ECM2433: The C family

C Workshop 4: Macbeth

On the server you will find a file called

/home/links/jtc202/ecm2433/macbeth.txt

This contains the complete text of Shakespeare's play Macbeth and provides the data for the programming exercises in this workshop.

The aim of this workshop is for you to write your code in separate files, as follows:

- **macbeth.c**
  containing your "main" function and any other functions that are specific to macbeth
- **macbeth.h**
  The header file associated with macbeth.c.
- **genericFunctions.c**
  containing all the generic functions described in exercises 1-5 below.
- **genericFunctions.h**
  The header file associated with genericFunctions.c.

You do not need to worry too much about which functions go in which ".c"; the aim is to get you used to compiling and linking code in separate modules, and to use the "static" and "extern" modifiers in your function definitions.

You may wish to use the *strcmp*, *strcpy* and *strlen* functions defined in the standard *string.h* header file, and for exercises 1 to 4 you may wish to use the Linux *wc* or *grep* commands to verify that your program is displaying the correct results. You may wish to note that capital letters have ASCII codes in the range 65-90 (see http://www.asciitable.com/).

1.   Write a program that reads the file and prints out the number of lines in the file.

2.   Write a program that reads the file and prints out the number of words in the file.

3.   Write a program that reads the file and prints out the number of acts in the play. This information is stored in records in the file that begin with the word "ACT" (in capitals).

4.   Each act is made up of a number of scenes. Write a program that reads the file and prints out the number and description of each scene in the play. This information is stored in records in the file that begin with the word "SCENE" (in capitals). The output should be divided up into the acts. For example, the output should begin:

     Act 1
     1: A desert place.
     2: A camp near Forres.

5.   The names of all the named characters in the play appear in capital letters in the file.

     a.   Write a program that reads the file and prints out the names as they are read.

     b.   Amend the program so that it maintains a list of unique character names and prints this list out once the whole file has been processed. Can you print them in alphabetical order?

     c.   Amend the program so that as well as printing out the list of unique character names, it prints out the number of times each appears in the text.