KNOCKOUT TOURNAMENT

DIGITAL FUNDAMENTALS AND COMPUTER ORGANIZATION [CS6105]

HARDWARE DESCRIPTION LANGUAGE PROJECT

BY

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knockout Tournament

INTRODUCTION

Hardware description language is used to implement circuits in programming language this is also called as verilog.The waveform gtkwave is used to analyse its output in graphical manner .knockout tournament project displays semifinals and finals in any sports tournament such as fifa worldcup or icc cricket worldcup.

PROBLEM AND SOLUTION

In sports events where knockout tournament is held that means each match is a do or die match the team wins goes to next stage quarter final to semifinals and to final .so each match's winner either a or b is the team that is to be played in next match against the opponent the next stage is dependent on match result which is enable to the mux .This concept is like 4 teams where a,b play a semifinal and c ,d plays another semifinal based on 2 results finals match is decided the winner is decided by the finals result .so 3 results decided's the winner .so 2^3 8 combinations are discussed to obtain a clear cut idea of the possibilites of each team winnings

PROJECT MODULE

```
module match(win,one,two,sel);
        input [1:0]one;
        input [1:0]two;
        input sel;

        output [1:0]win;

        assign win=(sel)?two:one;

        //0 means team one wins,1 means team 2 wins
endmodule

module tournament(champion,a,b,c,d,s2,s1,s0);
        input [1:0]a;
        input[1:0]b;
        input [1:0]c;
        input[1:0]d;
```

```
        input s2;
        input s1;
        input s0;

        output [1:0]champion;

        wire [1:0]sf1;
        wire [1:0]sf2;

        match semifinal1(sf1,a,b,s0);
        //semifinal match between a and b team

        match semifinal2(sf2,c,d,s1);
        //semifinal match between c and d team

        match finals(champion ,sf1,sf2,s2);
        //final is between winner of sf1 and sf2

endmodule
```

