

## Programming Exercise 1: Capitalizing

**Due: Tuesday February 19, 2002**

### Objective

This project is a finger-warming exercise to make sure that everyone can compile an assembly language program, run it through the debugger and submit the requisite files using the systems in place for the programming projects.

### Assignment

For this project, you must do the following:

1. Modify the assembly language program ‘toupper.asm’ as follows. Assume that the input is a person’s name in upper case (e.g., “KIRK, JAMES T.”). Your program should convert the name to lower case except for the first character of each word (e.g., “Kirk, James T.”). You may assume that words are separated by one or more spaces. Non-alphabetic characters and characters that are already lower case should be unchanged.
2. Using the UNIX script command, record some sample runs of your program and a debugging session using gdb. In this session, you should fully exercise the debugger. You must set several breakpoints, single step through some instructions, use the automatic display function and examine the contents of memory before and after processing. The script command is initiated by the command ‘script’. This puts you in a new UNIX shell which records every character typed or printed to the screen. You exit from this shell by typing ‘exit’ at the UNIX prompt. A file named typescript is placed in the current directory.

The source code for toupper.asm is available on the GL file system in:

```
/afs/umbc.edu/users/c/h/chang/pub/cs313/
```

### Turning in your program

Use the UNIX ‘submit’ command on the GL system to turn in your project. You should submit two files: 1) the modified assembly language program and 2) the typescript file of your debugging session. The class name for submit is ‘cs313’ and the assignment name is ‘prog1’. The UNIX command to do this should look something like:

```
submit cs313 prog1 fixnames.asm typescript
```

### Notes:

Additional help on running NASM, gdb and making system calls in Linux are available on the assembly language programming web page for this course:

```
<http://www.csee.umbc.edu/~chang/cs313.s02/assembly.shtml>
```

Recall that the project policy states that programming assignments must be the result of individual effort. *You are not allowed to work together.* Also, your projects will be graded on five criteria: correctness, design, style, documentation and efficiency. So, it is not sufficient to turn in programs that assemble and run. Assembly language programming can be a messy affair — neatness counts.