BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CSE306 (Computer Architecture Sessional), January 2021 Term
All Lab Sections, March 11, 2021

Specification for 4-bit ALU Simulation

- The functional design specification for each group of each section can be found in Appendix A. First, read carefully the specification of your group. Then, go through the next specifications/instructions of this section.
- Required Flags:
  - Carry
  - Sign
  - Overflow
  - Zero
- Flags will be affected as per the rules of Assembly Language.
- Any SSI (AND, OR, NOT, XOR etc.) and MSI (MUX, Decoder, Adder etc.) chip can be used.
- Emphasis should be given on efficiency of design and minimization of ICs used.
- Late submission will result in reduced marking.
- For simulation you can use any simulation software.
- While demonstration you must bring your group specification.

Report Preparation Guideline

Your have to write a Report containing the followings:

- Introduction
- Problem Specification with assigned instructions
- Truth Table & Required k-maps
- Block Diagram
- Complete Circuit diagram
- ICs used with count as a chart

- Simulator used along with the version number
- Discussion

Submission Guideline

- A submission link will be opened on Moodle for submitting your ALU simulation. Make a folder file containing all your simulation project files along with the soft copy of your report. The naming format of the folder should be your section name followed by your group id (e.g., B1_Group7). Zip the folder and use the zipped file for submission. Please ensure a single submission from each group.

Submission Deadline: For all sections: March 28, 2021 (Sunday) at 11.59pm.

Version

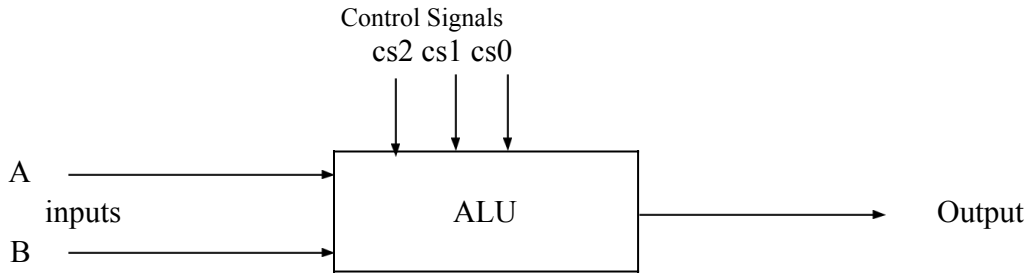
This section contains the version of the assignment. It starts with Version 0. If we find some major problems in this assignment description file, then we shall change this pdf. If that case, we shall increase the version number and list the changes in this section. So, keep an eye on this version number of the pdf in the moodle to see whether the version is changed or not. If it is changed, the first read this section to see where the changes have been made and whether it is applicable for your group. On the other hand, if the changes are minor (for example, correcting the grammatical mistakes), then version number will not be changed.

Version 0

This is the initial version of the problem description pdf.

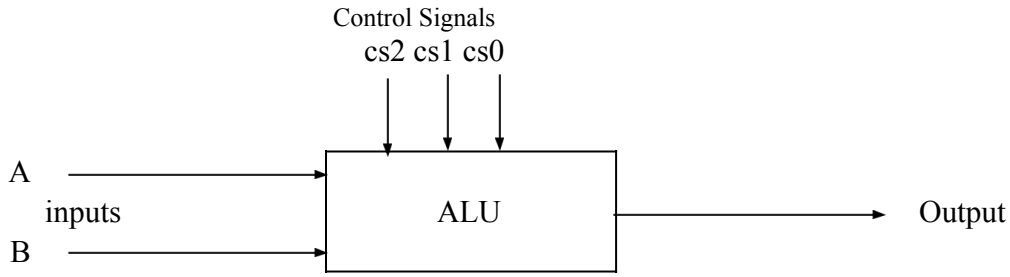
Functional design specifications for each group of each section

cin			Functions for			
cs2	cs1	cs0	Group 1	Group 2	Group 3	Group 4
0	0	0	Add	Decrement A	Subtract with borrow	Decrement A
0	0	1	Transfer A	Subtract with borrow	Transfer A	Add
0	1	0	Add with carry	Transfer A	Subtract	Transfer A
0	1	1	Increment A	Subtract	Increment A	Add with carry
1	x	0	AND	OR	AND	Complement A
1	x	1	XOR	Complement A	OR	XOR



