**Design of a 2 Bit Arithmetic Logic Unit**  
You will need to have Logisim in order to complete this project. You are to design and  
implement a two bit Arithmetic Logic Unit. The ALU must contain the following operations:  
•Logic Operations:  
o AND  
o OR  
o NOT  
o XOR  
•Arithmetic Operations:  
o ADD  
o SUBTRACT  
o MULTIPLY  
o COMPARE  
You may implement more operations if you wish. The list above is the bare minimum. You may  
use the circuit given in the ALU.jpg file as a reference of what to do. However, the file contains  
an implementation for 1 Bit ALU. You do not have to strictly follow the given sample; your own  
ideas are welcomed.  
Simply changing the data bit sizes of the devices to two bits will not be accepted as a solution.  
There must be two sets of each of the gates/adders connected together with the appropriate  
number of multiplexers. The size of the opcode for the ALU is not fixed and depends up to you  
and your design.  
**This is an individual project. Every student must submit his/her own work. Any signs of**  
**plagiarism will result in penalties.**  
**Description of the ALU image**  
In the image, there are certain boxes labeled x1/x2. These are basically input pins into various  
devices. The number indicates the data width of the particular input. To the right bottom edge  
of the image there are three AND gates. Their inputs come in from an input pin and the  
comparator. The data on the input pin is two bits wide. The wires have been split using a  
splitter and have been connected to the AND gate as two separate data. The white circles are  
LED’s.  
**You will also have to include a report detailing how the ALU works**. Your report should include  
the following:  
•Describe the overall design  
•How the ALU is working  
•A description of how the OPCODE is working in conjunction with the multiplexers  
•Any special design issues that you have taken into consideration and how you managed  
to overcome/ solve/ bypass the issue.  
•Anything else worth mentioning  
**Submission Guidelines**  
You will have approximately two weeks to complete this project and must submit it to me via  
email.  
**You must submit both .circ file and .jpg file of the circuit. The filenames must be your id. The**  
**scale factor of the image must be set to 200% so that’s its legible.**  
**The report must be in PDF format. Any other file format will not be accepted. The filename of**  
**this report will also be your ID. The header inside the document must contain your name and**  
**ID.**  
The subject of your email must contain “EEE 332/ CSE 331 Lab Project”. The body of the email  
should have your name and id. Attach the necessary files with this email.  
There are a total of 15 marks for this project. 8 Marks are allocated for the ALU design and 7  
marks are allocated for the report.