Raymond Davidson — PS 1.

Completion Time: 15h 37m

## Q1:

Data set:  $y \leftarrow c(105, 69, 86, 100, 82, 111, 104, 110, 87, 108, 87, 90, 94, 113, 112, 98, 80, 97, 95, 111, 114, 89, 95, 126, 98)$ 

### 1.1

• It is 25	<ul> <li>x̄ is 98.44</li> <li>Z is 1.645</li> <li>s is 13.093</li> <li>n is 25</li> </ul>	$1.654 = 98.44 \pm 90\% \frac{13.093}{\sqrt{25}}$
------------	-------------------------------------------------------------------------------------------	---------------------------------------------------

### 1.2

Level of significance:  $\alpha = 0.05$ 

If the teacher wants to know whether the student body's average IQ in more than the national average, she must test the opposite, vis-à-vis the null hypothesis.

Ergo, the  $H_0$  is: My students' have the same or lower IQ than the national average.  $H_0$ :  $\mu \le 100$ 

$$\frac{98.44 - 100}{13.093/\sqrt{25}} = -60$$

Degrees of Freedom: df = n - 1 :: 24 = 25 - 1

Reject  $H_0$  if p-value  $\leq \alpha$ 

$$t > -60 = \text{p-value is } .7215 > \alpha = 0.05$$

Do not reject H<sub>0</sub>

### load libraries

#### set wd

## clear global .envir

```
library(knitr) library(rmarkdown)
```

 $include\_graphics() \# remove objects rm(list=ls()) \# detach all libraries detachAllPackages <- function() \{ basic.packages <- c("package:stats", "package:graphics", "package:graphics", "package:graphics", "package:graphics", "package:datasets", "package:methods", "package:base") package.list <- search()[ifelse(unlist(gregexpr("package:", search()))==1, TRUE, FALSE)] package.list <- setdiff(package.list, basic.packages) if (length(package.list)>0) for (package in package.list) detach(package, character.only=TRUE) } detachAllPackages()$ 

### load libraries

 $pkgTest <- function(pkg) \{ new.pkg <- pkg[!(pkg \%in\% installed.packages()[, "Package"])] if (length(new.pkg)) install.packages(new.pkg, dependencies = TRUE) sapply(pkg, require, character.only = TRUE) \}$ 

## here is where you load any necessary packages

## ex: stringr

```
lapply(c("stringr"), pkgTest)
```

lapply(c(), pkgTest)

# set working directory

setwd("~/Documents/GitHub/QTM200Spring2021/problem\_sets/PS1")

#### Problem 1

y <-c(105, 69, 86, 100, 82, 111, 104, 110, 87, 108, 87, 90, 94, 113, 112, 98, 80, 97, 95, 111, 114, 89, 95, 126, 98)

### Problem 2

 $\label{lem:com/ASDS-TCD/StatsI_Fall2021/main/datasets/expenditure.txt", header=T) expenditure <- read.table("https://raw.githubusercontent.com/ASDS-TCD/StatsI_Fall2021/main/datasets/expenditure.txt", header=T) <math display="block">\label{expenditure.txt} TCD/StatsI_Fall2021/main/datasets/expenditure.txt", header=T)$ 

#Y - PC Exp. on H; X1 - PC Income; X2 - #ofRes. per 100k \$Insecure; X3 - #ofPeopl per 1k in Urban Areas str(expenditure) expenditure[2:5]

```
####Q2.1
```

```
#The higher income p.c., the more is spent on housing.
scatter.smooth(expenditure$Y, expenditure$X1)
#How much is spent on housing p.c. and amount of people financially insecure.
scatter.smooth(expenditure$Y, expenditure$X2)
#Money spent on housing p.c. and amount of people living in urban areas.
```

```
scatter.smooth(expenditure$Y, expenditure$X3)
#Income p.c. and financial insecurity
scatter.smooth(expenditure$X1, expenditure$X2)
#Income p.c. and people living in urban areas: higher the income, the less urban dwellers.
scatter.smooth(expenditure$X1, expenditure$X3)
#Correlation between financial insecurity and urban population.
scatter.smooth(expenditure$X2, expenditure$X3)
```

##I would be able to gather more information if I new how to label the dots by state abbreviation and region, denoted by 4 different colors.

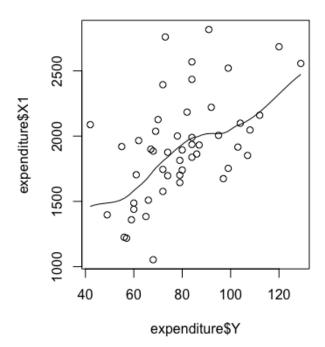
###Q2.2

```
#Region 4 has highest p.c. expenditure on housing.
barplot(expenditure$Y, expenditure$Region, col="light green")
```

###Q2.3

#I can't figure out how to change the points.

scatter.smooth(expenditure\$Y, expenditure\$X1, expenditure\$Region)



expenditure\$X2

