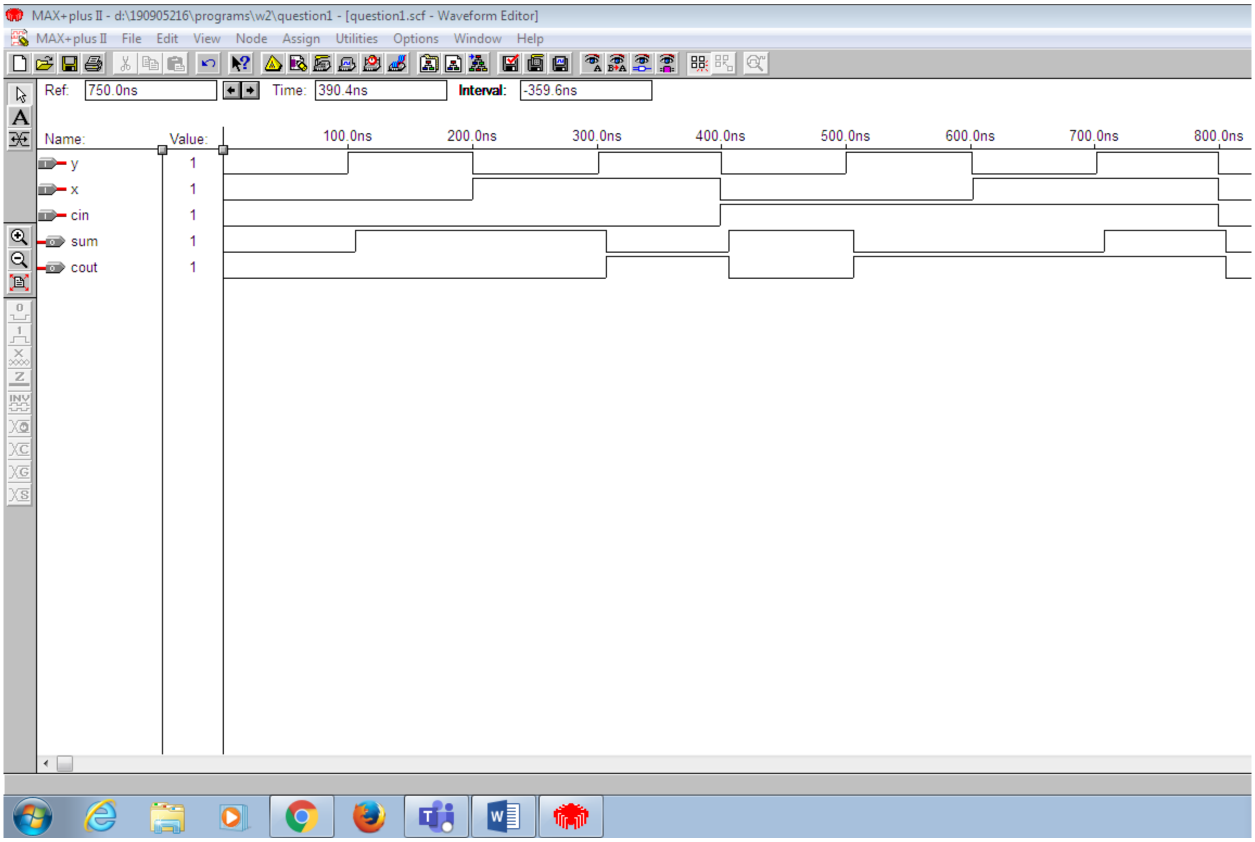
Week 2:

Question 1:

```
module question1(cin, x, y, sum, cout);

input cin, x, y;

output  sum, cout;

assign sum = cin ^ x ^ y;

assign cout =(x & y)|(y & cin)|(cin & x);

endmodule
```



