Problem Set 1 Response

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Question 1 (50 points): Education

Find 90% confidence interval for the average student IQ in the school.

```
CI_lower <- qnorm(0.05,
                  mean = mean(y),
                  sd = (sd(y)/sqrt(length(y))) # the equation for the standard error of the mean
)
CI_upper <- qnorm(0.95,
                  mean = mean(y),
                  sd = (sd(y)/sqrt(length(y)))
)

matrix(c(CI_lower, CI_upper), ncol = 2,
       dimnames = list("",c("Lower", "Upper")))

mean(y)
```

```
     Lower    Upper
     94.13283 102.7472

     mean(y)[1] 98.44
```

The hypothesis test with $\alpha = 0.05$.

```
t.test(y,
       country_schools_IQ = country_schools_IQ,
       mu = 0,
       var.equal = FALSE,
       alternative = "two.sided",
       conf.level = 0.05)
```

```
One Sample t-test
```

```
data: y
t = 37.593, df = 24, p-value < 2.2e-16
alternative hypothesis: true mean is not equal to 0

5 percent confidence interval: 98.27407 98.60593
sample estimates:mean of x
98.44
```

1 Question 2 (50 points): Political Economy

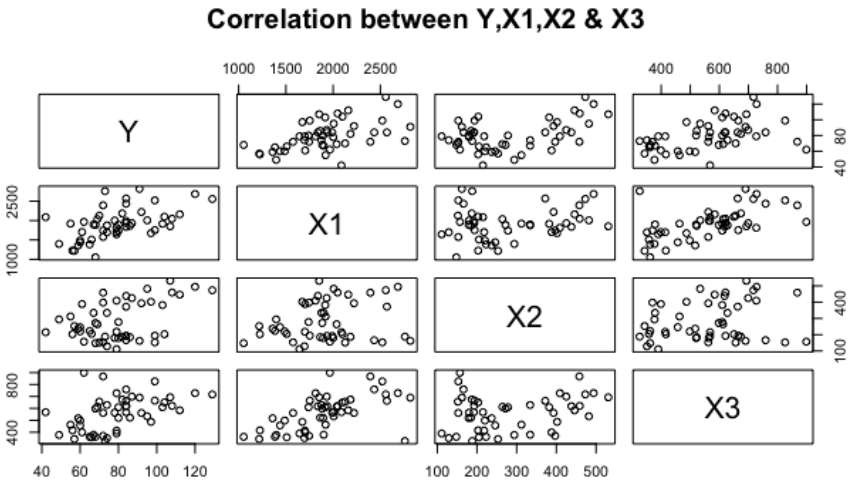
The correlation plot between Y, X1, X2 and X3

You can also save figures in R, and place them in your answers that you're writing in your .tex file. First, you need to make sure your path/file name is correct, then you'll save your work when your in R (see code below).

```
pairs(~ Y + X1 + X2 + X3, data = expenditure, rowlattop = FALSE, bg = "blue",
      main = "Correlation between Y,X1,X2 & X3")
```

With our figure saved, we just need to render it in our .tex file, which we can do using the `figure` environment:

Figure 1: Correlation between Y, X1, X2 and X3.



It seems the correlation appears to be much similar when compering the different variables.

The correlation plot between Y and Region

On average west region have the highest per capita expenditure on housing assistance.

The correlation plot between Y, X1 and Region

```
ggplot(data = expenditure, aes(x=X1, y=Y)) +
  geom_point(aes(color=Region,
                 shape=as.factor(Region)))
```

Figure 2: correlation plot between Y and Region.

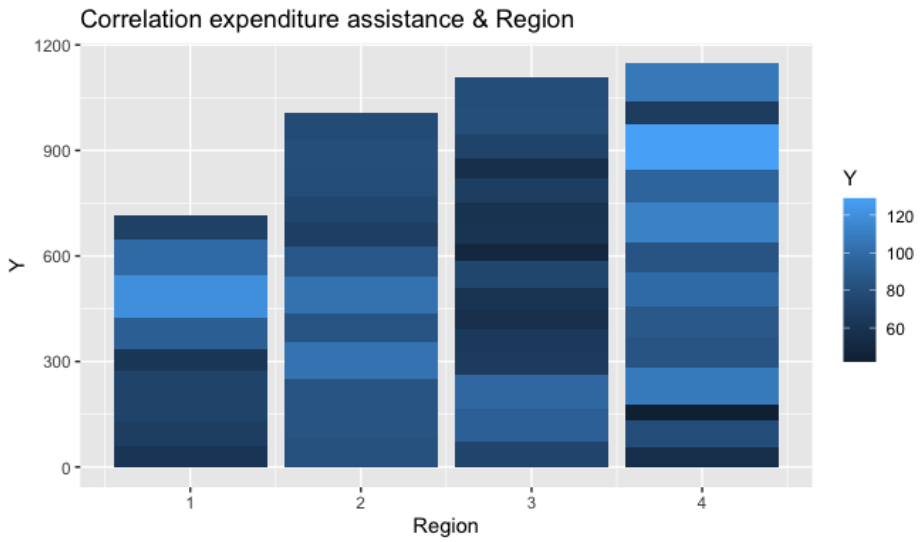


Figure 3: correlation plot between Y and Region.