PROJECT TESTBENCH

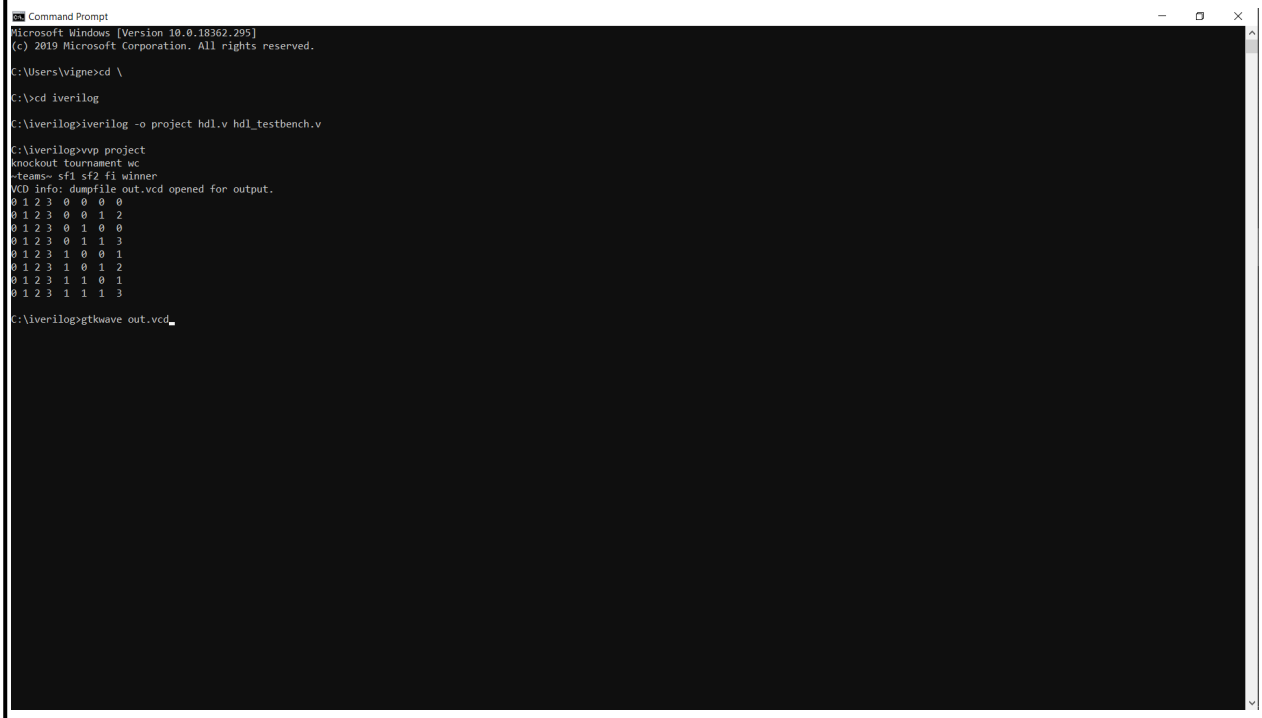
```
`timescale 1ns/1ns
module tournament_tb;
        wire[1:0] t_out;
        reg[1:0] t_a;
        reg[1:0]t_b;
        reg[1:0]t_c;
        reg[1:0]t_d;
        reg t_s2;
        reg t_s1;
        reg t_s0;
tournament wc(
.a(t_a),.b(t_b),.c(t_c),.d(t_d),.s2(t_s2), .s1(t_s1), .s0(t_s0), .champion(t_out) );

initial
begin
        $display("knockout tournament wc");
        $display("~teams~ sf1 sf2 fi winner");
        $monitor(t_a,,t_b,,t_c,,t_d,,,t_s0,,,t_s1,,,t_s2,,,t_out);

// 1
        t_a = 2'b00;
        t_b = 2'b01;
```

```
        t_c = 2'b10;
        t_d = 2'b11;
        t_s0 = 1'b0;
        t_s1 = 1'b0;
        t_s2 = 1'b0;
#10
//2
        t_a = 2'b00;
        t_b = 2'b01;
        t_c = 2'b10;
        t_d = 2'b11;
        t_s0 = 1'b0;
        t_s1 = 1'b0;
        t_s2 = 1'b1;
#10
//3
        t_a = 2'b00;
        t_b = 2'b01;
        t_c = 2'b10;
        t_d = 2'b11;
        t_s0 = 1'b0;
        t_s1 = 1'b1;
        t_s2 = 1'b0;
#10
 //4
        t_a = 2'b00;
        t_b = 2'b01;
        t_c = 2'b10;
        t_d = 2'b11;
        t_s0 = 1'b0;
        t_s1 = 1'b1;
        t_s2 = 1'b1;
#10
//5
        t_a = 2'b00;
        t_b = 2'b01;
        t_c = 2'b10;
        t_d = 2'b11;
        t_s0 = 1'b1;
        t_s1 = 1'b0;
        t_s2 = 1'b0;
#10
 //6
        t_a = 2'b00;
```

```
        t_b = 2'b01;
        t_c = 2'b10;
        t_d = 2'b11;
        t_s0 = 1'b1;
        t_s1 = 1'b0;
        t_s2 = 1'b1;
#10
 //7
        t_a = 2'b00;
        t_b = 2'b01;
        t_c = 2'b10;
        t_d = 2'b11;
        t_s0 = 1'b1;
        t_s1 = 1'b1;
        t_s2 = 1'b0;
#10
 //8
        t_a = 2'b00;
        t_b = 2'b01;
        t_c = 2'b10;
        t_d = 2'b11;
        t_s0 = 1'b1;
        t_s1 = 1'b1;
        t_s2 = 1'b1;

end

initial begin
        $dumpfile("out.vcd");
        $dumpvars(1,wc.tournament);
end

endmodule
```

