585 HW2

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Problem 1

```
smartsales <- read.csv("C:/Users/16932/Desktop/MA585/smartsales.csv")
holidaygifts <- read.csv("C:/Users/16932/Desktop/MA585/holidaygifts.csv")
randomtopics <- read.csv("C:/Users/16932/Desktop/MA585/randomtopics.csv")
```

```
travel_expenditure <- read.csv("C:/Users/16932/Desktop/MA585/travel expenditure.csv")
```

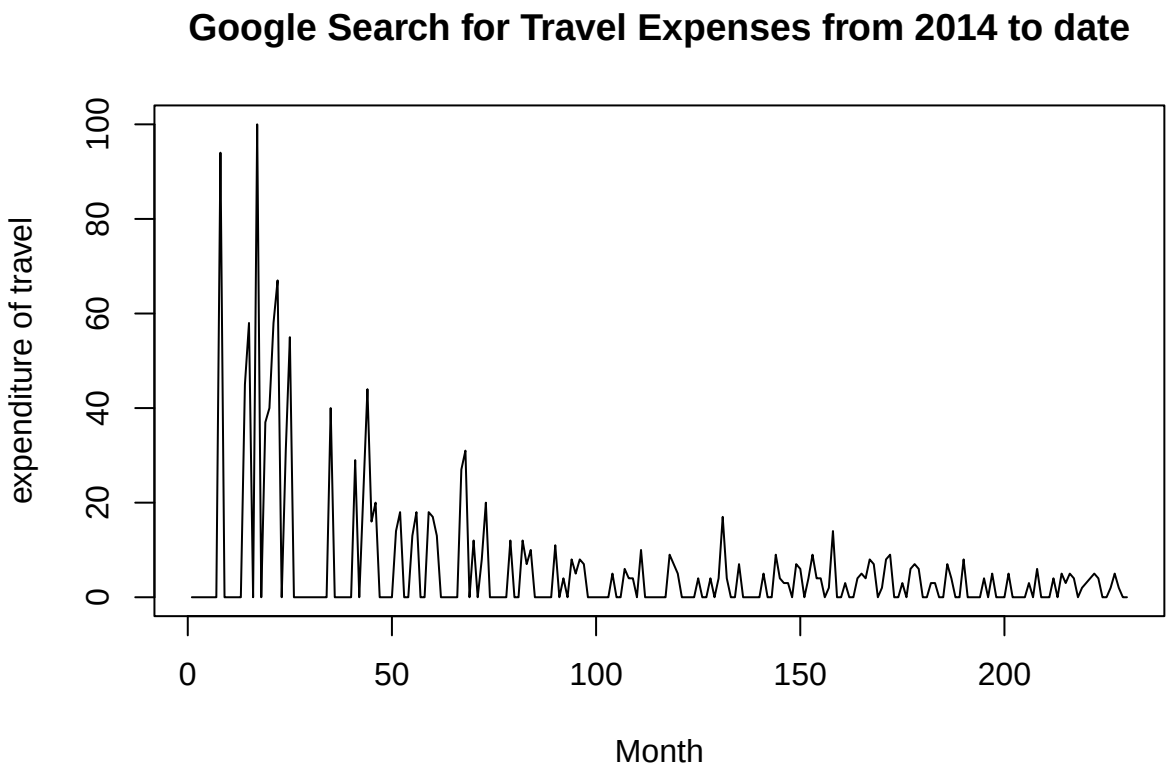
```
library(TSA)
```

```
##
##     'TSA'
```

```
## The following objects are masked from 'package:stats':
##
##     acf, arima
```

