

CDA3101  
Assignment 4  
Multicycle Datapath and Control

**Objectives.** Learn how to enhance the datapath and control for a multicycle implementation of a simple ALU.

Put all your answers on these two sheets.

1. Modify the datapath and control for the multicycle implementation to add the *jal* (jump and link) instruction. Remember that the *jal* instruction is like a *j* (jump) instruction, but it also places the address of the instruction following the *jal* instruction in register \$31 as a return address. Examine the figures below and on the following page showing the datapath and the finite state machine (FSM) control for the multicycle implementation, respectively. Make the appropriate modifications to both the datapath and the FSM control figures to support the *jal* instruction. (100 points)



