**CDA 4101** **Worksheet: ALU Operations** **Spring 2017**

Complete the attached worksheet to enumerate all possible operations for the ALU described in **Figures 3.18 & 3.19**, page 167, Tanenbaum.

## Overview

The ALU is constructed by connecting several ALU bit-slices via their Carry-In and Carry-Out.

All ALU bit slices respond in parallel to a common set of control inputs:

* **F0, F1** : Function select – AND, OR, NOT, ADD
* **ENB** : B-input enable
* **ENA** : A-input enable
* **INVA** : A-input invert

A 6th control input, **INC**, drives the Carry-In of the low-order bit-slice.

Specifics

1. Determine the internal A and B data inputs produced by the simple combinational circuit with inputs **INVA**, **ENA**, **ENB** and external data inputs A and B.
2. Determine the ALU output for each control input sextuple <**F0**, **F1**, **ENA**, **ENB**, **INVA**, **INC**>. Remember that **INC** drives the Carry-In of the low-order slice only. The ALU outputs the *word* composed of the output bits of all the bit-slices. Some control sextuples will force a meaningless ALU operation/output.
3. Reconcile the ALU outputs highlighted in the worksheet (in yellow) with the ALU outputs enumerated in **Figure 4-2**, page 246.