Assignment 1 COMP2111 18s1
Being Unique

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This assignment is worth up to 20 marks and due before the (logical) end of week 5, that is, **Wednesday April 4th, 12:59:59** local time Sydney. This assignment is done individually.

Problem Statement

This assignment is concerned with re-implementing a simplified version of the unix command `uniq`.

Tasks

1. Specify a program that mimics `uniq` assuming variable n contains a non-negative integer, the number of elements of the array of strings a. The output is stored in the array b and the same as a but with adjacent identical strings collapsed to one. The number of strings in b is returned in the variable k. Neither n nor a should be changed by the program.

   Formally, such a specification could either a single specification statement or a pair of assertions: a precondition and a postcondition.

2. Formally derive an implementation of your specification or just guess an implementation and prove it correct.

3. Translate your implementation into a C function with the prototype as provided in `uniq.h` and save it as `uniq.c`. Note that k has been changed into a return value of the function. We have provided a simple test harness in `uniqtest.c`. It can be compiled using the `Makefile` provided.

4. Describe your solutions to tasks 1–3 in a LaTeX document that your tutor enjoys reading. In more detail:

   - State clearly what the requirements are.

   - Argue informally how your formal specification captures the requirements.

- Describe how you derived the implementation from the specification. List all arising proof obligations and discharge them by proof.

- Justify any changes made during the translation to C.

Deliverables

`uniq.c` C source.

`uniq.tex` is a LaTeX document with your name and student number in the `\author` command. It contains your task 4 solution.

Examples

Examples of the interaction with your source files on CSE servers are as follows. (Our shell prompt is `$` and user input is coloured red.)

```
$ make
cc -O -Wall -Werror -c uniq.c
cc -O -Wall -Werror uniq.o uniqtest.c -o uniqtest
$ ./uniqtest < test1.txt
blah
blub
blah
$ make uniq.pdf
⋮
```

Submission Instructions

Once submissions are enabled, the `give` command to be run on any CSE lab machine or server is:

```
% 2111
% give cs2111 ass1 uniq.c uniq.tex
```

The command above submits what's necessary. Should you feel the need to include more files, ask on the forums. Do not submit *any* of the provided files including uniq.h, uniqtest.c, Makefile, 2111defs.sty, 2111defs2.sty, and 2111theorems.sty even if you decide to use them. If in doubt, ask on the forums.

```
$Log: ass1.tex,v $
Revision 1.1  2018/03/14 09:26:32  kaie
Initial revision
```