

## *CS2403 Programming Languages*

### **Homework 5**

*Due:* May 31, 2012 in class

1. (40%) Define a C **struct** of your choice. Let us call it **fun\_struct**. Then, write a C function to compare the contents of two variables of **fun\_struct**. The function returns a 1 if the two variables are equal and a 0 otherwise. Write a simple **main()** to define and initialize the two **fun\_struct** variables. Now, compile the program and generate its assembly code. Based on the assembly code, (a) please draw the layout of the activation record of your function, and (b) describe how the two **fun\_struct** parameters and the elements in the **fun\_struct** are referenced.
2. (25%) For the above program, if the C function takes two **fun\_struct** variables as parameters, defines a local **fun\_struct** variable and returns a **fun\_struct** variable, observe how the assembly code generated by your compiler differs from that in the above.
3. (35%) Write a simple C function that contains a block, i.e., a segment of statements enclosed by { and } that declare some local variables. Let some local variables declared inside the block have the same name as those declared outside. Compile your program and generate the assembly code. Observe how your compiler implements the block and refers to its local variables.