MMSS 311-2 HW0

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Problem 1

(a) A vector with the numbers 1–5 in order

```
v <- c(1:5)
v
```

```
## [1] 1 2 3 4 5
```

(b) A scalar named Mindy that takes the value 12

```
Mindy <- 12
Mindy
```

```
## [1] 12
```

(c) A 2×3 matrix with the numbers 1–6 in order by rows

```
byrow <- matrix(1:6, nrow = 2, ncol = 3, byrow = TRUE)
byrow
```

```
##      [,1] [,2] [,3]
## [1,]    1    2    3
## [2,]    4    5    6
```

(d)

```
bycol <- matrix(1:6, nrow = 2, ncol = 3)
bycol
```

```
##      [,1] [,2] [,3]
## [1,]    1    3    5
## [2,]    2    4    6
```

(e)

```
ones <- matrix(1, nrow = 10, ncol = 10)
```

(f)

```r
str <- c("THIS", "IS", "A", "VECTOR")
```

(g)

```r
sum3 <- function(a, b, c){
  return(a+b+c)
  print(a+b+c)
}
```

(h)

```r
YON <- function(n){
  if(n <= 10){
    return('Yes')
  }
  return('No')
}
```

(i)

```r
g <- rnorm(1000, mean = 10, sd = 1)
```

(j)

```r
y <- rnorm(1000, mean = 5, sd = 0.5)
```

(k)

```r
x <- NULL
for (i in 1:1000){
  x[i] <- mean(sample(g, 10, replace = TRUE))
}
```

(j)

```r
lm <- lm(y ~ x)
summary(lm)
```

```
##
## Call:
## lm(formula = y ~ x)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.42682 -0.35896  0.00372  0.34271  1.65529
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  4.34939    0.50532   8.607   <2e-16 ***
```

```
## x            0.06554    0.05065   1.294    0.196
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.508 on 998 degrees of freedom
## Multiple R-squared:  0.001675,   Adjusted R-squared:  0.0006748
## F-statistic: 1.675 on 1 and 998 DF,  p-value: 0.1959
```

The coefficient is 0.03 but the p-value is not less than 0.05, so y doesn't have a significant increasing trend against x.

Problem 2

```
setwd("~/Documents/GitHub/MMSS-311-2")
pums <- read.csv("pums_chicago.csv")
dim(pums)
```

```
## [1] 50000   204
```

(b) There are 204 variables and 50000 observations.
(c) See below

```
annual_income <- mean(pums$PINCP, na.rm = TRUE)
```

(d)

```
pums$PINCP_LOG <- log(pums$PINCP)
```

```
## Warning in log(pums$PINCP): NaNs produced
```