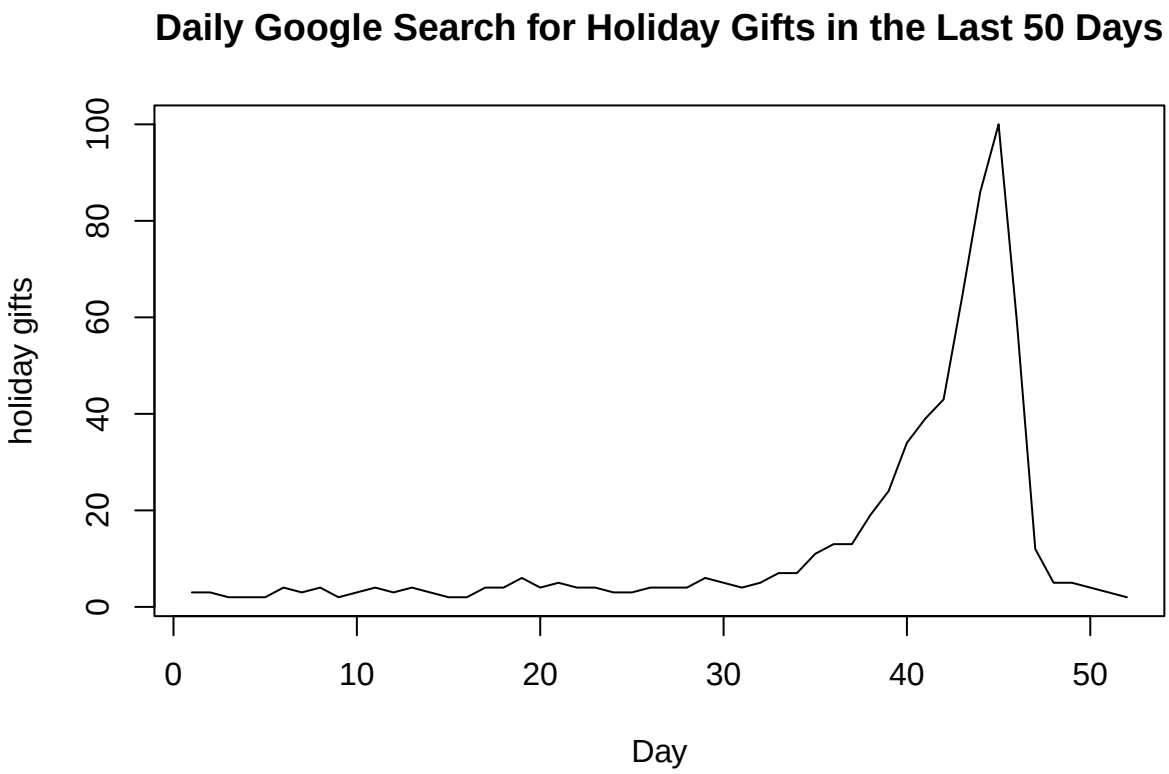
```
## The following object is masked from 'package:utils':
##
##     tar
```

```
plot.ts(travel_expenditure, ylab="expenditure of travel",xlab="Month")
title("Google Search for Travel Expenses from 2014 to date")
```



