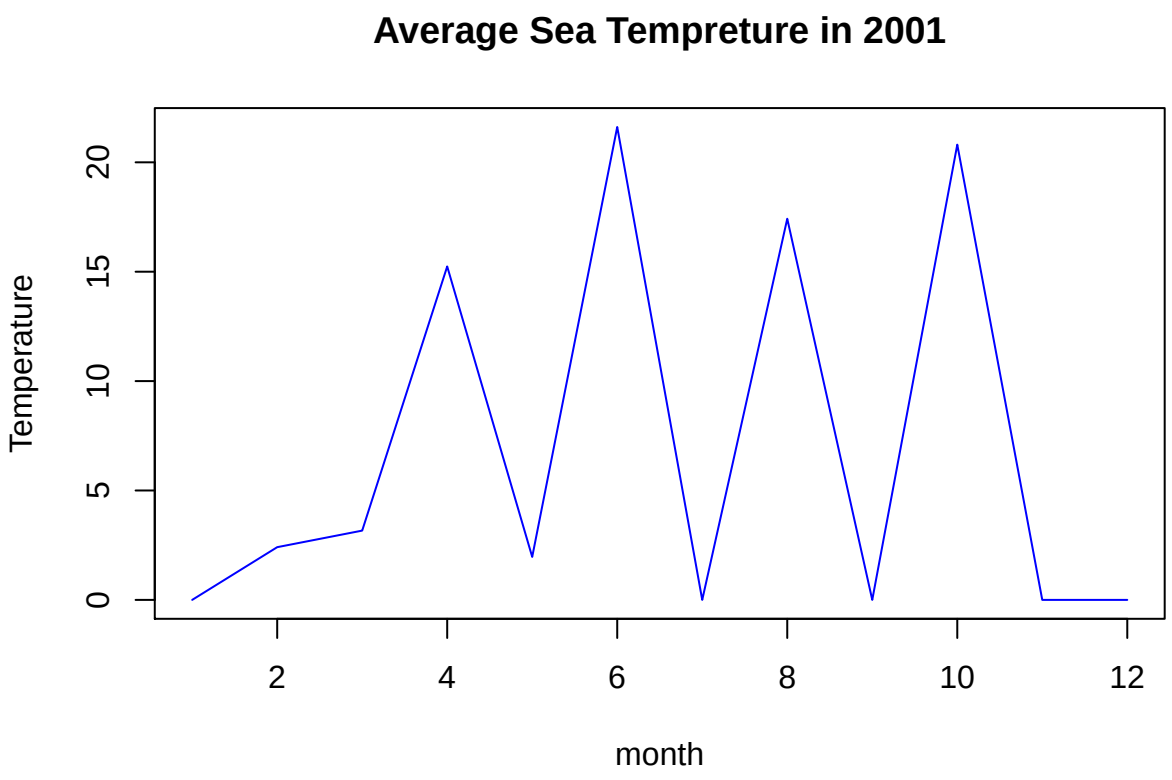
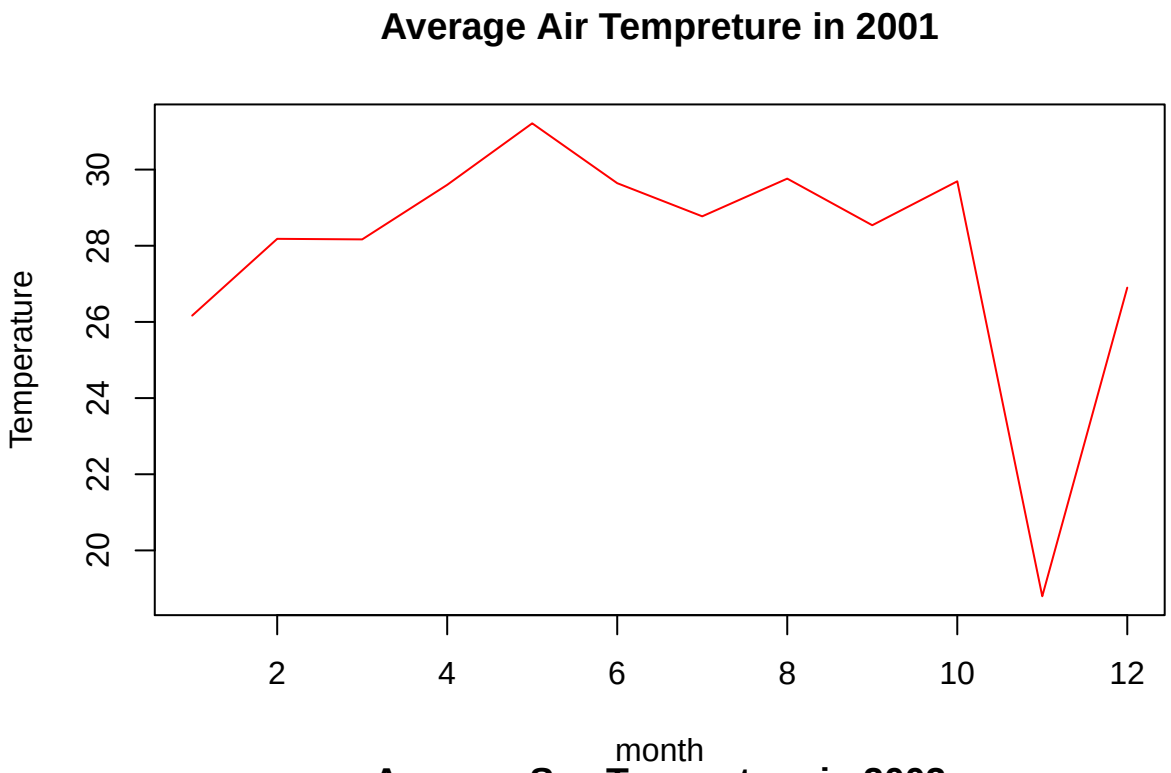
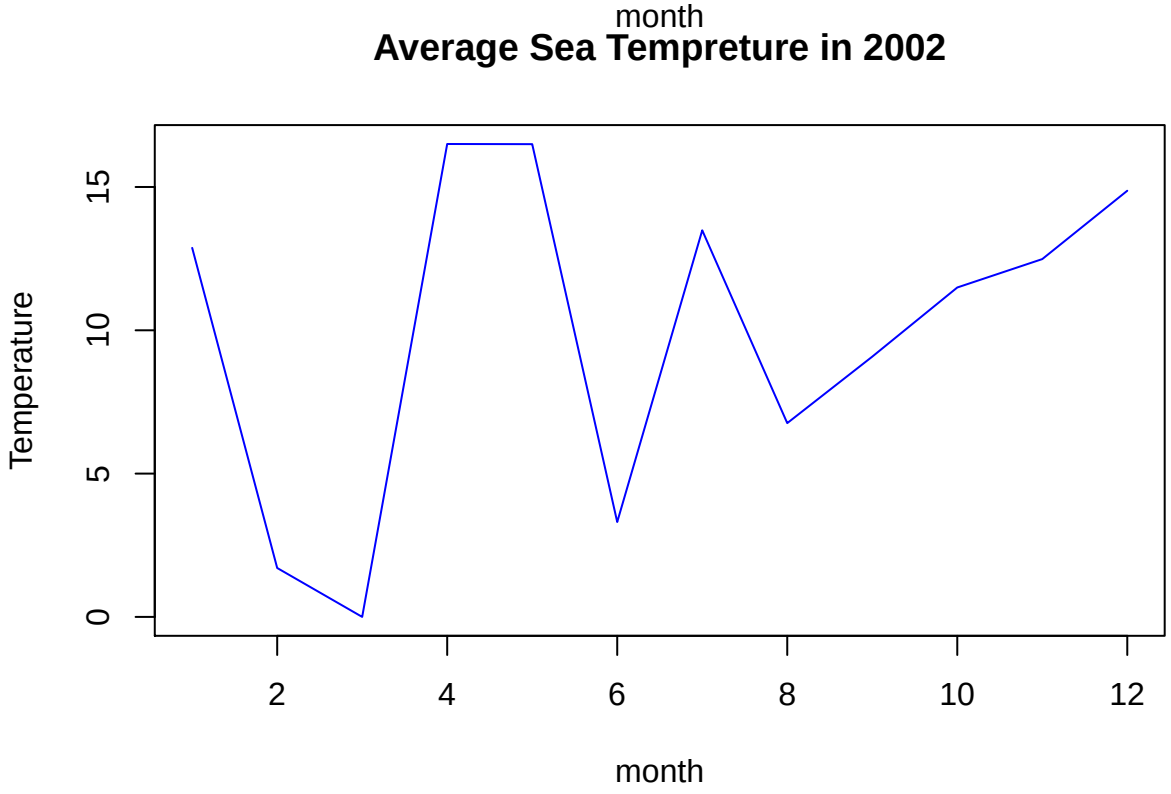
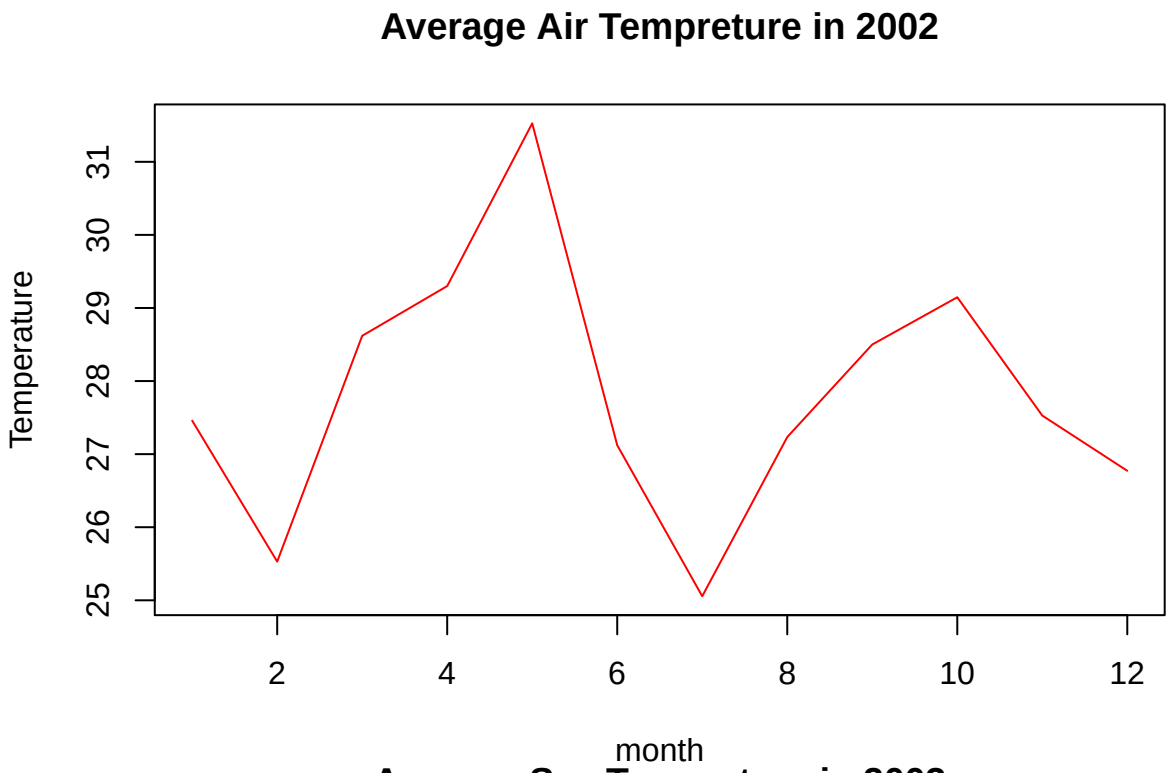
Data Analysis