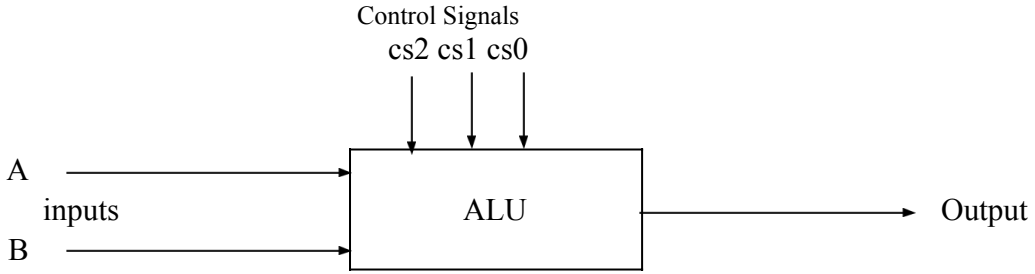
cin			Functions for	
cs2	cs1	cs0	Group 5	Group 6
0	0	0	Add	Decrement A
0	1	0	Transfer A	Subtract with borrow
1	0	0	Add with carry	Transfer A
1	1	0	Increment A	Subtract
x	0	1	OR	AND
x	1	1	Complement A	XOR

cin			Functions for			
cs2	cs1	cs0	Group 1	Group 2	Group 3	Group 4
0	0	0	Add	Decrement A	Subtract with borrow	Decrement A
0	0	1	Transfer A	Subtract with borrow	Transfer A	Add
1	0	0	Add with carry	Transfer A	Subtract	Transfer A
1	0	1	Increment A	Subtract	Increment A	Add with carry
x	1	0	AND	OR	AND	Complement A
x	1	1	XOR	Complement A	OR	XOR



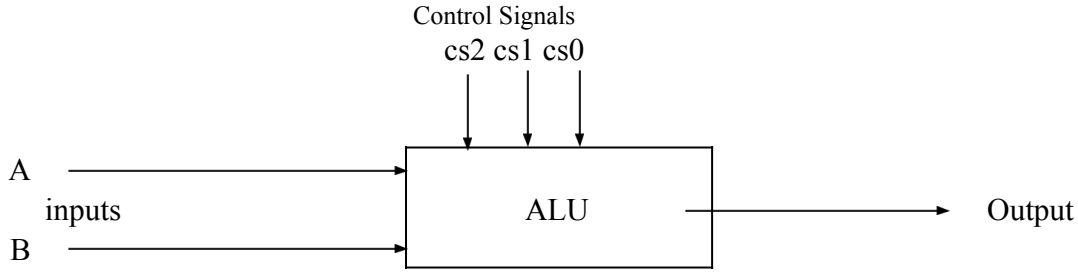
cin			Functions for	
cs2	cs1	cs0	Group 5	Group 6
0	0	0	Subtract with borrow	Decrement A
0	1	0	Transfer A	Add
1	0	0	Subtract	Transfer A
1	1	0	Increment A	Add with carry
x	0	1	OR	XOR
x	1	1	AND	Complement A

cin cs2	cs1	cs0	Functions for Group 1	Group 2	Group 3	Group 4
0	0	0	Add	Decrement A	Subtract with borrow	Decrement A
0	0	1	Add with carry	Transfer A	Subtract	Transfer A
0	1	x	AND	OR	AND	Complement A
1	0	0	Transfer A	Subtract with borrow	Transfer A	Add
1	0	1	Increment A	Subtract	Increment A	Add with carry
1	1	x	XOR	Complement A	OR	XOR



cin cs2	cs1	cs0	Functions for Group 5	Group 6
0	0	0	Subtract with borrow	Decrement A
0	1	0	Subtract	Transfer A
0	x	1	OR	XOR
1	0	0	Transfer A	Add
1	1	0	Increment A	Add with carry
1	x	1	AND	Complement A

cin			Functions for			
cs2	cs1	cs0	Group 1	Group 2	Group 3	Group 4
0	0	0	Add	Decrement A	Subtract with borrow	Decrement A
0	0	1	Add with carry	Transfer A	Subtract	Transfer A
0	1	0	Transfer A	Subtract with borrow	Transfer A	Add
0	1	1	Increment A	Subtract	Increment A	Add with carry
1	0	x	OR	AND	OR	XOR
1	1	x	XOR	Complement A	AND	Complement A



cin			Functions for	
cs2	cs1	cs0	Group 5	Group 6
0	0	0	Add	Decrement A
0	1	0	Add with carry	Transfer A
0	x	1	XOR	OR
1	0	0	Transfer A	Subtract with borrow
1	1	0	Increment A	Subtract
1	x	1	AND	Complement A