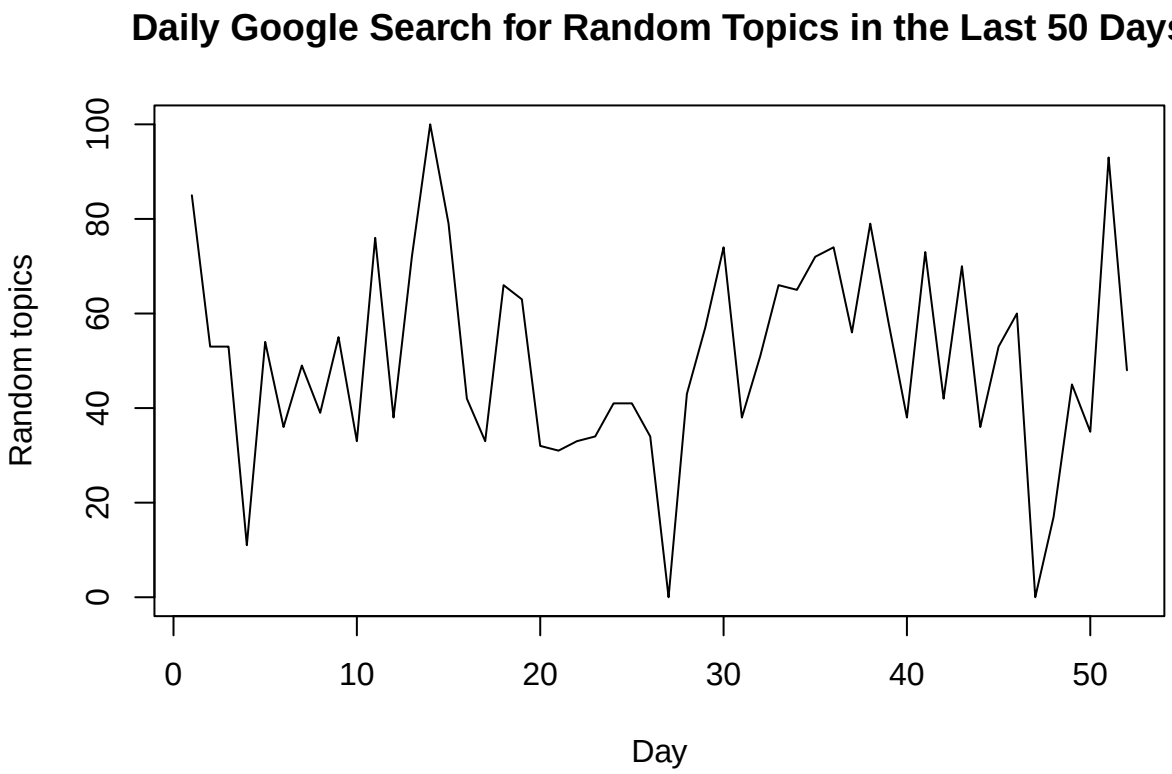
This plot shows a time series with a clear trend component.It has a clear downward trend over the years, indicating the decreasing expenditure of travel. I think the reason for it is the decreasing travel cost.

```
plot.ts(holidaygifts, ylab="holiday gifts",xlab="Day")
title("Daily Google Search for Holiday Gifts in the Last 50 Days")
```



The plot of "holiday gifts" shows a clear seasonal pattern, it upwards sharply in one day, indicating the increased demand for gift-giving during these times.

```
plot.ts(randomtopics, ylab="Random topics",xlab="Day")
title("Daily Google Search for Random Topics in the Last 50 Days")
```