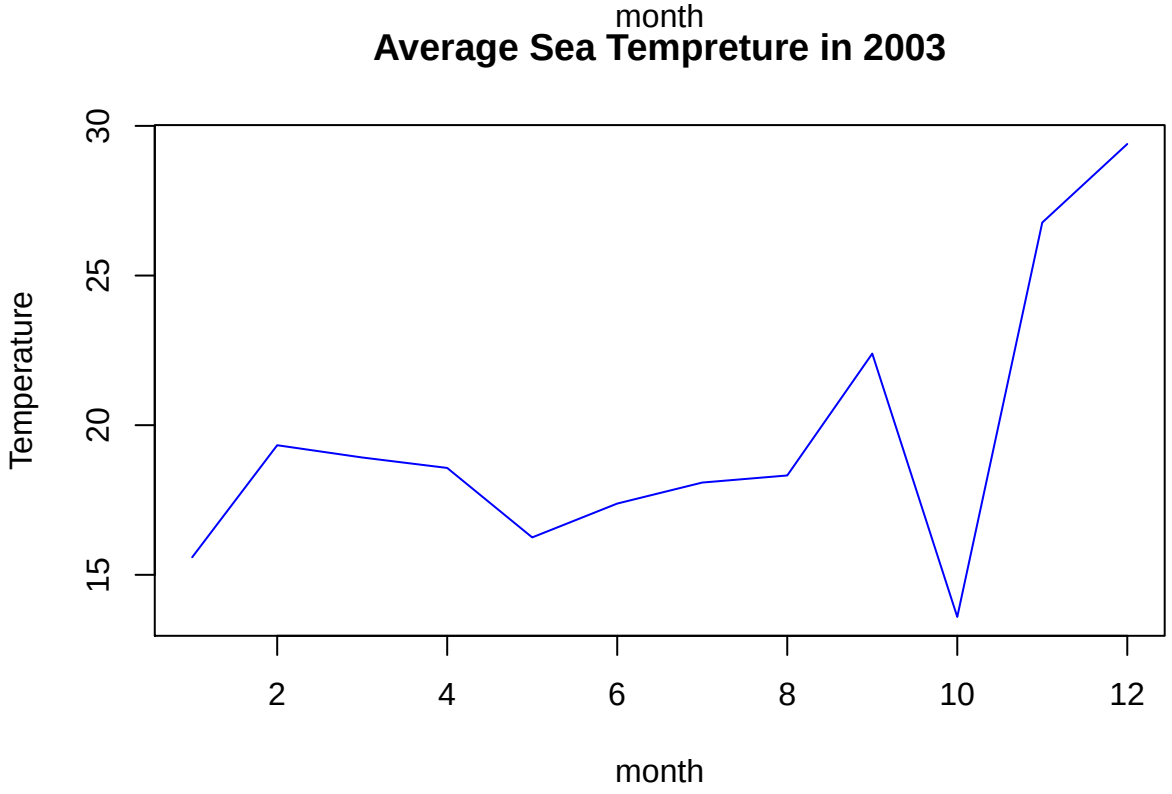
```
matrix.jan.temp = NULL
matrix.jul.temp  = NULL

# the following loop will generate the graphs
# and it will build two matrices to track the average temprtures
# of two months through out the 16 years.
for (YEAR in 2001:2016) {
  load(paste0("./eda_data/ave_temp_",YEAR,".Rdata"))

  plot(EDA.year[,2], type = "l", main =
         paste("Average Sea Tempreture in", YEAR, sep = " "),
       xlab = "month", ylab = "Temperature", col = "blue")

  plot(EDA.year[,3], type = "l", main =
         paste("Average Air Tempreture in", YEAR, sep = " "),
       xlab = "month", ylab = "Temperature", col = "red")

  jan.temp = EDA.year[1,2:3 ]
  jul.temp = EDA.year[7,2:3]
  #jan.temp = cbind(YEAR, jan.temp)
  matrix.jul.temp = rbind(matrix.jul.temp , jul.temp)
  matrix.jan.temp = rbind(matrix.jan.temp , jan.temp)
}
```

