

ISE1/EE2 Introduction to Computer Systems

Assessed Assignment

This assignment is designed to test your ability to write a reasonably complex programme in ARM assembly language.

Deliverables

- A well commented listing of your programs
- a floppy disk containing all your programs
- evidence that your programs do work

The deadline for this computing assignment is the **18th January 2002**.

Before you start

In this assignment, you are required to perform three tasks on an English essay, which is approximately 7,400 characters long.

You must first download a copy of this file (filename: turing.txt) into your home directory from my web page: http://www.ee.ic.ac.uk/pcheung/teaching/ee2_computing/.

Problem 1: File Reading

Refer to the ARM System Calls document and read about the following system calls: SWI_Open, SWI_Flen, SWI_Read, SWI_Write. An example is given to show how you can write a short file on disk.

Write a program to open the file turing.txt, and print its content on the screen.

Problem 2: Sorting Data

Write a program in ARM assembly language to sort the characters in this file in ascending order of ASCII codes, and write the sorted passage onto disk again. Ignore any white spaces. You may choose any sorting algorithm. Comment on its efficiency.

Exercise 3: Frequency of Occurrence

Write a program to report how often the characters A to Z, and 'white spaces' occur in this passage. (White spaces are spaces, tabs, carriage-return and line feeds.) Any other characters are classified as "Others". You should treat upper and lower case letters to be the same (i.e. 'A' and 'a' are the same).

Output the frequency of occurrence in the following form:

```
A: 234
B: 102
...
...
Z: 3
White spaces: 89
Others: 120
```