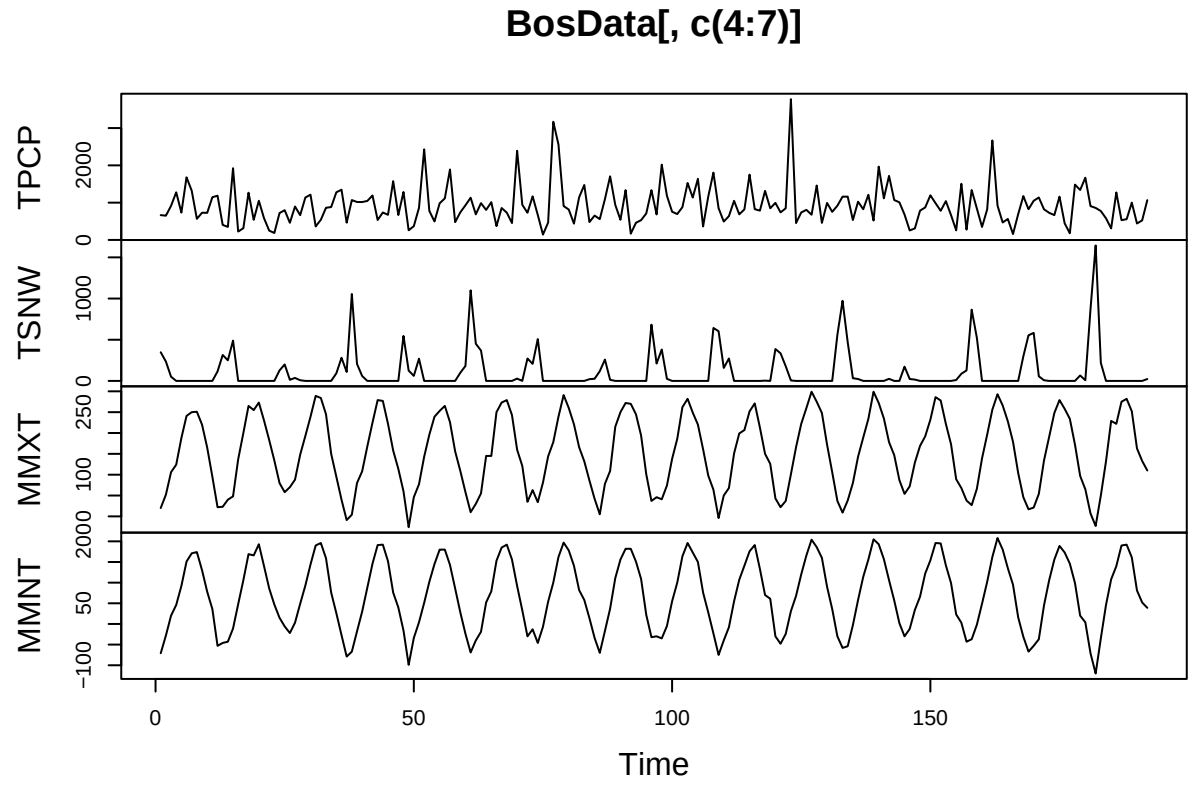


This plot shows a time series with no clear trend or seasonal pattern and is poorly described.

Problem 2

```
BosClimateData <- read.csv("C:/Users/16932/Desktop/MA585/BosClimateData (1).csv")
BosData=subset(BosClimateData,BosClimateData$STATION_NAME=="BOSTON LOGAN INTERNATIONAL AIRPORT MA US")
```

```
plot.ts(BosData[,c(4:7)])
```



For TPCP and TSNW, there is not obvious trend. For MMNT and MMXT, there are periodic trend.

```
length(subset(BosData$TSNW,BosData$TSNW>1))/length(BosData$TSNW)
```

```
## [1] 0.3854167
```

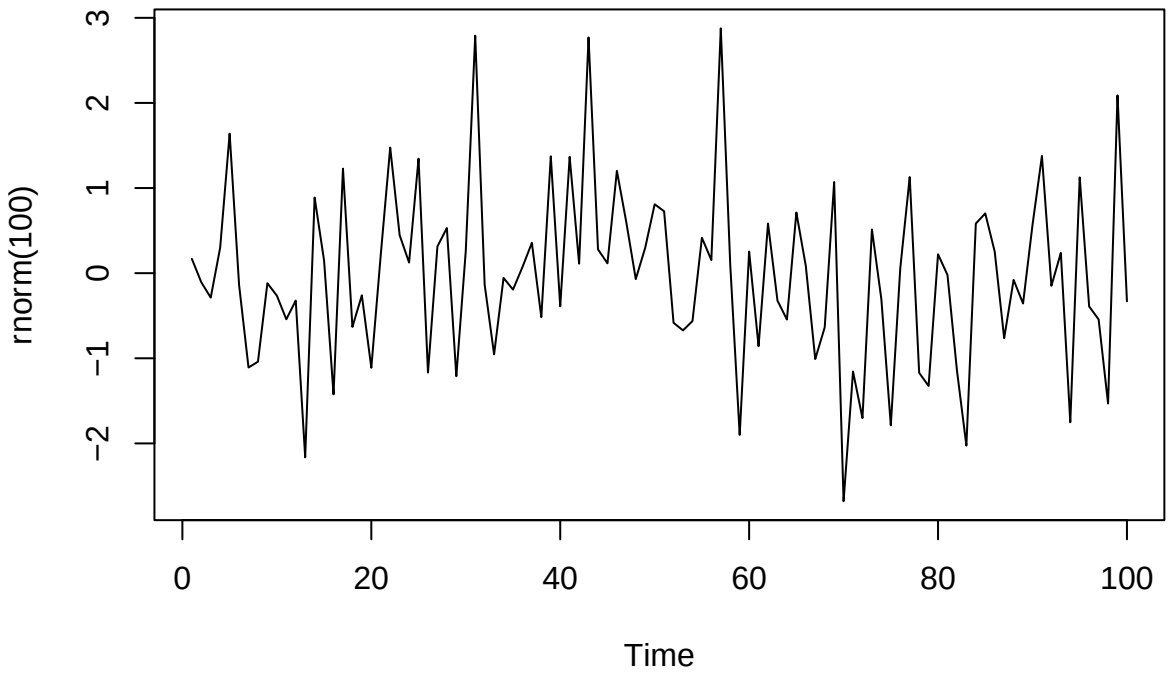
```
length(subset(BosData$MMXT,BosData$MMXT>80))/length(BosData$MMXT)
```

```
## [1] 0.7083333
```

