in class assignment 4

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```
knitr::opts_chunk$set(echo = TRUE)
```

1. The Fibonacci numbers are the sequence of numbers defined by the linear recurrence equation Fn =

Fn???1 +Fn???2 where F1 = F2 = 1 and by convention F0 = 0. For example, the first 8 Fibonacci numbers

are 1, 1, 2, 3, 5, 8, 13, 21.

1. For a given n, compute the nth Fibonnaci number using a for loop
2. For a given n, compute the nth Fibonnaci number using a while loop in website
3. For a given n, compute the nth Fibonnaci number using a repeat loop in website

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.

```
knitr::opts_chunk$set(echo = TRUE)
x<-1
print(x)
```

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

```
acc<-0
xold<-0
for(i in 1:14){
  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
```

```
#this is the 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
```

```
#this is the 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
```

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 sapply in your script.

```
knitr::opts_chunk$set(echo = TRUE)
X<-50
Y<-2
mymat<- matrix(rnorm(100, mean=X,sd=Y), 10, 10)
  print(mymat)
```

```
##           [,1]     [,2]     [,3]     [,4]     [,5]     [,6]     [,7]
##  [1,] 50.80062 49.52584 52.71012 49.19143 52.96724 46.90495 50.83165
##  [2,] 49.80265 49.43636 48.50385 49.70234 48.65911 52.75056 48.04599
##  [3,] 46.55706 52.41896 52.86734 48.59363 50.80732 45.91580 49.28654
##  [4,] 50.23709 49.59753 53.10790 48.64764 52.75301 48.62944 51.29311
##  [5,] 47.69020 48.59724 49.79365 51.38246 50.39656 54.21286 49.52345
##  [6,] 50.33268 49.05292 49.16820 49.26079 48.49535 49.93055 49.19711
##  [7,] 49.21935 51.14481 49.60505 51.33969 46.99258 46.48718 49.90573
##  [8,] 49.73658 49.96099 50.51012 49.73742 51.39622 49.01205 43.13824
##  [9,] 50.50216 51.48417 51.41969 51.95309 54.53571 49.78277 51.88055
## [10,] 47.29267 51.93291 50.40938 51.50273 51.28426 47.32910 53.36628
##           [,8]     [,9]    [,10]
##  [1,] 49.73927 48.96804 47.52696
##  [2,] 49.07563 49.76492 48.63760
##  [3,] 45.15010 49.44567 50.42801
##  [4,] 44.29512 47.63143 50.17680
```

```
##  [5,] 50.43614 48.64595 48.27665
##  [6,] 48.77920 51.12616 51.25065
##  [7,] 50.63888 47.47938 47.99561
##  [8,] 45.22101 45.64583 48.94528
##  [9,] 48.55337 49.35645 45.50694
## [10,] 47.23023 51.39989 51.72838
```

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

```
##  [1] 49.91661 49.43790 49.14704 49.63691 49.89552 49.65936 49.08083
##  [8] 48.33037 50.49749 50.34758
```

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

```
##  [1] 49.21711 50.31517 50.80953 50.13112 50.82874 49.09553 49.64687
##  [8] 47.91190 48.94637 49.04729
```

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

```
##  [1] 1.975379 1.311136 2.634869 2.575621 1.893665 0.961582 1.751018
##  [8] 2.696558 2.418927 2.236488
```

```
apply(mymat,1,FUN=sd)#std. by column
```

```
##  [1] 1.975379 1.311136 2.634869 2.575621 1.893665 0.961582 1.751018
##  [8] 2.696558 2.418927 2.236488
```

3. 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.

```
knitr::opts_chunk$set(echo = TRUE)

#a.

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

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

```
#b.
newtitanic<-data.frame(Titanic)
Titanicsurvivor<-apply(Titanic,4,FUN=sum)
print(Titanicsurvivor)
```

```
##   No  Yes
## 1490  711
```

```
newtitanic$Survived=="No"
```

```
##  [1]  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE
## [12]  TRUE  TRUE  TRUE  TRUE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE
## [23] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
```

```
newtitanic$Sex[newtitanic$Survived=="No"]
```

```
##  [1] Male   Male   Male   Male   Female Female Female Female Male   Male
## [11] Male   Male   Female Female Female Female
## Levels: Male Female
```

```
newtitanic$Sex[newtitanic$Survived=="Yes"]
```

```
##  [1] Male   Male   Male   Male   Female Female Female Female Male   Male
## [11] Male   Male   Female Female Female Female
## Levels: Male Female
```

```
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
```