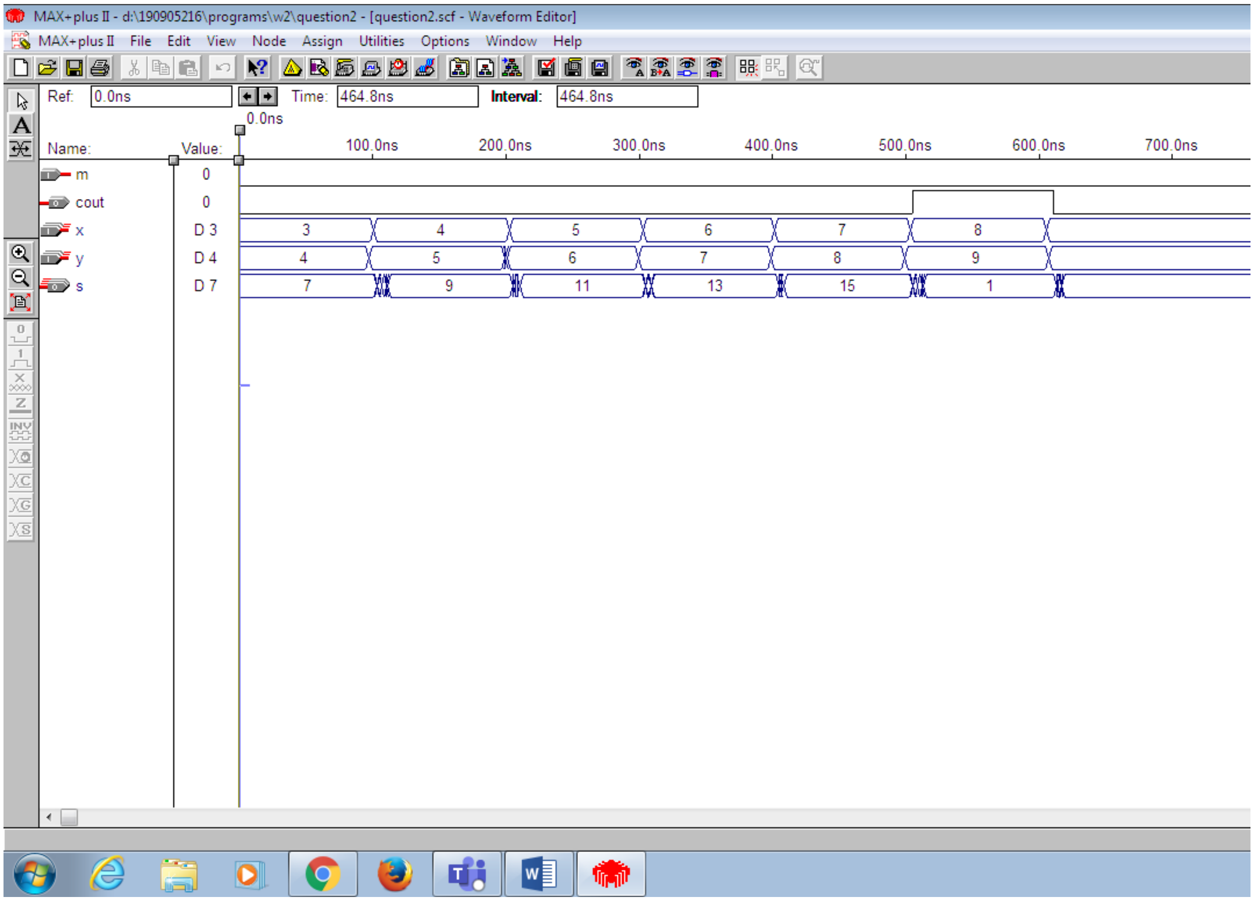
MAX+plus II - d:\190905216\programs\w2\question1 - [question1.scf - Waveform Editor]

Ref: 750.0ns Time: 390.4ns Interval: -359.6ns

Name:	Value:
y	1
x	1
cin	1
sum	1
cout	1

Question 2:

```
module question2(s, cout, x, y, m);
input [3:0] x, y;
input m;
output [3:0] s;
output cout;
wire [3:0] w;
wire [3:1] c;
assign w = y^m;
fulladd f1(x[0], w[0], m, s[0], c[1]);
fulladd f2(x[1], w[1], c[1], s[1], c[2]);
fulladd f3(x[2], w[2], c[2], s[2], c[3]);
fulladd f4(x[3], w[3], c[3], s[3], cout);
endmodule

module fulladd (j, k, l, ss, cc);
input j, k, l;
output ss, cc;
assign ss = j^k^l;
assign cc = j&k|k&l|l&j;
endmodule
```



MAX+plus II - d:\190905216\programs\w2\question2 - [question2.scf - Waveform Editor]

Ref: 0.0ns Time: 464.8ns Interval: 464.8ns

Name:	Value:
m	0
cout	0
x	D 3
y	D 4
s	D 7

Question 3:

```
module question3 (a, b, cin, cx, r);
input [3:0] a, b;
input cin;
output [3:0] r;
output cx;
wire [3:0] t, u;
wire co, cxo;
fourbitadder f1(t, co, a, b, cin);
assign cx = co|(t[3]&t[2])|(t[3]&t[1]);
assign u[0] = 0;
assign u[1] = cx;
assign u[2] = cx;
assign u[3] = 0;
fourbitadder f2(r, cxo, t, u, 0);
endmodule

module fourbitadder(s, cout, x, y, m);
input [3:0] x, y;
input m;
output [3:0] s;
output cout;
wire [3:0] w;
wire [3:1] c;
assign w = y^m;
fulladd f1(x[0], w[0], m,             s[0], c[1]);
fulladd f2(x[1], w[1], c[1], s[1], c[2]);
fulladd f3(x[2], w[2], c[2], s[2], c[3]);
fulladd f4(x[3], w[3], c[3], s[3], cout);
endmodule
```

```
module fulladd (j, k, l, ss, cc);
input j, k, l;
output ss, cc;
assign ss = j^k^l;
assign cc = j&k|k&l|l&j;
endmodule
```