University of Puerto Rico Mayagüez
Department of Electrical and Computer Engineering

ICOM 4036: Programming Languages
Programming Assignment #1
DUE: October 1, 2004

1. Write a program in C++ that sorts an array of integers using the BubbleSort algorithm.

2. Translate the C++ program to Easy I assembly language one instruction at a time (like in class). The array should be stored as a contiguous sequence of 16-bit words in memory.

3. Optimize the Easy I algorithm to take a minimal number of cycles to execute assuming that each Easy I instruction takes one cycle to execute.

4. Translate the C++ program to MIPS assembly language one instruction at a time. The array should be stored as a contiguous sequence of 32-bit words in memory. Make sure that your algorithm works by testing it on the SPIM simulator.

5. Optimize the MIPS algorithm to take a minimal number of cycles to execute assuming that each MIPS instruction takes one cycle to execute.

6. Tabulate the number of cycles that each of the four versions take to execute.