# Class 6, Homework Assignment

**Question 1 (2 points). Set 'a' equal to 256. Create a loop with 3 steps and in each step 'a' becomes the square root of itself. What is 'a' after the loop?**

```
a <- 256
for (i in 1:3) {
    a <- sqrt(a)
}
a
```

```
## [1] 2
```

**Question 2 (2 points). Use a loop to calculate the sum and product of these numbers: 1.1, 2.2, 3.3, 4.4, 5.5. Compare the results with the results of sum() and prod() functions.**

```
a <- c(1.1, 2.2, 3.3, 4.4, 5.5)
b <- 0
c <- 1
for (i in 1:5) {
    b <- b + a[i]
    c <- c * a[i]
}
b
```

```
## [1] 16.5
```

```
sum(a)
```

```
## [1] 16.5
```

```
c
```

```
## [1] 193.2612
```

```
prod(a)
```

```
## [1] 193.2612
```

**Question 3 (2 points). Create a vector with 20 values. The first part of these values needs to be 'Year', the last part of these values need to be an interger from 1991 to 2010, and these two parts need to be separated by '_'. Create this vector with and without a loop.**

```
a1 <- character(20)
num <- 1991:2010
for (i in 1:20) {
    a1[i] <- paste('Year', num[i], sep='_')
}
```

```
a2 <- paste('Year', num, sep='_')
a1
```

```
##  [1] "Year_1991" "Year_1992" "Year_1993" "Year_1994" "Year_1995"
##  [6] "Year_1996" "Year_1997" "Year_1998" "Year_1999" "Year_2000"
## [11] "Year_2001" "Year_2002" "Year_2003" "Year_2004" "Year_2005"
## [16] "Year_2006" "Year_2007" "Year_2008" "Year_2009" "Year_2010"
```

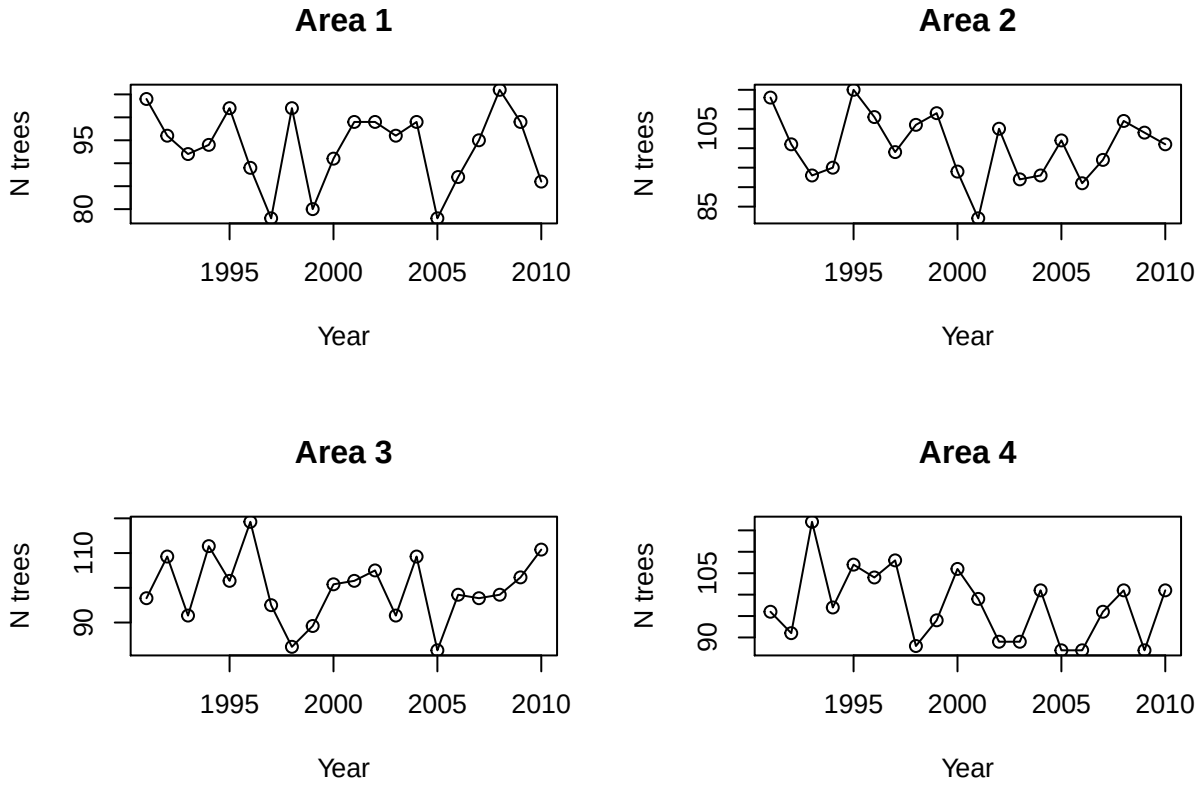
```
a2
```

```
##  [1] "Year_1991" "Year_1992" "Year_1993" "Year_1994" "Year_1995"
##  [6] "Year_1996" "Year_1997" "Year_1998" "Year_1999" "Year_2000"
## [11] "Year_2001" "Year_2002" "Year_2003" "Year_2004" "Year_2005"
## [16] "Year_2006" "Year_2007" "Year_2008" "Year_2009" "Year_2010"
```

**Question 4 (2 points). Use the code provided below to create a matrix with 80 random numbers, 4 rows, and 20 columns and call it 'mat'. Consider that this matrix contains the number of trees in 4 areas and 20 years (1991 to 2010). Make a scatt plot for each row of this matrix against the years. Plot both lines and points. Call x-axis and y-axis "Year" and "N trees", respectively. Name each plot as "Area 1" to "Area 4".**

```
mat <- matrix(rpois(n=80, lambda=100), nrow=4, ncol=20)
```

```
par(mfrow=c(2,2))
for (i in 1:dim(mat)[1]) {
    plot(mat[i,] ~ c(1991:2010), type='o',
         xlab='Year', ylab='N trees',
         main=paste('Area', i, sep=' '))
}
```




**Question 5 (2 points). Use the same 'mat' matrix created in question 4. Use a loop to calculate the mean, standard deviation, minimum number, and maximun number for each row.**

```
mat.mean <- mat.sd <- mat.min <- mat.max <- numeric(dim(mat)[1])
for (i in 1:dim(mat)[1]) {
    mat.mean[i] <- mean(mat[i,])
    mat.sd[i] <- sd(mat[i,])
    mat.min[i] <- min(mat[i,])
    mat.max[i] <- max(mat[i,])
}
mat.mean
```

```
## [1]  93.60 100.35  99.80  97.25
```

```
mat.sd
```

```
## [1] 8.387961 8.292514 9.578485 8.453433
```

```
mat.min
```

```
## [1] 78 82 82 87
```

```
mat.max
```

```
## [1] 106 115 119 117
```