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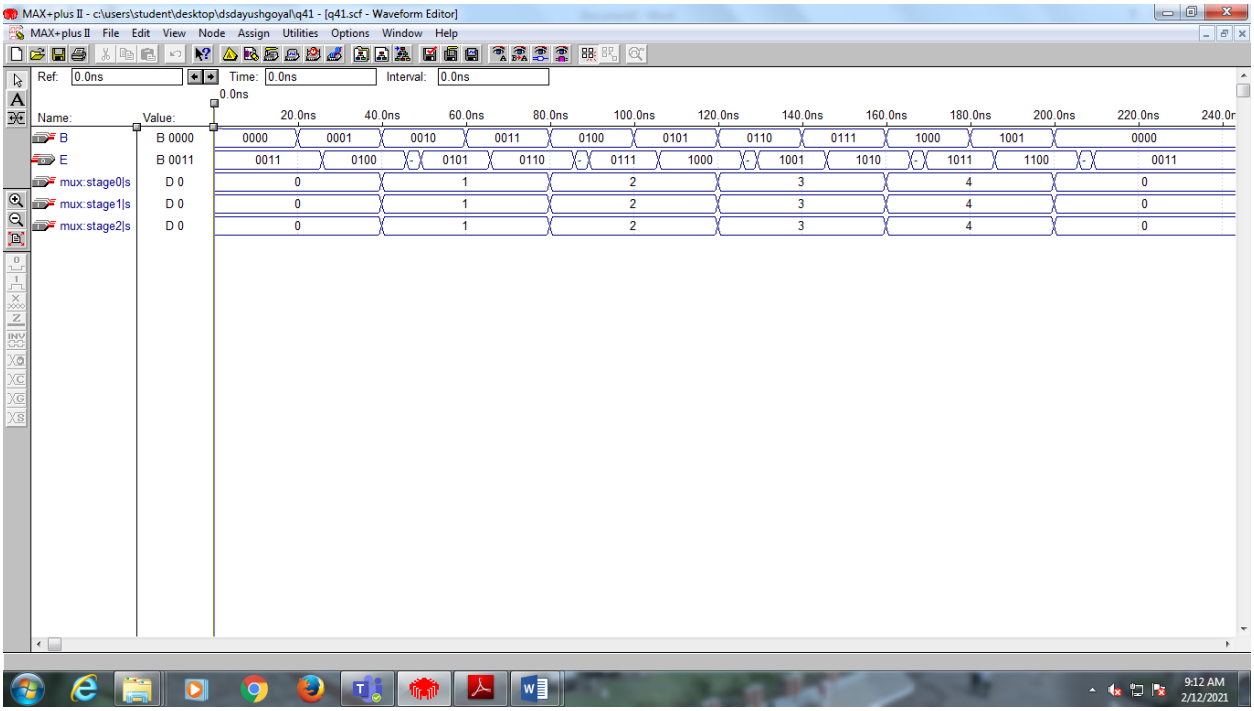
DSD Lab 4 (Week 4)

Q1)

```
module q41(B,E);
	input [3:0]B;
	output [3:0]E;
	assign E[0] = ~B[0];
	eighttoonemux stage0({1'b0,1'b0,1'b0,1'b1,1'b1,B[0],1'b0,1'b0}, B[3:1], E[3]);
	eighttoonemux stage1({1'b0,1'b0,1'b0,B[0],1'b0,~B[0],1'b1,B[0]}, B[3:1], E[2]);
	eighttoonemux stage2({1'b0,1'b0,1'b0,~B[0],B[0],~B[0],B[0],~B[0]}, B[3:1], E[1]);
endmodule

module eighttoonemux(w,s,f);
	input [7:0]w;
	input [2:0]s;
	output f;
	reg f;
	always @(w or s)
	begin
	case(s)
	0: f = w[0];
	1: f = w[1];
	2: f = w[2];
	3: f = w[3];
	4: f = w[4];
	5: f = w[5];
	6: f = w[6];
	7: f = w[7];
```

```
        endcase
        end
endmodule
```

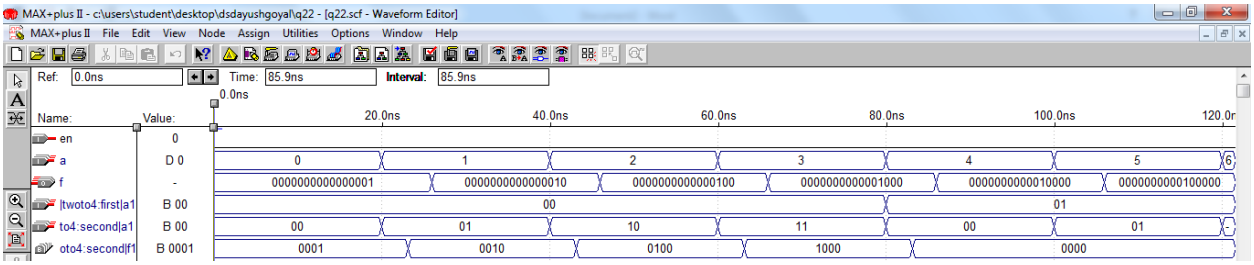


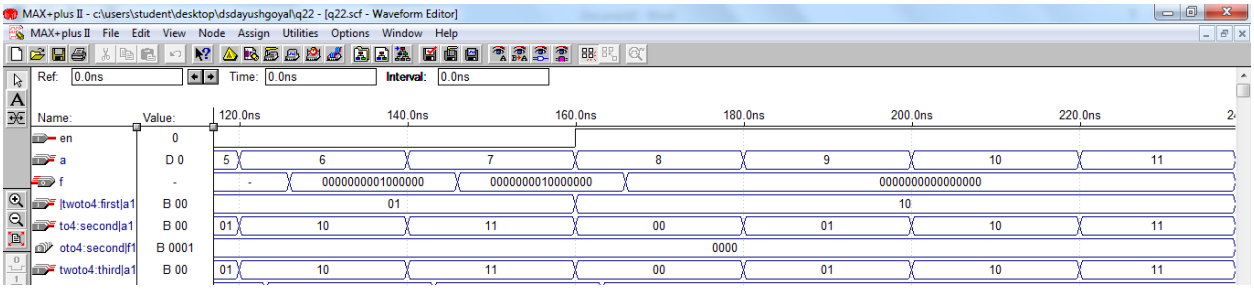
Q2)

```
module twotofour(a1, en1, f1);
        input en1;
        input [1:0]a1;
        output [3:0]f1;
        reg [3:0]f1;
        always @(a1 or en1)
        begin
        case({en1, a1})
        3'b000: f1 = 4'b0001;
        3'b001: f1 = 4'b0010;
        3'b010: f1 = 4'b0100;
        3'b011: f1 = 4'b1000;
```

```
        default: f1= 4'b0000;
        endcase
        end
endmodule

module q22(a, en, f);
        input en;
        input [3:0]a;
        output [15:0]f;
        wire [3:0]w;
        twotofour first(a[3:2], en, w);
        twotofour second(a[1:0], ~w[0], f[3:0]);
        twotofour third(a[1:0], ~w[1], f[7:4]);
        twotofour fourth(a[1:0], ~w[2], f[11:8]);
        twotofour fifth(a[1:0], ~w[3], f[15:12]);
endmodule
```





Q3)

```
module q3(x, f);
        input [15:0]x;
        output [3:0]f;
        reg [3:0]f;
        integer i;
        always @(x)
        begin
        for(i = 0; i<=15; i= i+1)
        begin
        if(x[i] == 1'b1)
        begin
        f = i;
        end
        end
        end
endmodule
```