

# February 28, 2017 - In-Class Project

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2017-03-05

part1

1

```
ckm_nodes=read.csv("ckm_nodes.csv")
```

2

```
table(ckm_nodes$adoption_date,exclude = NULL)
```

```
##
##      1      2      3      4      5      6      7      8      9     10     11     12     13     14     15
##    11      9      9     11     11     11     13      7      4      1      5      3      3      4      4
##    16     17   Inf <NA>
##      2      1     16    121
```

16 doctors never prescribed tetracycline.

121 doctor "NA"

3

```
index=which(!is.na(ckm_nodes$adoption_date))
length(index)
```

```
## [1] 125
```

```
cleaned_nodes=ckm_nodes[c(index),]
```

4

```
adopters=function(month,not.yet=FALSE){
  if (not.yet==FALSE){
    return(as.vector(cleaned_nodes$adoption_date==month))
  }
  else {
    return(as.vector(cleaned_nodes$adoption_date>month))
  }
}
```

```
adopters(month=14,not.yet=TRUE)
```

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

```
## [34] FALSE FALSE FALSE FALSE FALSE TRUE FALSE FALSE TRUE FALSE FALSE
## [45] FALSE FALSE FALSE FALSE FALSE TRUE FALSE TRUE FALSE FALSE FALSE
## [56] FALSE FALSE FALSE FALSE FALSE FALSE TRUE FALSE FALSE FALSE FALSE
## [67] TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [78] FALSE TRUE FALSE FALSE TRUE FALSE FALSE TRUE FALSE FALSE TRUE
## [89] TRUE FALSE TRUE FALSE FALSE TRUE FALSE TRUE TRUE FALSE FALSE
## [100] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE TRUE TRUE FALSE
## [111] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [122] FALSE FALSE FALSE TRUE
```

```
sum(adopters(month=14,not.yet=TRUE))
```

```
## [1] 23
```

5

```
matrix=read.table("ckm_network.dat")
clean_network=matrix[index,index]
```

6

```
contact=apply(clean_network,1,sum)
```

Part2

7

a

```
count_peer_pressure=function(index,month){
  sum((cleaned_nodes[which(clean_network[index]==1),2]<=month))
}
count_peer_pressure(37,5)
```

```
## [1] 3
```

b

```
prop_peer_pressure=function(index,month){
  if (count_peer_pressure(index,month)==0){
    return(NaN)
  } else{
    m=count_peer_pressure(index,month)
    m/length((cleaned_nodes[which(clean_network[index]==1),2]<=month))
  }
}
prop_peer_pressure(37,5)
```

```
## [1] 0.6
```

```
prop_peer_pressure(102,14)
```