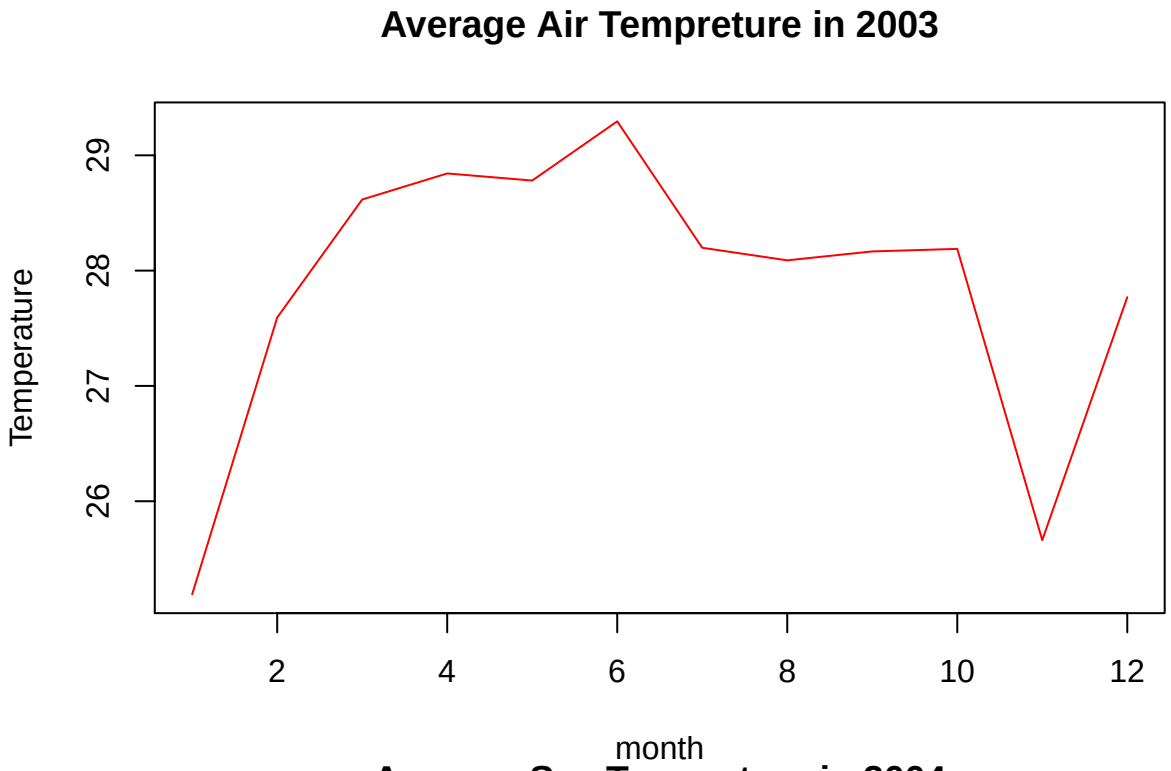


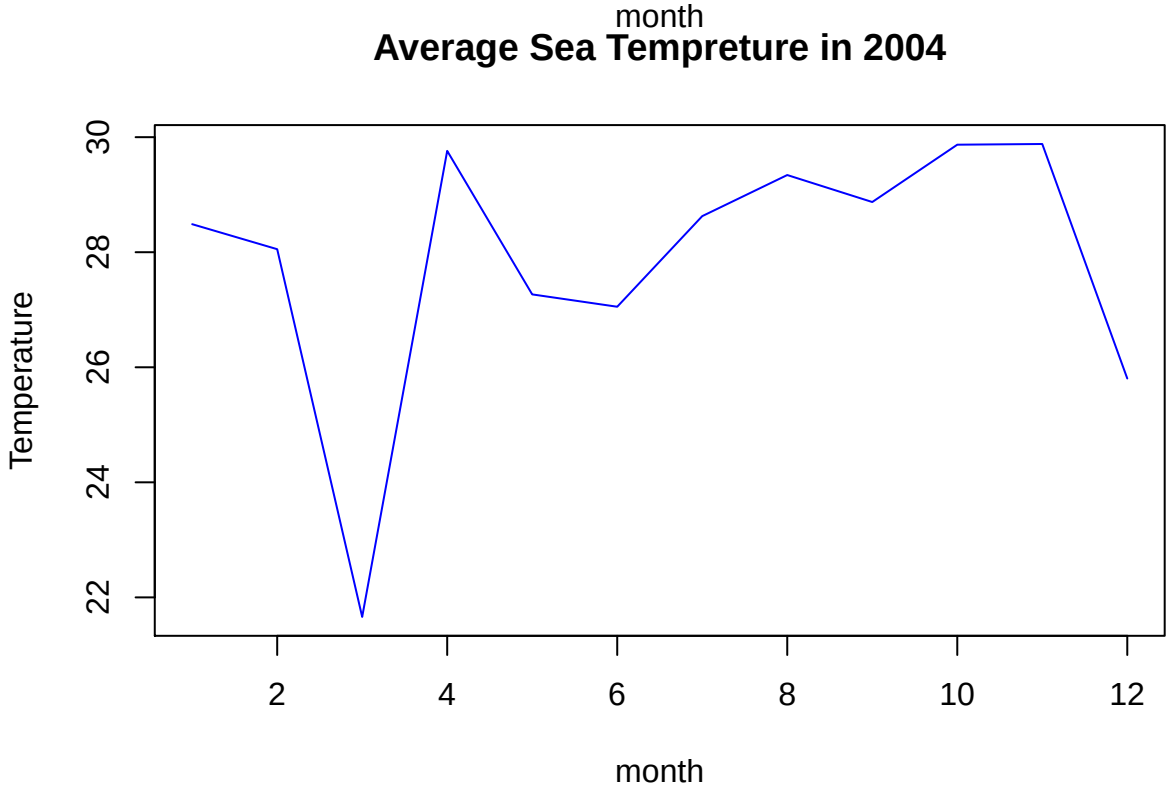

Average Air Tempreture in 2001
Temperature
20
22
24
26
28
30
2
4
6
8
10
12
month

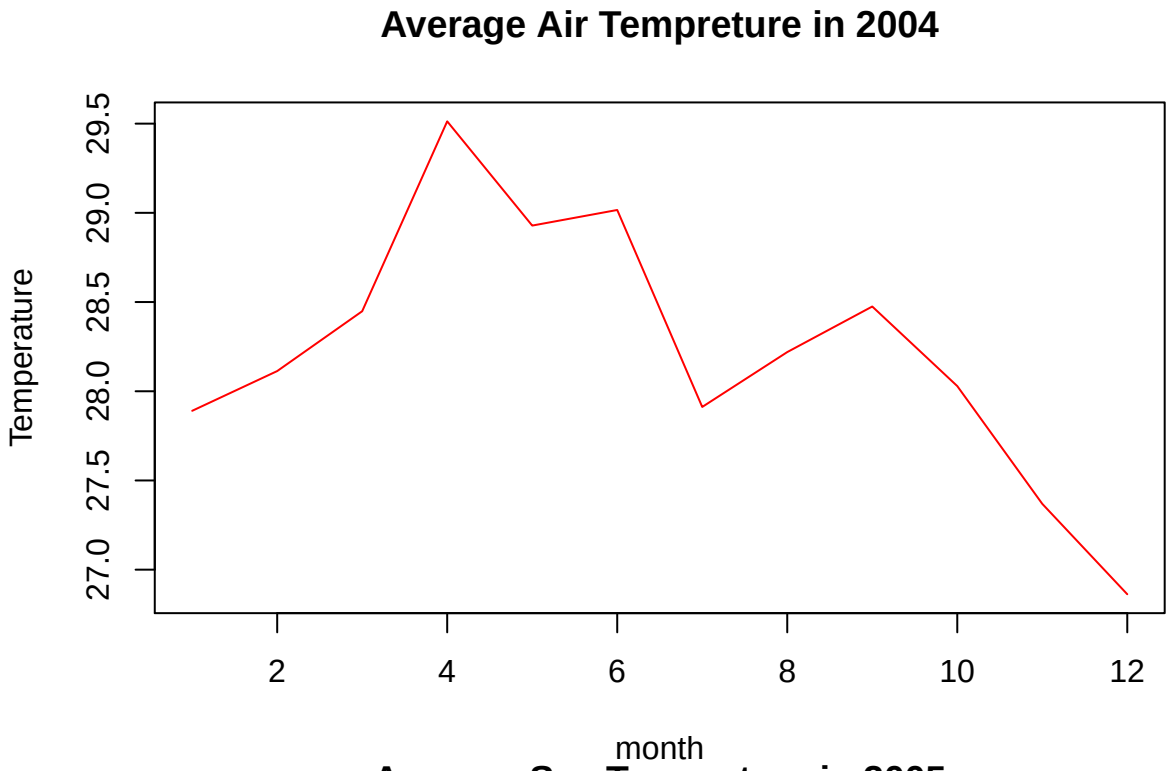

Average Sea Tempreture in 2002
Temperature
0
5
10
15
2
4
6
8
10
12
month

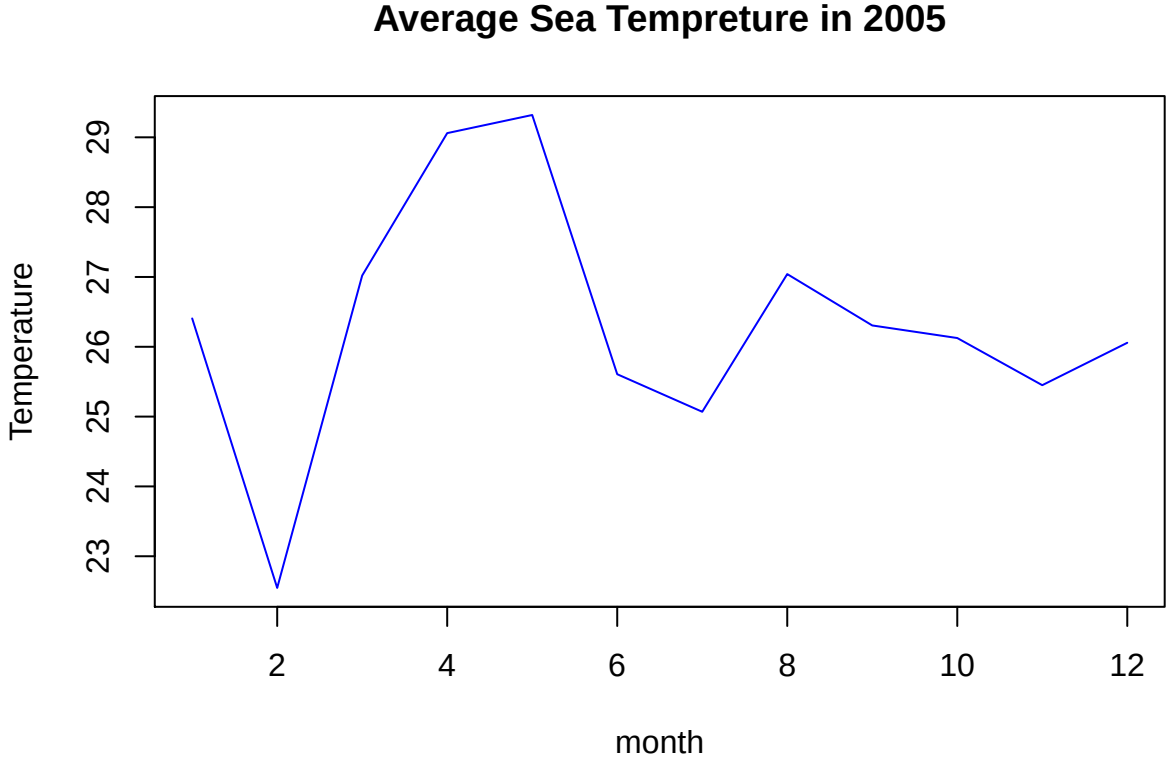

Average Air Tempreture in 2002
Temperature
25
26
27
28
29
30
31
2
4
6
8
10
12
month