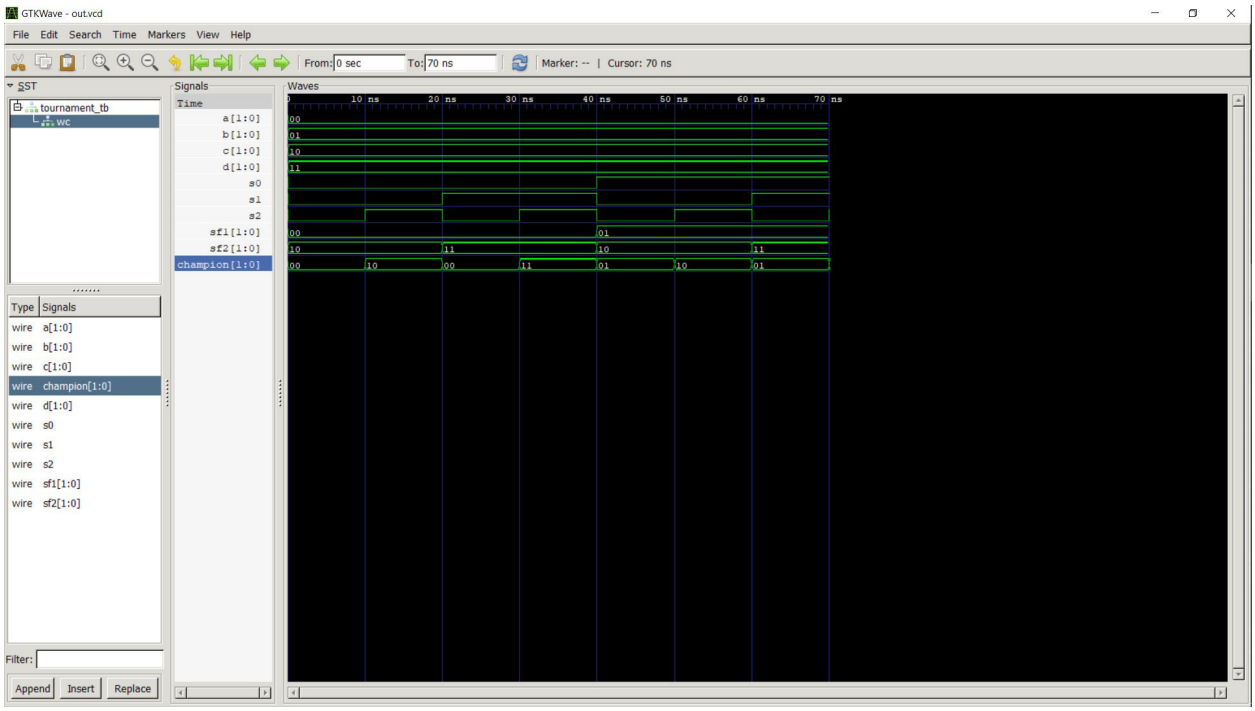
OUTPUT OBTAINED

TEAMS 0,1,2,3 denotes A,B,C,D Teams.SF1,SF2,FI denotes 0 if first team wins and denotes 1 if second team wins .winner denotes the champion of the tournament either A OR B OR C OR D(0,1,2,3).

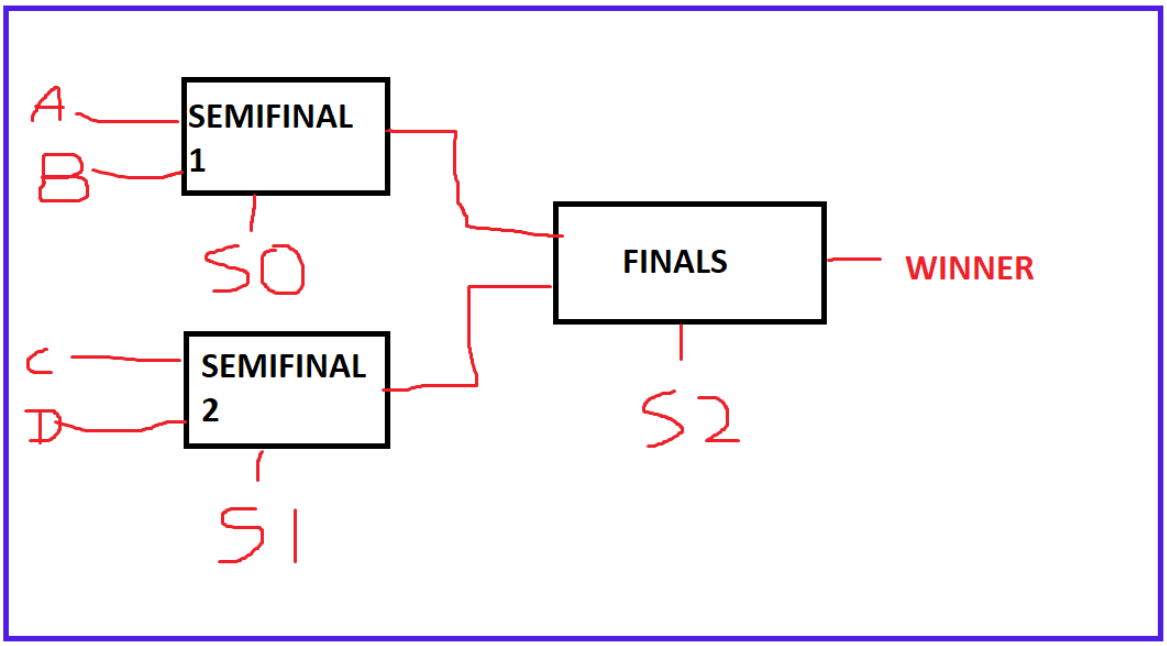


GTKWAVE FORM

The wave form denotes 00,01,10,11 for 0,1,2,3 and s0 ,s1,s2 denotes the results of the semifinals 1,2 and finals respectively and sf1 ,sf2 denotes the winner for semifinal1 and semifinal2 .The champion represents the winner of the tournament all the values are based on the testbench s0,s1,s2 combinations.



BLOCK DIAGRAM



CONCLUSION

This hardware description language is applied to a worldwide followed knockout tournament the results of each match in knockout decideds the winner which is represented as champion .