

Homework 8  
MATH 4830, Spring 2006  
due Thurs. April 6

1. Return to Problem 6 on the Midterm Exam. We would like to compare the failure times of a certain type of light bulb produced by two different manufactures, B and A, by testing 10 bulbs selected at random from each of the outputs. The data, in hundreds of hours used before failure can be read into R by:

```
> bulb <- read.table("http://www-math.cudenver.edu/~bbailey/4830/bulb.dat",  
header=T)
```

(a) In R, perform a permutation test for the difference in means for the `bulb` dataset, using 100 and 1000 replications. (Note: if you do not set your seed, you will not be able to reproduce your results!)

(b) In R, get approximate  $p$ -values for your permutation tests in part (a). What is your conclusion about the difference in population means?

2. Problem 1 (cont.) Now, suppose we would like to perform a permutation test for the difference in medians for the `bulb` dataset.

(a) Write (make) your own function call it `myperm2` that will return  $n$  permutations of differences of the medians of two datasets. Be sure to include the code of your function `myperm2`.

(b) In R, perform a permutation test for the difference in medians for the `bulb` dataset, using 100 and 1000 replications. (Note: if you do not set your seed, you will not be able to reproduce your results!)

(c) In R, get approximate  $p$ -values for your permutation tests in part (b). What is your conclusion about the difference in population medians?

3. p.573, Problem 10.

(a) By hand.

(b) Using the R function `prop.test` (Note: you will have to make a 2 by 2 matrix for the data)

4. p. 573, Problem 112. For (a) use the R function `prop.test`. For (b) use the R function `fisher.test`. How do the  $p$ -values compare for the two tests?