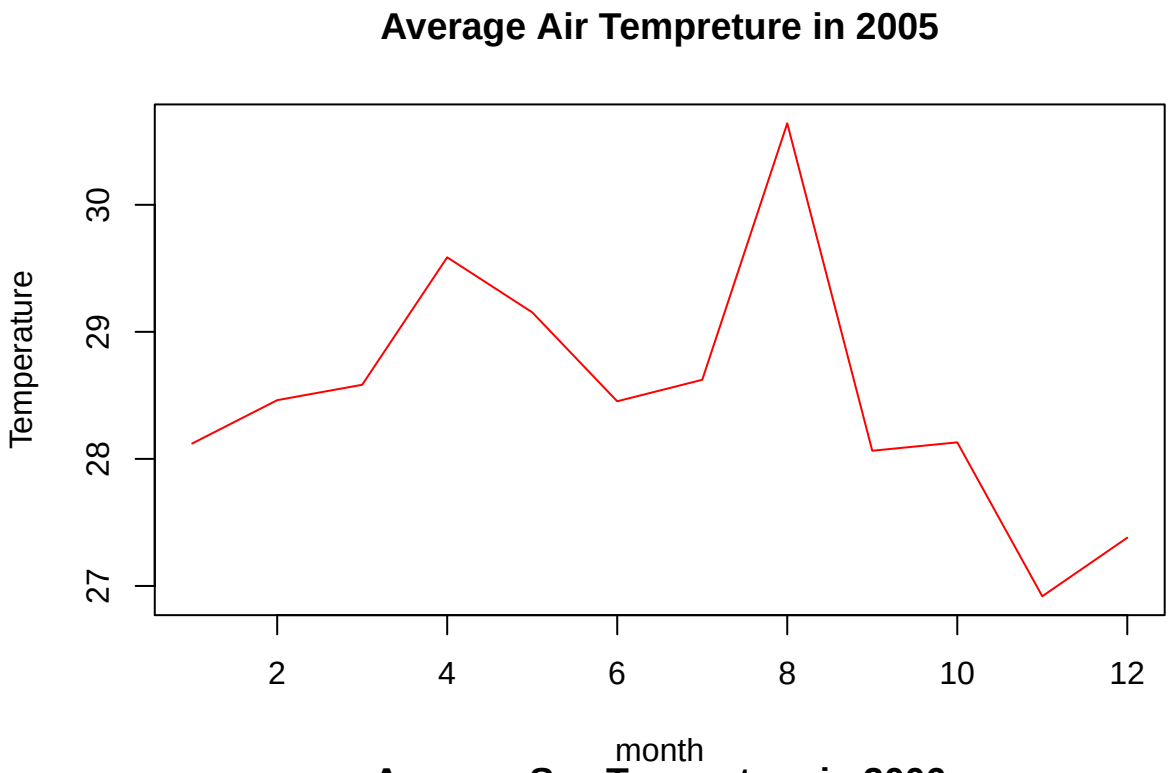

Average Sea Tempreture in 2003
Temperature
15
20
25
30
2
4
6
8
10
12
month

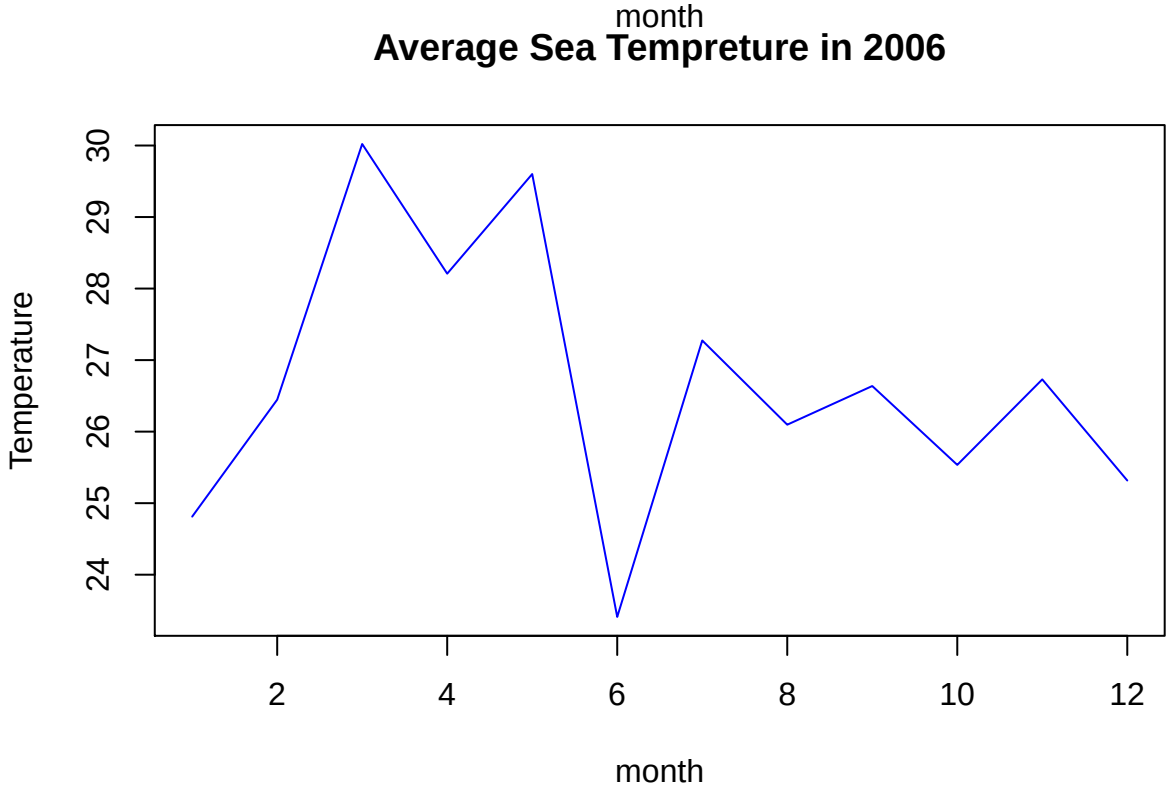

Average Air Tempreture in 2003
Temperature
26
27
28
29
2
4
6
8
10
12
month

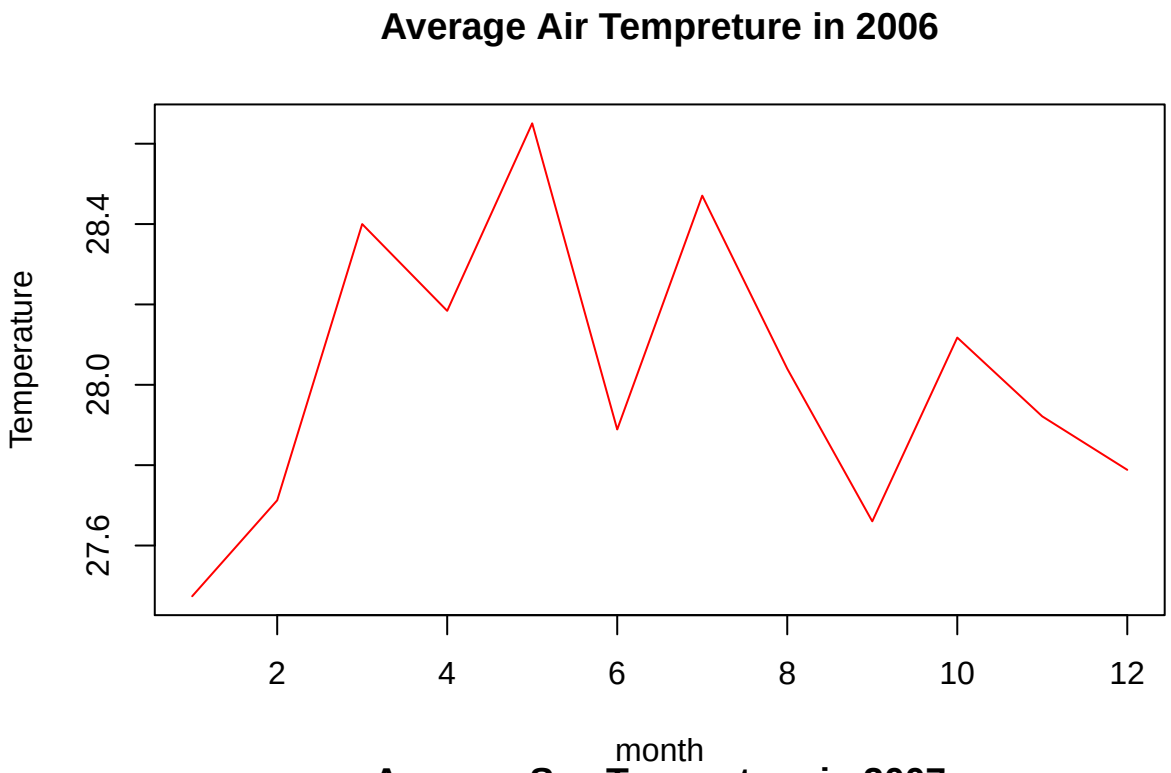

Average Sea Tempreture in 2004
