**Digital Design and Computer Organization Laboratory**

**UE19CS206**

**3rd Semester, Academic Year 2020-21**

Date:

|  |  |  |
| --- | --- | --- |
| Name: TUSHAR Y S | SRN:  PES1UG19CS545 | Section  I |

Experiment Number: 3 Week# 4

Program Number : 1

**Title of the Program: ALU**

**Paste the Program**

module fulladd(input wire a, b, cin, output wire sum, cout);

wire [4:0] t;

xor2 x0(a, b, t[0]);

xor2 x1(t[0], cin, sum);

and2 a0(a, b, t[1]);

and2 a1(a, cin, t[2]);

and2 a2(b, cin, t[3]);

or2 o0(t[1], t[2], t[4]);

or2 o1(t[3], t[4], cout);

endmodule

module alu\_slice(input wire op0,op1,input wire i0,i1,cin,output wire cout,o);

wire t\_xor,t\_and,t\_or,t\_fa,t\_mux;

xor2 x(i1,op0,t\_xor);

fulladd f\_1(i0,t\_xor,cin,t\_fa,cout);

and2 a\_0(i0,i1,t\_and);

or2 o\_0(i0,i1,t\_or);

mux2 m\_0(t\_and,t\_or,op0,t\_mux);

mux2 m\_1(t\_fa,t\_mux,op1,o);

endmodule

module alu (input wire [1:0] op, input wire [15:0] i0, i1,

output wire [15:0] o, output wire cout);

// Declare wires here

wire [14:0] c;

// Instantiate modules here

alu\_slice as\_0(op[0],op[1],i0[0],i1[0],op[0],c[0],o[0]);

alu\_slice as\_1(op[0],op[1],i0[1],i1[1],c[0],c[1],o[1]);

alu\_slice as\_2(op[0],op[1],i0[2],i1[2],c[1],c[2],o[2]);

alu\_slice as\_3(op[0],op[1],i0[3],i1[3],c[2],c[3],o[3]);

alu\_slice as\_4(op[0],op[1],i0[4],i1[4],c[3],c[4],o[4]);

alu\_slice as\_5(op[0],op[1],i0[5],i1[5],c[4],c[5],o[5]);

alu\_slice as\_6(op[0],op[1],i0[6],i1[6],c[5],c[6],o[6]);

alu\_slice as\_7(op[0],op[1],i0[7],i1[7],c[6],c[7],o[7]);

alu\_slice as\_8(op[0],op[1],i0[8],i1[8],c[7],c[8],o[8]);

alu\_slice as\_9(op[0],op[1],i0[9],i1[9],c[8],c[9],o[9]);

alu\_slice as\_10(op[0],op[1],i0[10],i1[10],c[9],c[10],o[10]);

alu\_slice as\_11(op[0],op[1],i0[11],i1[11],c[10],c[11],o[11]);

alu\_slice as\_12(op[0],op[1],i0[12],i1[12],c[11],c[12],o[12]);

alu\_slice as\_13(op[0],op[1],i0[13],i1[13],c[12],c[13],o[13]);

alu\_slice as\_14(op[0],op[1],i0[14],i1[14],c[13],c[14],o[14]);

alu\_slice as\_15(op[0],op[1],i0[15],i1[15],c[14],cout,o[15]);

endmodule

**Paste the Screen Shot of the output waveform**

