

Problem Set 5
CPSC 489/689 Quantum Algorithms
Andreas Klappenecker

The assignment is due Wednesday, Mar 4, 2003.

Demonstrate your program between 2pm-5pm
to Neelima Chinthamani in HRBB 509A

Replace the two functions `applygate` and `measure_state` with sensible code, completing the simulator `alfred`.

Package the program with the GNU build system. Write `configure.in` and `Makefile.am`, and package the program such that it is possible to obtain an executable by invoking `configure` and `make`.

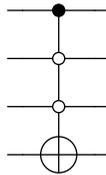
Hints: The GNU automake manual is somewhat misleading in the re-naming conventions of the `lex` and `yacc` outputs.

- The standard output of `flex alfred.l` are the files `yy.tab.c` and `yy.tab.h`, which are re-named to `alfred.c` and `alfred.h`, respectively.
- The standard output of `yacc -d alfred.y`, or its bison equivalent, are the files `y.tab.c` and `y.tab.h`, which are renamed to `alfred-alfred.c` and `alfred-alfred.h`, respectively. Consequently, you want to include the file `alfred-alfred.h` instead of `y.tab.h` in the scanner file `alfred.l`.

The file `Makefile.am` can contain as little as four lines, specifying the program, the sources, the libraries, and the options for `yacc` (`alfred.YFLAGS = -d`). You do not need to specify any dependencies!

Make sure that your program will compile if we delete the output of `lex` and `yacc` (or `flex` and `bison`), before invoking `make`.

The `alfred` language specifies the gate



by $G([3, -1, -2], 0, [0, 1, 1, 0])$, where the most significant qubit at position 3 is a 1-condition, and the 0-conditions of the qubits at position 1 and 2 are specified by -1 and -2 . The lexer will translate these conditions into the following bit masks

$$\text{ocnd} = 0110_2 = 6, \text{ icnd} = 1000_2 = 8, \text{ gpos} = 0001_2 = 1.$$