Temperature
22
24
26
28
30
2
4
6
8
10
12
month

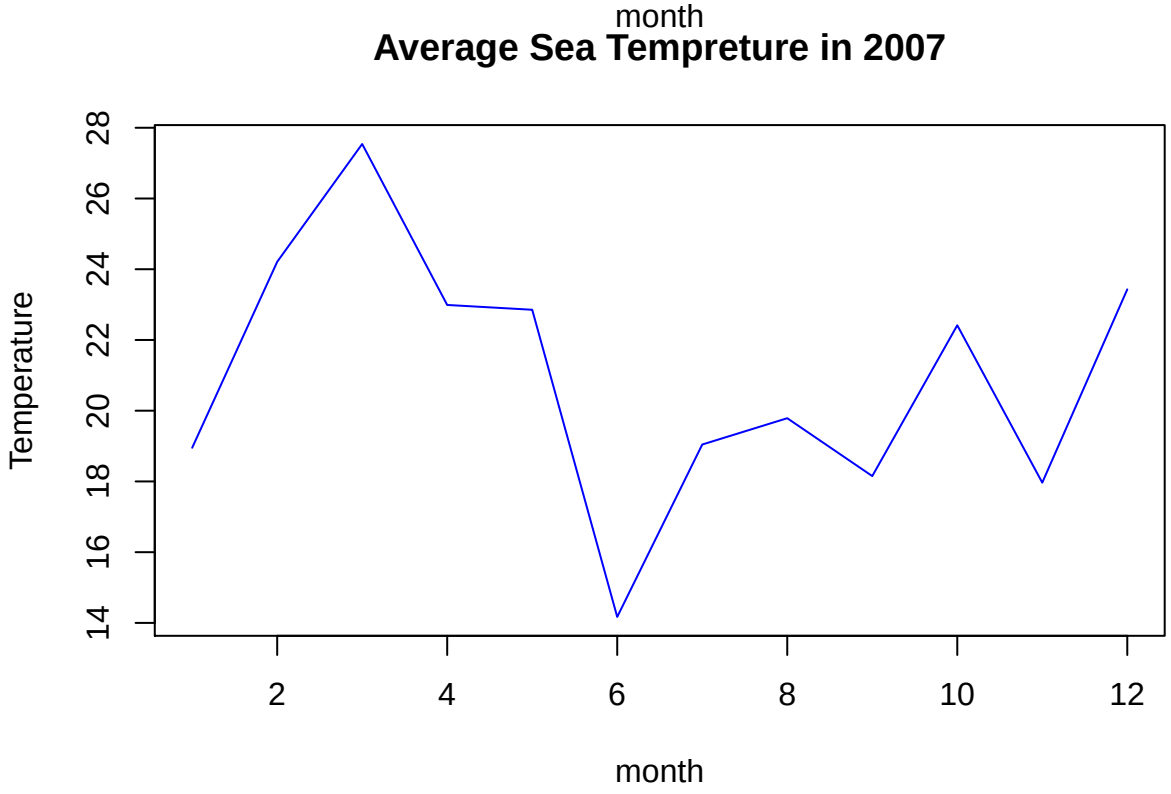

Average Air Tempreture in 2004
Temperature
27.0
27.5
28.0
28.5
29.0
29.5
2
4
6
8
10
12
month

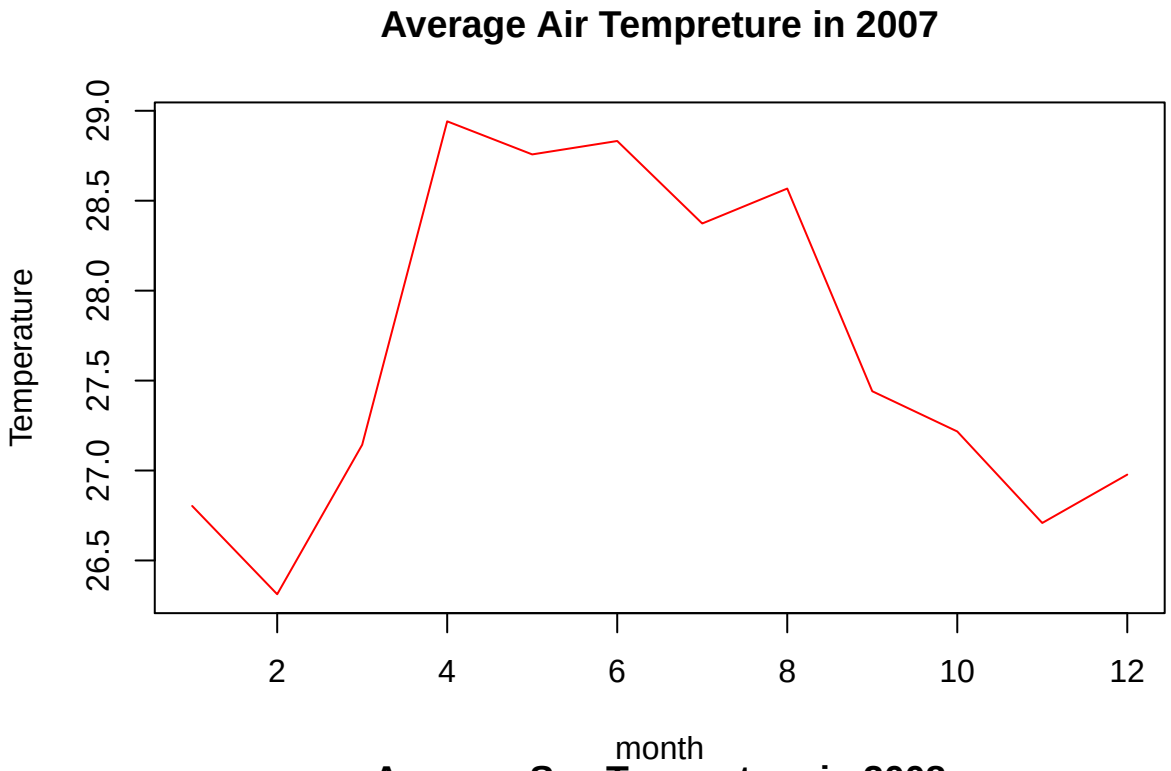

Average Sea Tempreture in 2005
Temperature
23
24
25
26
27
28
29
2
4
6
8
10
12
month