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

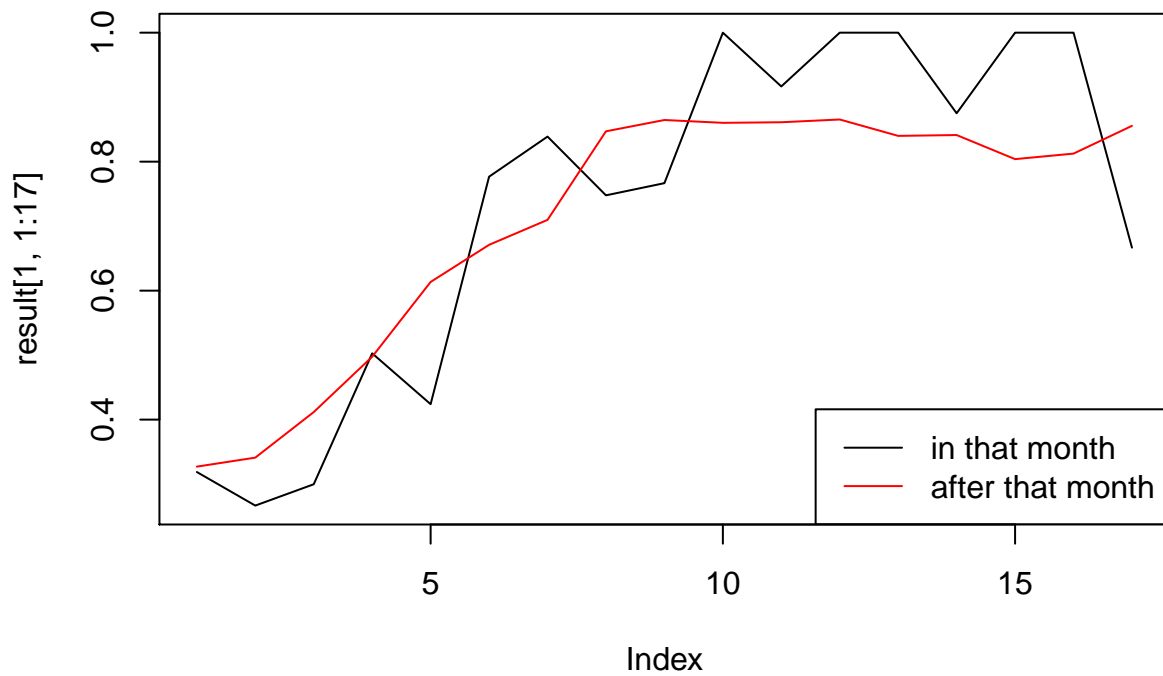
8

a

```
average_peer_pressure=function(month){  
  m1=which(adopters(month))  
  v1=vector(mode="numeric",length=length(m1))  
  
  for (i in 1:length(m1)){  
    v1[i]=prop_peer_pressure(m1[i],month)  
  }  
  mean1=mean(v1,na.rm=T)  
  
  m2=which(adopters(month,not.yet=TRUE))  
  v2=vector(mode="numeric",length=length(m2))  
  for (i in 1:length(m2)){  
    v2[i]=prop_peer_pressure(m2[i],month)  
  }  
  mean2=mean(v2,na.rm=T)  
  
  return(c(mean1,mean2))  
}
```

b

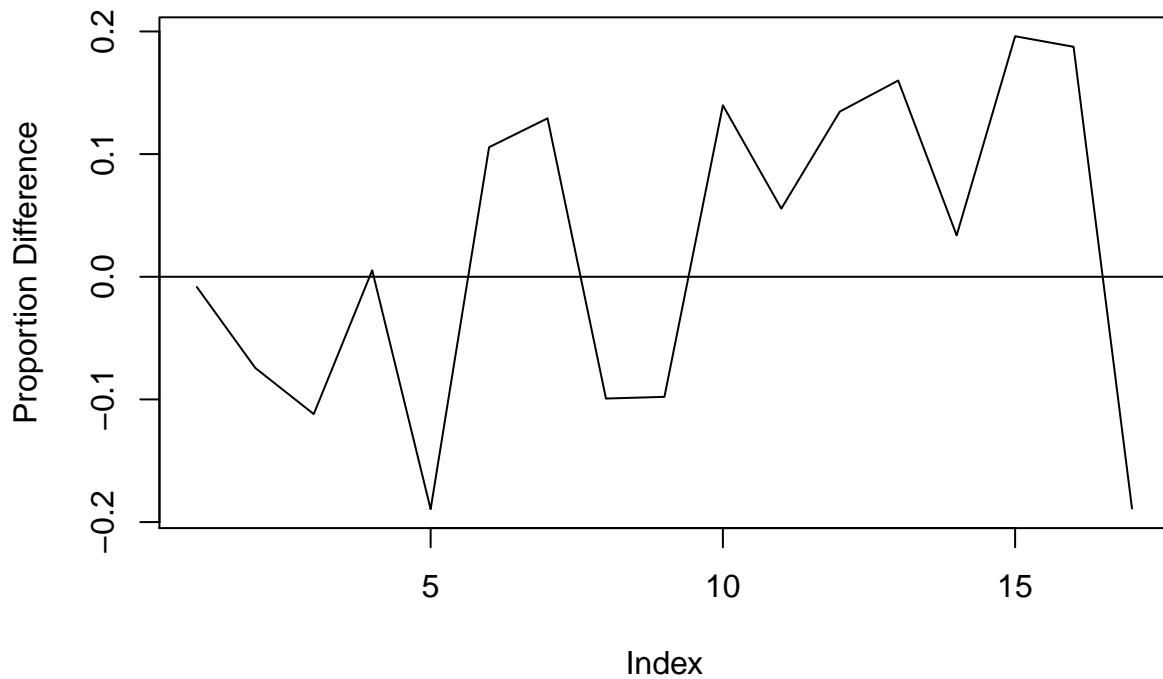
```
month=matrix(1:17,nrow = 17, ncol = 1)  
result=apply(month,1,function(x) average_peer_pressure(x))  
plot(result[1,1:17],type="l")  
lines(result[2,1:17],type="l",col="red",ylab="Proportion")  
legend("bottomright",c("in that month","after that month"),lwd=1,col=c(1,2))
```



```

difference=result[1,1:17]-result[2,1:17]
plot(difference,type="l",ylab="Proportion Difference")
abline(h=0)

```



Not necessary. Since proportion difference sometimes is less than 0 and sometimes is larger than 0.