There are 38.5% months had total snowfall greater than a foot. There are 70.83% months mean maximum temperature exceeded 80F.

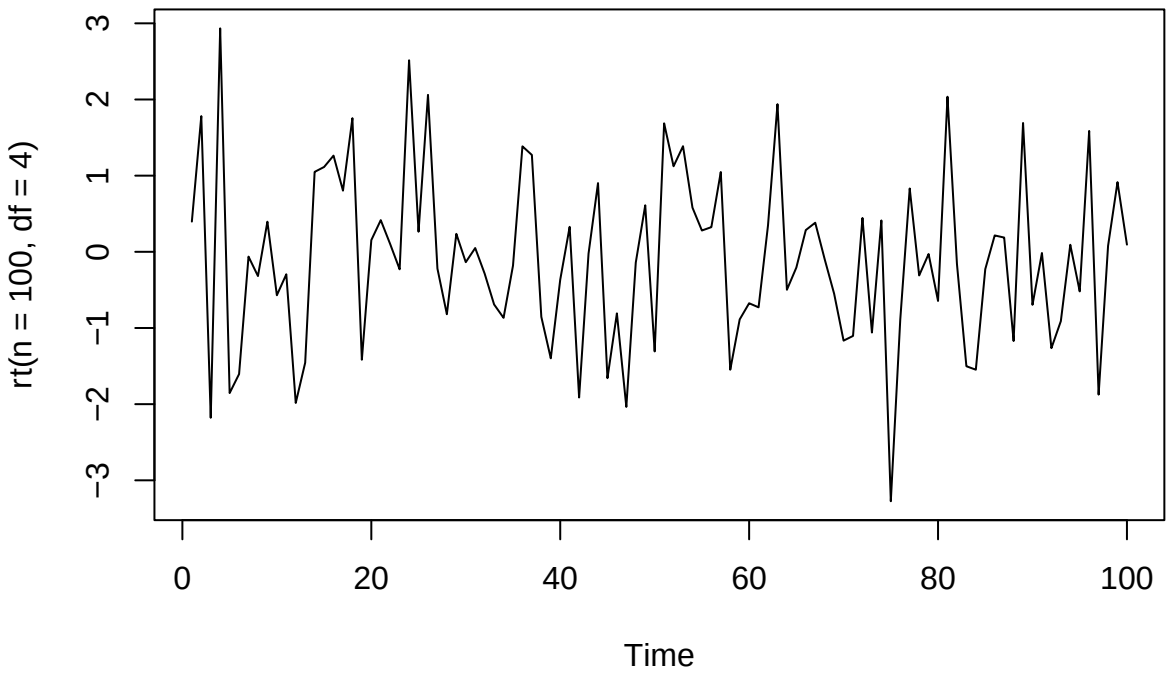
Problem 3

```
plot.ts(rnorm(100))
```



It looks like random.

```
plot.ts(rt(n=100, df=4))
```



The data is skewed in one direction, it suggest that the data generating process may not be Gaussian.