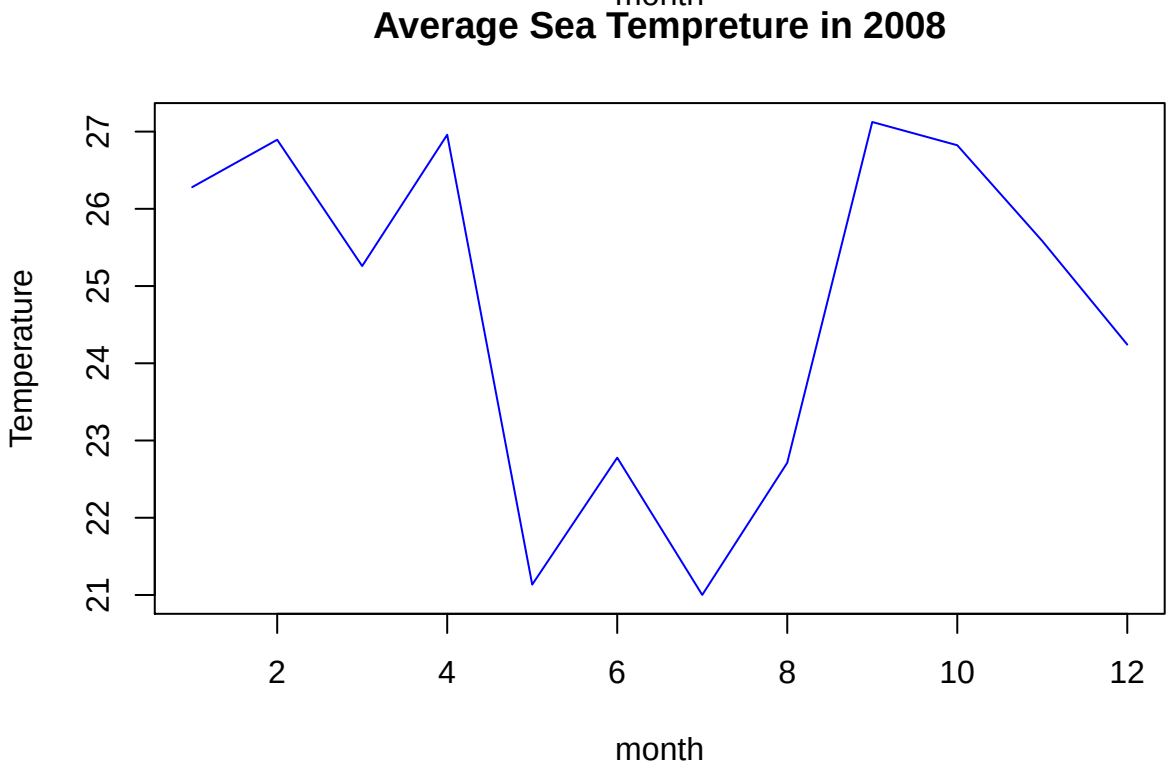

Average Air Tempreture in 2005
Temperature
27
28
29
30
2
4
6
8
10
12
month

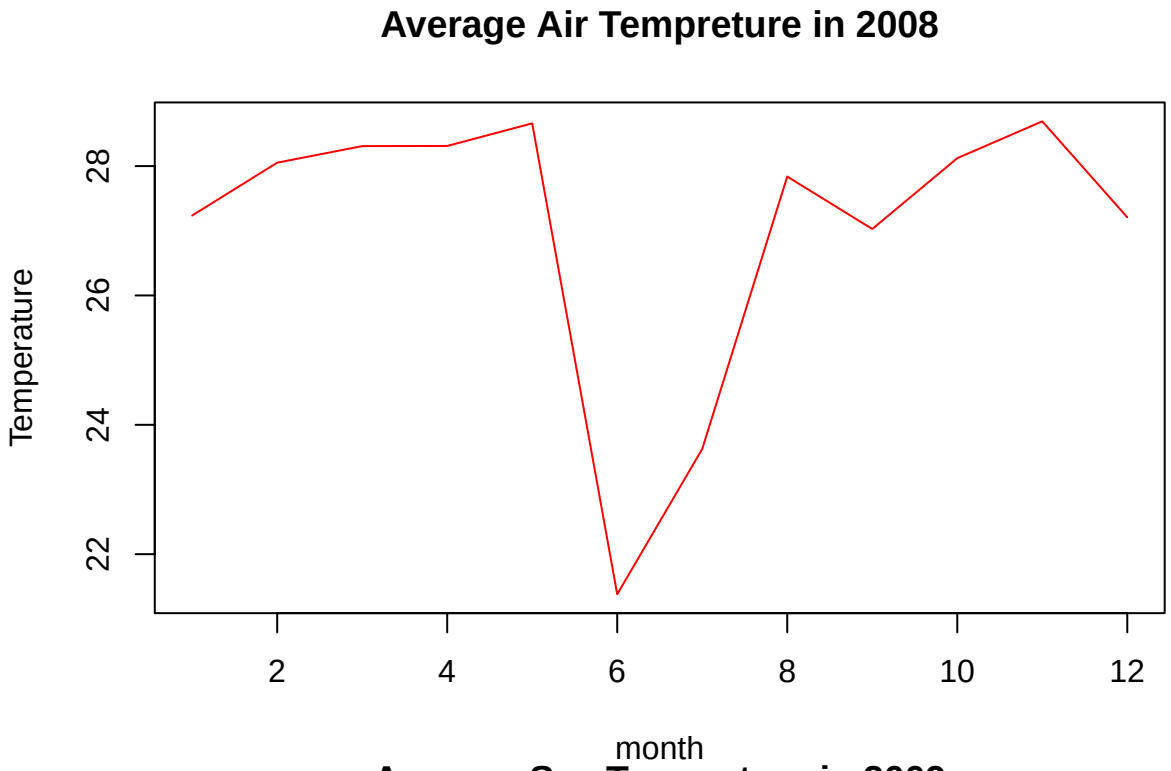

Average Sea Tempreture in 2006
Temperature
24
25
26
27
28
29
30
2
4
6
8
10
12
month

