Lab 2
Stat 133

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The primary purpose of this lab is to demonstrate how to create a single pdf file that contains R commands and the graphical output that they produce. The method illustrated herein is one way for you to properly prepare your homework for submission.

1 Create a File with R Commands

Begin by opening a text editor. I will illustrate with Emacs, but you are free to choose any editor that you like. You may also want to keep your work in a separate directory, so you first must create the directory. Hence, begin by typing—

```
$ mkdir Lab2
$ cd Lab2
$ emacs Lab2.R &
```

Now you are ready to type the R commands. We will write the code to create a bar plot of the admissions rate by gender in a famous UC Berkeley Admissions data set.

```
proportion=function(x){
    Tot=apply(x,2,sum)
    prop=sweep(x,2,Tot,"/")
    prop
  }

data(package = "datasets")

data(UCBAdmissions)
```

```
UCBAdmissions

dimnames(UCBAdmissions)

Totals=apply(UCBAdmissions,c(1,2),sum)

OverAll=proportion(Totals)

OverAll

help(barplot)

barplot(100*OverAll[1,],beside=T,legend.text=T,width=c(.5,.5),
        xlim=c(0,3), col=c("Blue","Red"), ylab="Percent Admitted",
        main="UC Berkeley Admissions--Over All")


#How Does the Admission Rate Look By Department?

ByDept=apply(UCBAdmissions,3,proportion)

final=array(ByDept, dim=dim(UCBAdmissions),
            dimnames=dimnames(UCBAdmissions))

Admitted=final[1,,]

barplot(100*Admitted, beside=T, legend.text=T, col=c("Blue","Red"),
        ylab="Percent Admitted", main="UC Berkeley Admissions--By
        Dept.", xlab="Department")


#How Do the Two BarPlots Compare?

Compare=cbind(OverAll[1,],final[1,,])

dimnames(Compare)[[2]][1]="All"

barplot(100*Compare, beside=T, legend.text=T, col=c("Red","Blue"),
        ylab="Percent Admitted", main="UCB Admissions--Comparing Over
        All To By  Dept.", xlab="Department")
```

You can test out the code as you work by cutting and pasting from the emacs buffer into an R session. Once you are satisfied with the R code, then you are ready to create graphical output.

2 Create JPEG Graphics Files

Once the R code is working properly you can submit it all at once within R by typing `source(''Lab2.R'')`. In order to create a numbered series of jpeg files, the following code should be submitted within an R session:

```
jpeg(filename = "Lab2_Fig%03d.jpeg")
source("Lab2.R")
dev.off()

# To clean up

for (i in dev.list()){
  dev.off(i)
}

dev.list()
```

3 Combine the Code and the Graphics into A PDF File

There are many ways to achieve this end, but I will illustrate the use of Open Office. Word should be similar, and for the more adventurous LaTeX is the best option. Nonetheless, Open Office is easier to start with and sufficient for our ends. Note: the symbol `-->>` connotes double clicking with the mouse.

Start Open Office: `ooffice &.`

Select New Text Document: `File --> New --> Text Document.`

Insert R Code: `Insert --> File...  -->> "Lab2.R".`

Insert JPEG Graphics: `Insert --> Graphics --> From File -->> "Lab2_Fig001.jpeg".` *(Repeat as needed.)*

Export a PDF File: `File --> Export As PDF --> File name="Lab2" --> Export.`

Note: you should add additional editing, formatting,and text—at the minimum include your name and the lab number.

4 A Bonus Problem

If anyone can figure out how to solve this problem, I will encourage Professor Nolan to give you bonus points. From the documentation for the barplot function, it sounds as if the width option will take a vector of widths for each

bar drawn. However, I could not get it to accept more than two different bar widths. I would like to have the "All" bars substantially wider than the department bars, which should all be the same size. Any one who can figure out how to accomplish that task will receive my gratitude, admiration, and a glowing recommendation to Professor Nolan.

5 Lending A Helping Hand

I have received numerous requests for students login names. If you would like to help me, as well as the students who can not remember their login names, then try out the Unix finger command on the SCF system.

```
$ finger STUDENTS REAL NAME
```