

In-class assignment 4

Taylor Eckert

September 13, 2018

```
knitr::opts_chunk$set(echo = TRUE)
#In-Class Assignment Four
```

“ Question 1, The Fibonacci numbers are the sequence of numbers defined by the linear recurrence equation $F_n = F_{n-1} + F_{n-2}$ where $F_1 = F_2 = 1$ and by convention $F_0 = 0$. For example, the first 8 Fibonacci numbers are 1, 1, 2, 3, 5, 8, 13, 21. For a given n , compute the n th Fibonacci number using a for loop For a given n , compute the n th Fibonacci number using a while loop For a given n , compute the n th Fibonacci number using a repeat loop Print the the 15th Fibonacci number obtained from each of the code written above. Hint: You can create a function taking n as argument. Alternatively, write the code for $n=15$.

```
# While Loop
```

```
x<- 1
print(x)
```

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

```
acc<- 0
xold <- 0
while(x <= 377){
  acc <- xold +x
  xold <- x
  x <- acc
  print(x)
}
```

```
## [1] 1
## [1] 2
## [1] 3
## [1] 5
## [1] 8
## [1] 13
## [1] 21
## [1] 34
## [1] 55
## [1] 89
## [1] 144
## [1] 233
## [1] 377
## [1] 610
```

```
# Repeat Loop
```

```
x<- 1
print(x)
```

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

```
acc<- 0
xold <- 0
repeat{
  acc <- xold +x
  xold <- x
  x <- acc
  print(x)
  if(x == 610){
    break
  }
}
```

```
## [1] 1
## [1] 2
## [1] 3
## [1] 5
## [1] 8
## [1] 13
## [1] 21
## [1] 34
## [1] 55
## [1] 89
## [1] 144
## [1] 233
## [1] 377
## [1] 610
```

Question 2, Create a 10 x 10 matrix with numbers fitting a normal distribution (matrix(rnorm(100, mean=X, sd=Y), 10, 10), where X and Y are numbers of your choice). Find the means and standard deviations of each row and column. Do these correspond to the values you chose for the rnorm inputs? Use the function apply in your script.

```
X <- 50
Y <- 2
mymat <- matrix(rnorm(100,mean = X, sd = Y), 10, 10)
print(mymat)
```

```
##           [,1]      [,2]      [,3]      [,4]      [,5]      [,6]      [,7]
## [1,] 51.52544 46.51128 48.26871 50.57485 47.33267 52.09756 51.08905
## [2,] 47.28484 52.10273 49.37324 48.52016 49.52046 51.58017 47.30006
## [3,] 45.92882 50.64832 49.19300 48.61174 45.19036 51.48175 49.05088
## [4,] 47.79681 50.07955 47.38661 51.68197 49.21674 48.36873 52.65033
## [5,] 48.12023 50.85317 54.54664 50.74493 49.62044 46.52118 48.80453
## [6,] 52.09031 50.39100 50.71747 52.10560 52.16210 50.95921 52.21884
## [7,] 48.67160 49.42191 50.73059 49.25203 48.08996 53.28216 50.02701
## [8,] 54.70599 51.34901 49.95750 53.93193 51.63761 51.07937 50.61274
## [9,] 49.64769 51.01067 49.49311 49.71591 52.87229 52.93679 50.16664
## [10,] 52.85354 48.73965 47.29194 50.23799 50.96306 51.39291 51.28332
##           [,8]      [,9]     [,10]
## [1,] 50.52962 49.57488 49.01820
## [2,] 51.51000 47.90897 48.38967
```

```
## [3,] 48.34456 50.40282 49.99176
## [4,] 50.51479 48.07992 50.34115
## [5,] 50.19759 51.71076 50.39861
## [6,] 47.43614 50.54450 51.85949
## [7,] 49.97984 48.11464 52.50579
## [8,] 47.67530 49.32571 51.03570
## [9,] 47.98285 49.31805 50.07414
## [10,] 49.36883 50.73568 50.02101
```

```
apply(mymat, 1, FUN = mean) # Mean by row
```

```
## [1] 49.65223 49.34903 48.88440 49.61166 50.15181 51.04846 50.00755
## [8] 51.13109 50.32181 50.28879
```

```
apply(mymat, 2, FUN = mean) # Mean by column
```

```
## [1] 49.86253 50.11073 49.69588 50.53771 49.66057 50.96998 50.32034
## [8] 49.35395 49.57159 50.36355
```

```
apply(mymat, 1, FUN = sd) # Std. Deviation by row
```

```
## [1] 1.848184 1.807421 2.007197 1.744133 2.161735 1.465278 1.746330
## [8] 2.049073 1.559544 1.554278
```

```
apply(mymat, 2, FUN = sd) # Std. Deviation by column
```

```
## [1] 2.809099 1.582593 2.088570 1.684263 2.363258 2.051272 1.625418
## [8] 1.409359 1.282598 1.216828
```

Titanic Casualties - Use the standard Titanic dataset which is part of R Base a. Use an appropriate apply function to get the sum of males vs females aboard. b. Get a table with the sum of survivors vs sex. c. Get a table with the sum of passengers by sex vs age.

```
# a.)
```

```
TitanicSex <- apply(Titanic, 2, FUN = sum)
print (TitanicSex)
```

```
## Male Female
## 1731 470
```

```
# b.)
```

```
apply(Titanic, c(2,4), FUN = sum)
```

```
## Survived
## Sex No Yes
## Male 1364 367
## Female 126 344
```

```
# c.)
```

```
apply(Titanic, c(2:3), FUN = sum)
```

```
##           Age
## Sex      Child Adult
##   Male      64  1667
##   Female    45   425
```