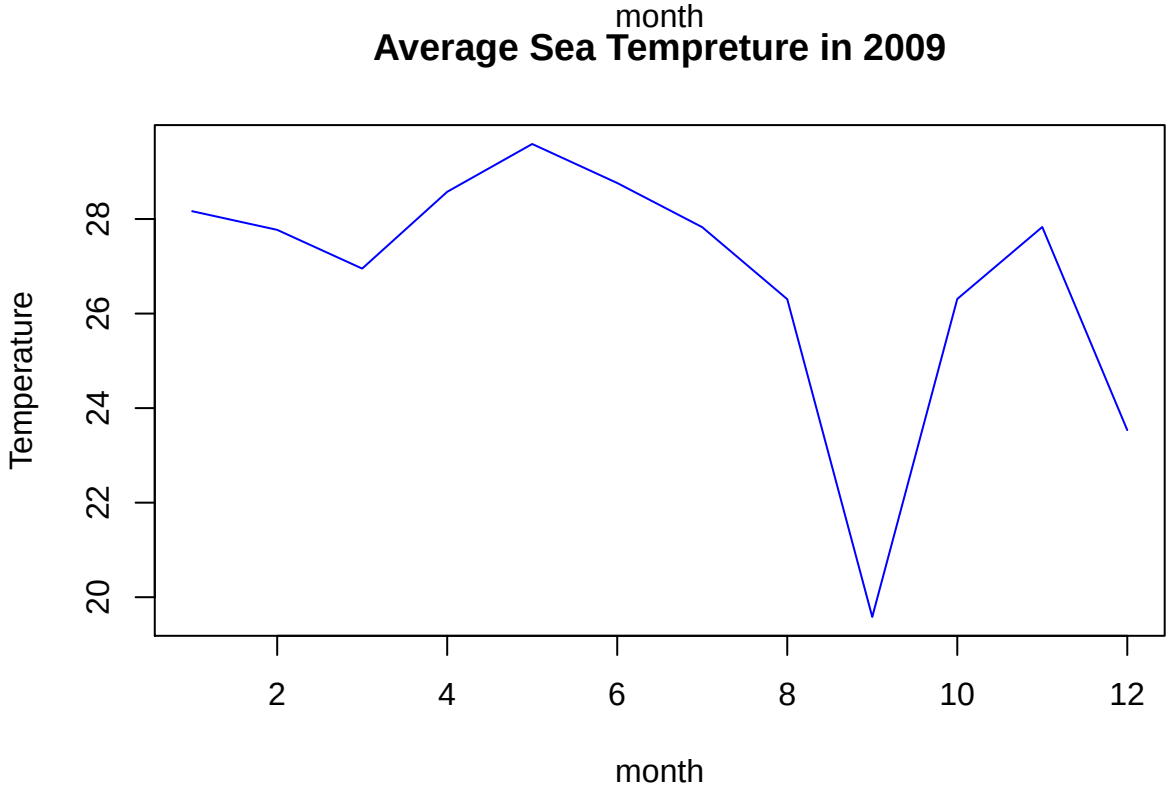

Average Air Tempreture in 2006
Temperature
27.6
28.0
28.4
2
4
6
8
10
12
month

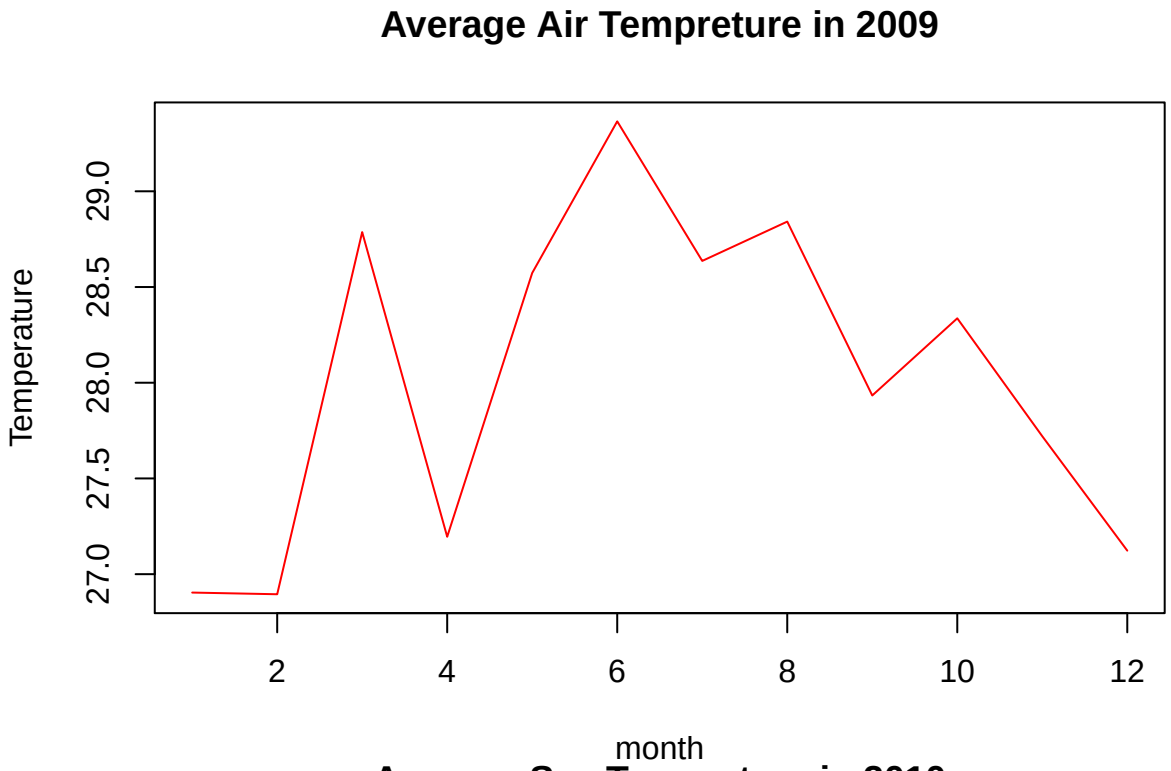

Average Sea Tempreture in 2007
Temperature
14
16
18
20
22
24
26
28
2
4
6
8
10
12
month

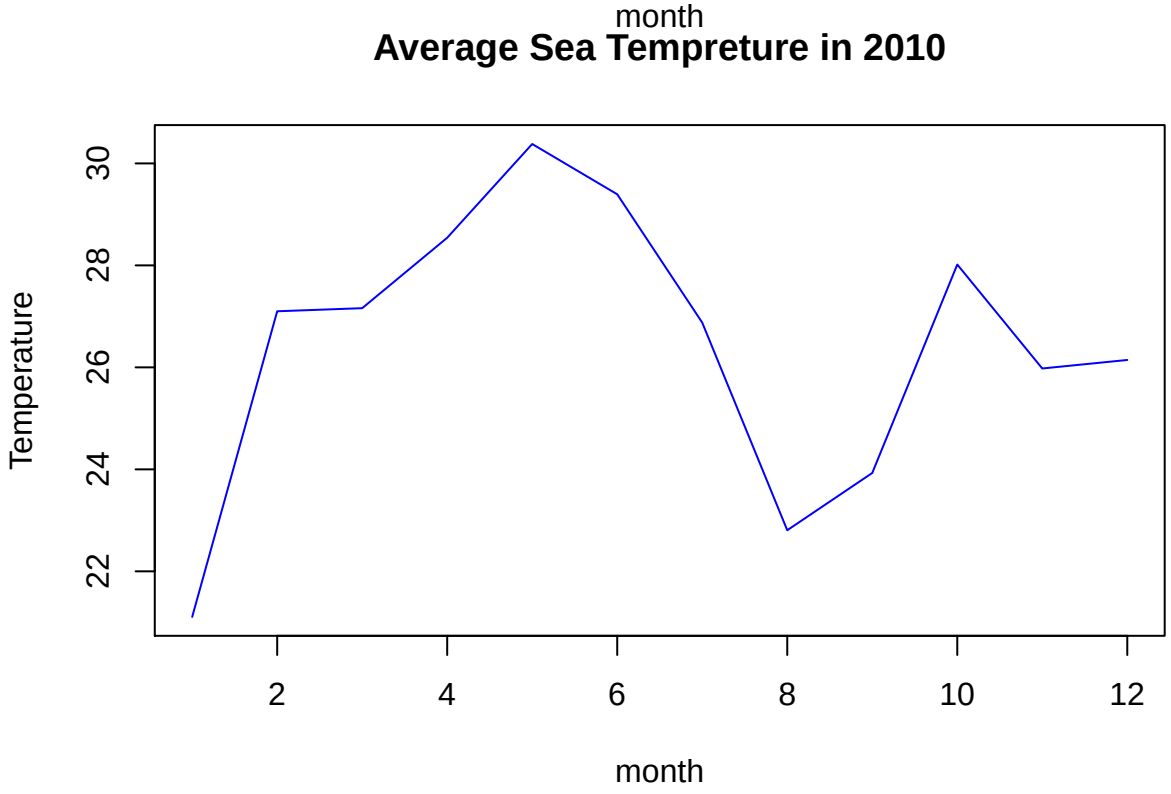

Average Air Tempreture in 2007
Temperature
26.5
27.0
27.5
28.0
28.5
29.0
2
4
6
8
10
12
month

