Prelab2 Shu Zhou 19342932

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```
##This is the Prelab2 of STATS 413
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```

(1.)

```
#install.packages("ISLR")
#library(ISLR)
```

(2.)

```r
DotProduct <- function(a,b) {
  c = 0;
  if(length(a)!=length(b)){
    warning("argument vectors have different length: returningNA")
    return(NA_real_)
  }
  for(i in 1:length(a)){
    c= c + a[i]*b[i]
  }
  return(c)
}
#Test Case #1
a = c(1,2,3,4,5)
b = c(2,3,4,5,6)
DotProduct(a,b)
```

```
## [1] 70
```

```r
#Test Case #2
norm = rnorm(10, mean=0, sd=1)
exp = rexp(10, rate=1)
DotProduct(norm,exp)
```

```
## [1] 2.1997
```

```r
#Test Case #3
pois = rpois(10, lambda =1)
t = rt(11, df = 1)
DotProduct(pois,t)
```

```
## Warning in DotProduct(pois, t): argument vectors have different length:
## returningNA
```

```
## [1] NA
```

(3.)

```
x = c(1:10) #Create a vector x containing the ordered integers from 1 to 10.
err = mvrnorm(10, mu = rep(0, 10),Sigma = diag(10) ) #statistical error vector
                    # follows a 10-dimensional multivariate normal distribution
y = x+err

lm(y~x)                 #Linear Regression
```

```
##
## Call:
## lm(formula = y ~ x)
##
## Coefficients:
##              [,1]     [,2]     [,3]     [,4]     [,5]     [,6]     [,7]
## (Intercept) -1.2114  -0.5481  -0.3502  -0.9826   0.8550   1.2628  -0.6589
## x            1.1656   1.0908   0.9845   1.1993   0.8978   0.7913   1.1731
##              [,8]     [,9]    [,10]
## (Intercept) -0.3129   0.2041   0.4535
## x            1.1265   0.9771   0.9787
```