**CS 537: Intro to Operating Systems (Summer 2017)**

**Worksheet 14 - Files and Directories**

**DUE:** Aug 7th 2017 (Monday)

Files and directories provide a basic abstraction of persistent data to users. Here we explore (abstractly) how basic file systems work, focusing on **links**. Sometimes links lead to pretty odd performance problems.

a. Assume we have a regular file that is referred to by the pathname `/a/b/c/orig.txt` – how many directories will we access when opening this file?

b. Now assume we create a **hard link** to this file, as follows: `ln /a/b/c/orig.txt /hard.txt`. How many directories will we access when opening `/hard.txt`?

c. Is the file `hard.txt` a special type of file? (explain)

d. What happens to `hard.txt` when we delete `orig.txt`? Can we still access it? (explain)

e. Now assume we create a **symbolic (soft) link** to this file, as follows: `ln -s /a/b/c/orig.txt /a/b/c/soft.txt`. How many directories will we access when opening `/a/b/c/soft.txt`?

f. Is the file `/a/b/c/soft.txt` a special kind of file? (explain)

g. What happens to `soft.txt` when we delete orig.txt? Can we still access it?

h. Let's say we create a symbolic link to a parent directory, as follows: `ln -s /a/b/c /a/b/c/loop`. How many different pathnames can we use to refer to the file `orig.txt` in the directory `/a/b/c` ?