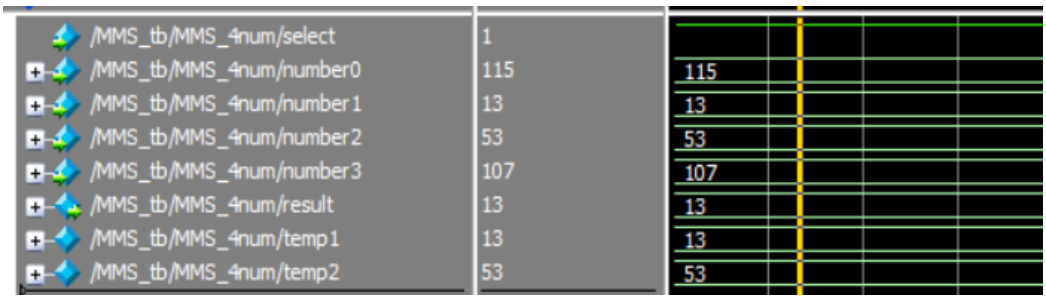
```v
module MMS_4num(result, select, number0, number1, number2, number3);

input        select;
input  [7:0] number0;
input  [7:0] number1;
input  [7:0] number2;
input  [7:0] number3;
output [7:0] result;

/*
    Write Your Design Here ~
*/
wire [7:0] temp1, temp2;
assign temp1 = ((number0 < number1) ^ select) ? number1 : number0;
assign temp2 = ((number2 < number3) ^ select) ? number3 : number2;
assign result = ((temp1 < temp2) ^ select) ? temp2 : temp1;


endmodule
```

Verilog code of MMS_4num.

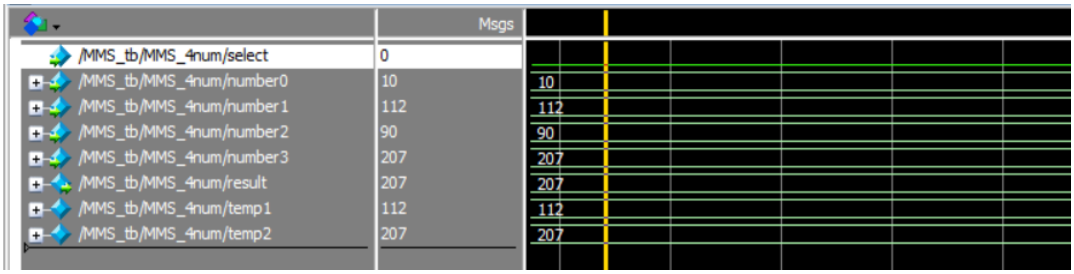
MMS_8num.v

```v
`include "MMS_4num.v"
module MMS_8num(result, select, number0, number1, number2, number3, number4,
 number5, number6, number7);

input        select;
input  [7:0] number0;
input  [7:0] number1;
input  [7:0] number2;
input  [7:0] number3;
input  [7:0] number4;
input  [7:0] number5;
input  [7:0] number6;
input  [7:0] number7;
output [7:0] result;

/*
    Write Your Design Here ~
*/
wire [7:0] out1, out2;
MMS_4num m1(out1, select, number0, number1, number2, number3);
MMS_4num m2(out2, select, number4, number5, number6, number7);
assign result = ((out1 < out2) ^ select) ? out2 : out1;

endmodule
```

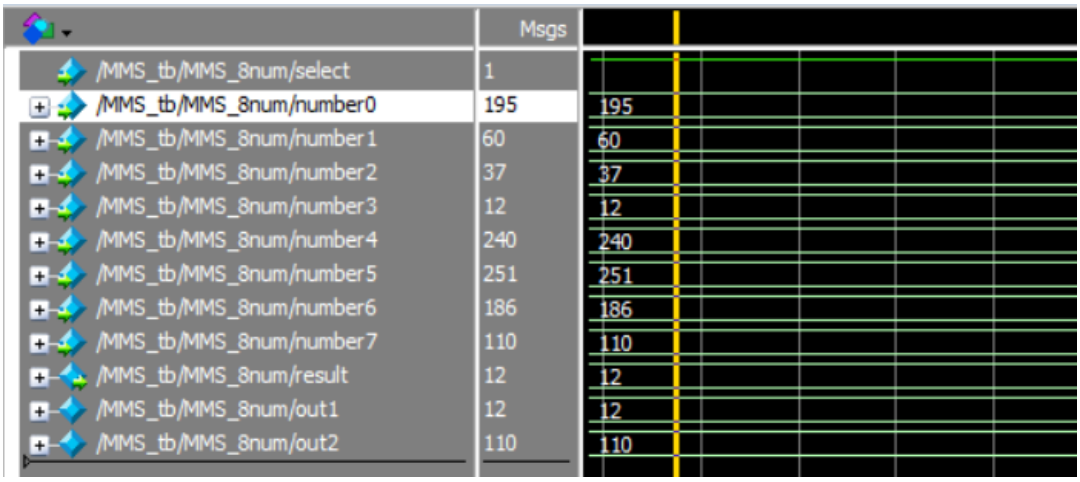
Verilog code of MMS_8num.



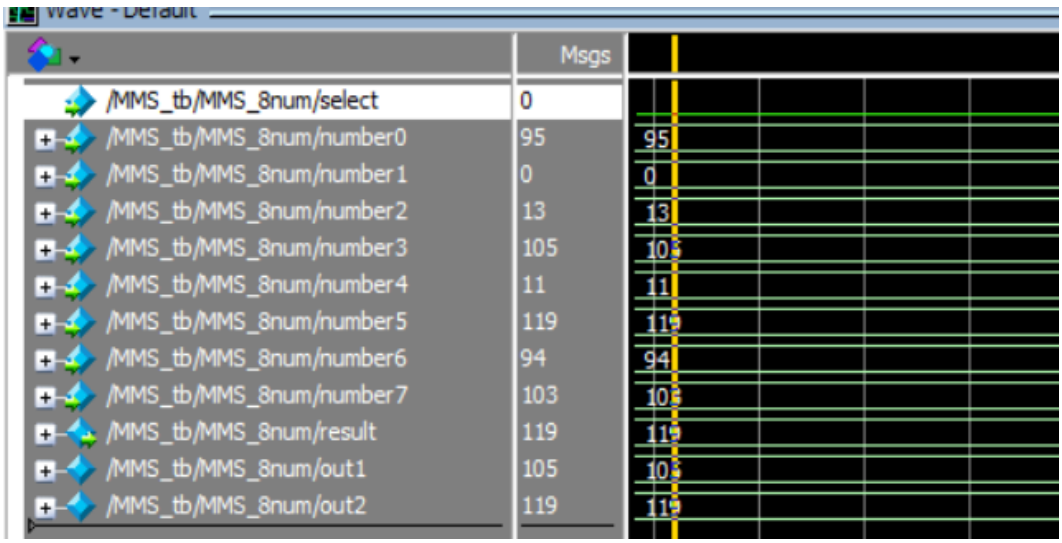
Segment wave of result of MMS_4num, select ==1 represented for selecting minimum, so the result will be 13.



Segment wave of result of MMS_4num, select == 0 represented for selecting maximum, so the result will be 207.



Segment wave of result of MMS_8num, select == 1 represented for selecting minimum, so the result will be 12.



Segment wave of result of MMS_8num, select == 0 represented for selecting minimum, so the result will be 119.