# RStudio Homework 1.

# Relationship between Cost of Living and Rent (Question 1-4 for Rent and Cost of living).

### As seen by the scatterplot below between Cost of Living and Rent, the direction is positive, the strength is moderate, and the form is straight. The correlation coefficient for this graph is 0.7722926. As the cost of Living and Rent are monetary cost measured relative to New York City, they are quantitative, satisfying the Quantitative Variable condition. As the relationship is in a straight line, it satisfies the linearity condition. Furthermore, there aren’t any major outliers, the correlation satisfies the Outlier condition. As all three conditions are satisfied, the correlation is valid. The y-intercept is 45.233, the x-intercept is 1.025. This means that if everything was changed relative to New York, then rent rising by 1% correlates to an increase in the cost of living by 1.025%.

##   
## Call:  
## lm(formula = Cost.of.Living.Index ~ Rent.Index, data = Cost\_of\_Living)  
##   
## Coefficients:  
## (Intercept) Rent.Index   
## 45.233 1.025

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##   
## Call:  
## lm(formula = Cost.of.Living.Index ~ Rent.Index, data = Cost\_of\_Living)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -100.617 -10.622 0.012 10.353 63.869   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 45.23260 1.83225 24.69 <2e-16 \*\*\*  
## Rent.Index 1.02462 0.04712 21.75 <2e-16 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 17.68 on 320 degrees of freedom  
## Multiple R-squared: 0.5964, Adjusted R-squared: 0.5952   
## F-statistic: 472.9 on 1 and 320 DF, p-value: < 2.2e-16

## [1] 0.7722926

# Relationship between Cost of Living and Groceries. (Question 1-4 for Cost of Living and Groceries).

As seen by the scatterplot below between Cost of Living and Groceries, the direction is positive, the strength is strong, and the form is straight. The correlation coefficient for this graph is 0.9538616. As the cost of Living and Groceries are monetary costs measured relative to New York City, they are quantitative, and thus satisfy the Quantitative Variable condition. As the relationship is in a straight line, it satisfies the linearity condition. Furthermore, there aren’t any major outliers, the correlation satisfies the Outlier condition. As all three conditions are satisfied, the correlation is valid. The y-intercept is 9.21784, the x-intercept is 0.95295. This means that if everything was changed relative to New York, then rent rising by 1% correlates with an increase in the cost of living by 0.95295%.

Call:  
## lm(formula = Cost.of.Living.Index ~ Groceries.Index, data = Cost\_of\_Living)  
##   
## Coefficients:  
## (Intercept) Groceries.Index   
## 9.2178 0.9529

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##   
## Call:  
## lm(formula = Cost.of.Living.Index ~ Groceries.Index, data = Cost\_of\_Living)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -26.2714 -6.2766 0.4478 5.2780 20.7336   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 9.21784 1.31039 7.034 1.22e-11 \*\*\*  
## Groceries.Index 0.95295 0.01677 56.831 < 2e-16 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 8.356 on 320 degrees of freedom  
## Multiple R-squared: 0.9099, Adjusted R-squared: 0.9096   
## F-statistic: 3230 on 1 and 320 DF, p-value: < 2.2e-16

## [1] 0.9538616

# Relationship between Cost of Living and Restaurant Price. (Question 1-4 for Cost of Living and Restaurant Price).

As seen by the scatterplot below between Cost of Living and Restaurant Price, the direction is positive, the strength is strong, and the form is straight. The correlation coefficient for this graph is 0.9493554. As the cost of Living and Restaurant Price are monetary costs measured relative to New York City, they are quantitative, and thus satisfy the Quantitative Variable condition. As the relationship is in a straight line, it satisfies the linearity condition. Furthermore, there aren’t any major outliers, the correlation satisfies the Outlier condition. As all three conditions are satisfied, the correlation is valid. The y-intercept is 24.6636, the x-intercept is 0.8033. This means that if everything was changed relative to New York, then rent rising by 1% correlates with an increase in the cost of living by 0.8033%

## ##   
## Call:  
## lm(formula = Cost.of.Living.Index ~ Restaurant.Price.Index, data = Cost\_of\_Living)  
##   
## Coefficients:  
## (Intercept) Restaurant.Price.Index   
## 24.6636 0.8033

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##   
## Call:  
## lm(formula = Cost.of.Living.Index ~ Restaurant.Price.Index, data = Cost\_of\_Living)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -26.638 -5.380 -0.786 5.153 37.062   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 24.66360 1.11432 22.13 <2e-16 \*\*\*  
## Restaurant.Price.Index 0.80333 0.01486 54.05 <2e-16 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 8.744 on 320 degrees of freedom  
## Multiple R-squared: 0.9013, Adjusted R-squared: 0.901   
## F-statistic: 2921 on 1 and 320 DF, p-value: < 2.2e-16

## [1] 0.9493554

# Relationship between Cost of Living and Local purchasing power. (Question 1-4 for Cost of Living and Purchasing Power).

As seen by the scatterplot below between Cost of Living and Local Purchasing power, the direction is positive, strength is weak, and the form is straight. The correlation coefficient for this graph is 0.525902. As the cost of Living and Local Purchasing power are monetary costs and monetary currency value measured relative to New York City, they are quantitative, and thus satisfy the Quantitative Variable condition. As the relationship is in a straight line, it satisfies the linearity condition. Furthermore, there aren’t any major outliers, the correlation satisfies the Outlier condition. As all three conditions are satisfied, the correlation is valid. The y-intercept is 48.9974, the x-intercept is 0.3762. This means that if everything was changed relative to New York, then an increase in Local Purchasing power by 1% correlates to an increase in the cost of living by 0.3762%.

##   
## Call:  
## lm(formula = Cost.of.Living.Index ~ Local.Purchasing.Power.Index,   
## data = Cost\_of\_Living)  
##   
## Coefficients:  
## (Intercept) Local.Purchasing.Power.Index   
## 48.9974 0.3762

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##   
## Call:  
## lm(formula = Cost.of.Living.Index ~ Local.Purchasing.Power.Index,   
## data = Cost\_of\_Living)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -56.956 -14.145 -2.834 14.212 94.005   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 48.99742 3.00227 16.32 <2e-16 \*\*\*  
## Local.Purchasing.Power.Index 0.37616 0.03401 11.06 <2e-16 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 23.67 on 320 degrees of freedom  
## Multiple R-squared: 0.2766, Adjusted R-squared: 0.2743   
## F-statistic: 122.3 on 1 and 320 DF, p-value: < 2.2e-16

## [1] 0.525902

# 5. Best and Worst Predictor for overall cost in cities.

The best predictor of overall cost are Groceries because it has the highest correlation coefficient of 0.9538616. The worst predictor of Overall cost is Local Purchasing power because it has the lowest correlation coefficient of 0.525902.

# 6. Predicted and Residual of Groceries in Beijing, China.

Actual Cost of Living = 77.19.

Therefore the actual Cost of Living for Beijing China is 77.19, while the predicted cost of living is 88.852. As such there is a residual of 11.662.