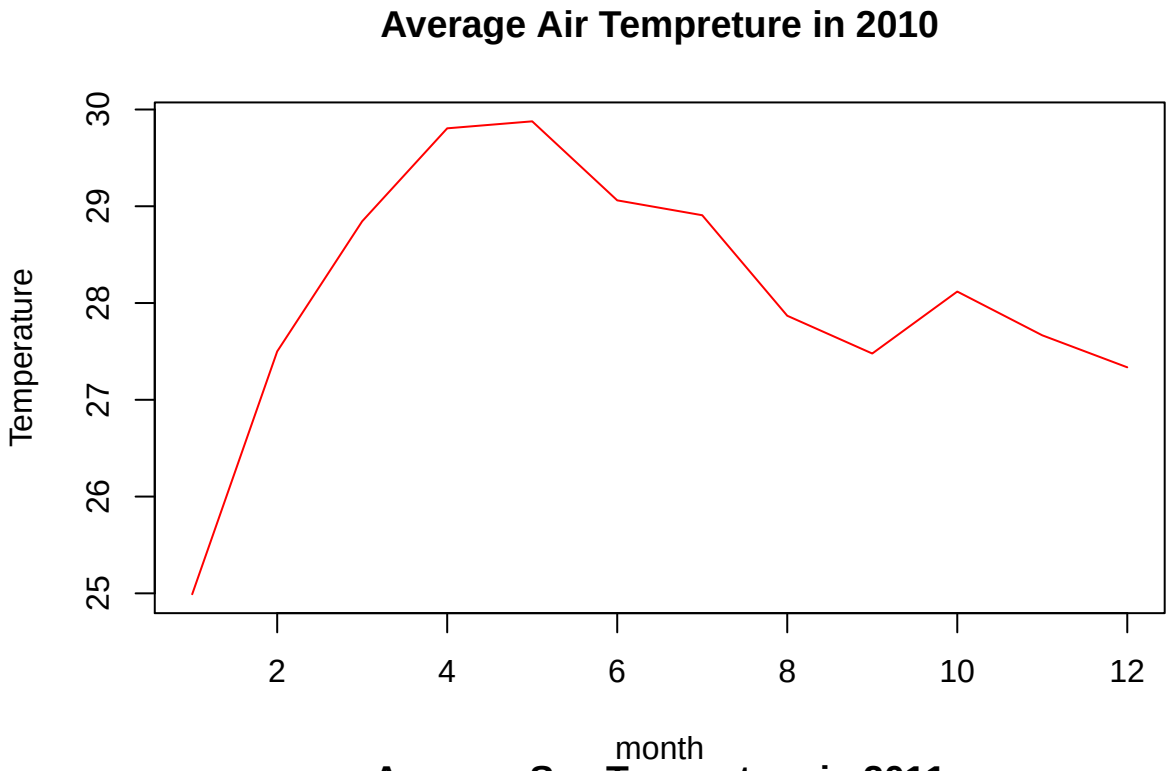

Average Sea Tempreture in 2008
Temperature
21
22
23
24
25
26
27
2
4
6
8
10
12
month

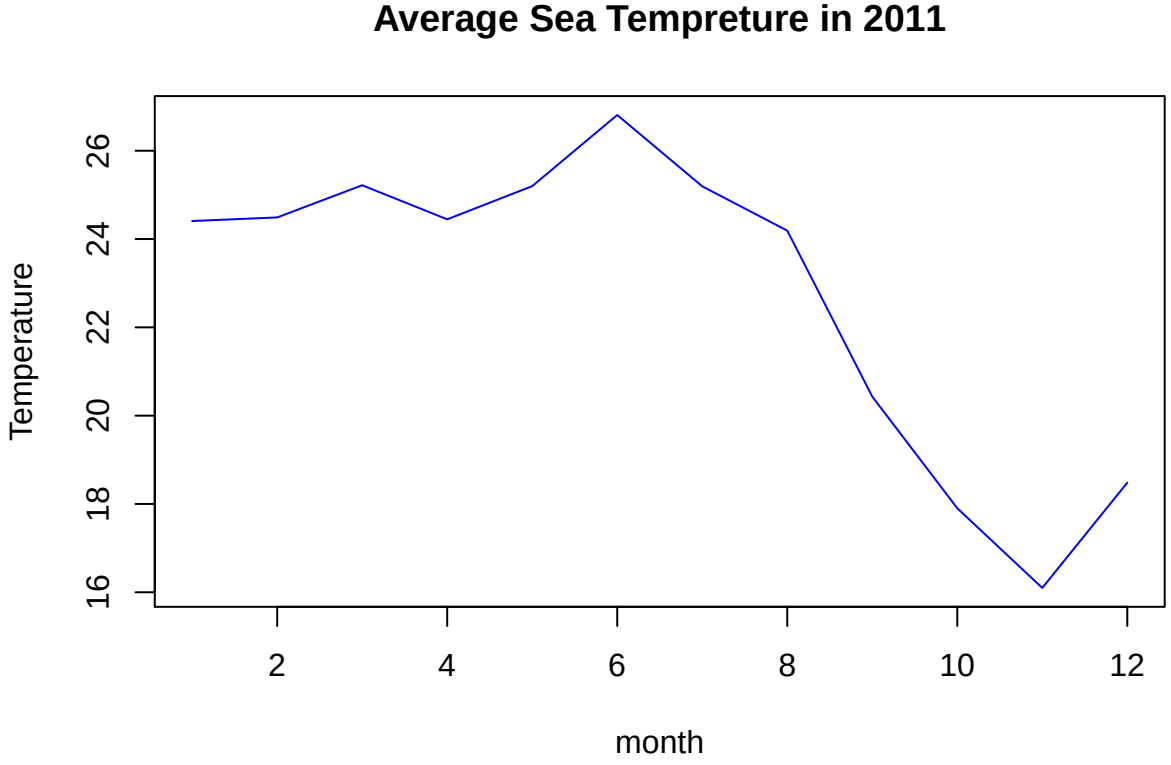

Average Air Tempreture in 2008
Temperature
22
24
26
28
2
4
6
8
10
12
month

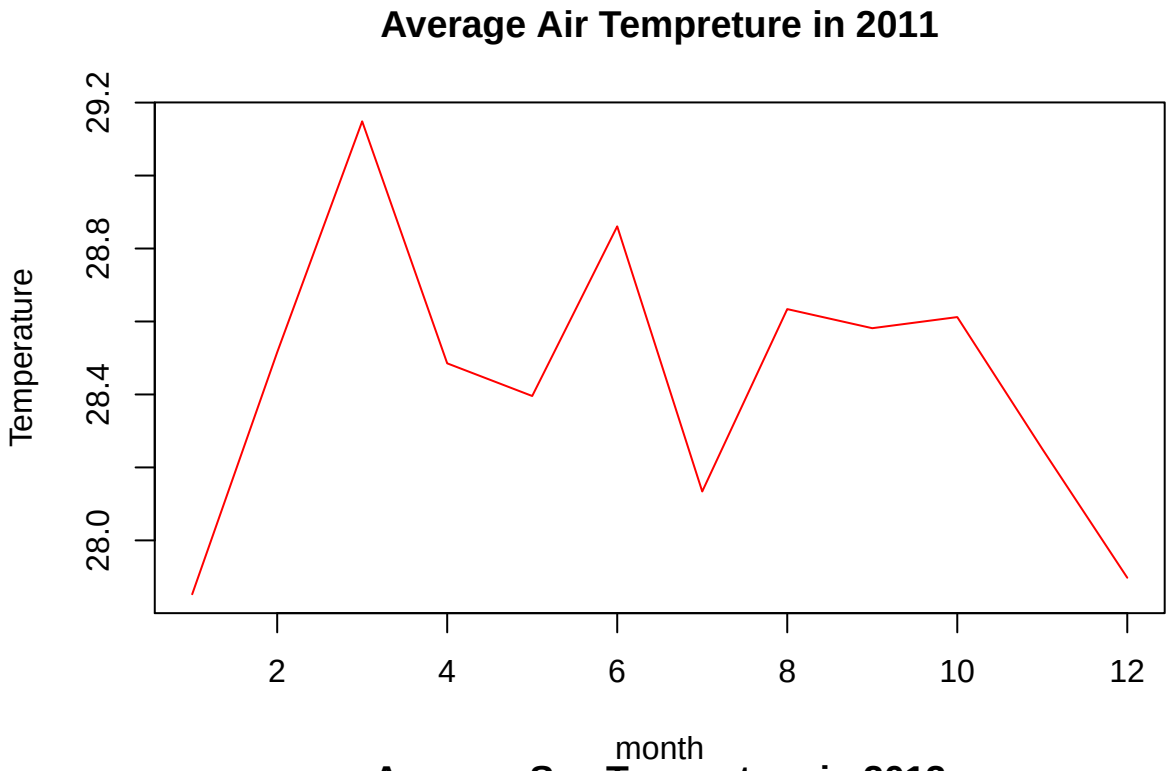

Average Sea Tempreture in 2009
Temperature
20
22
24
26
28
2
4
6
8
10
12
month

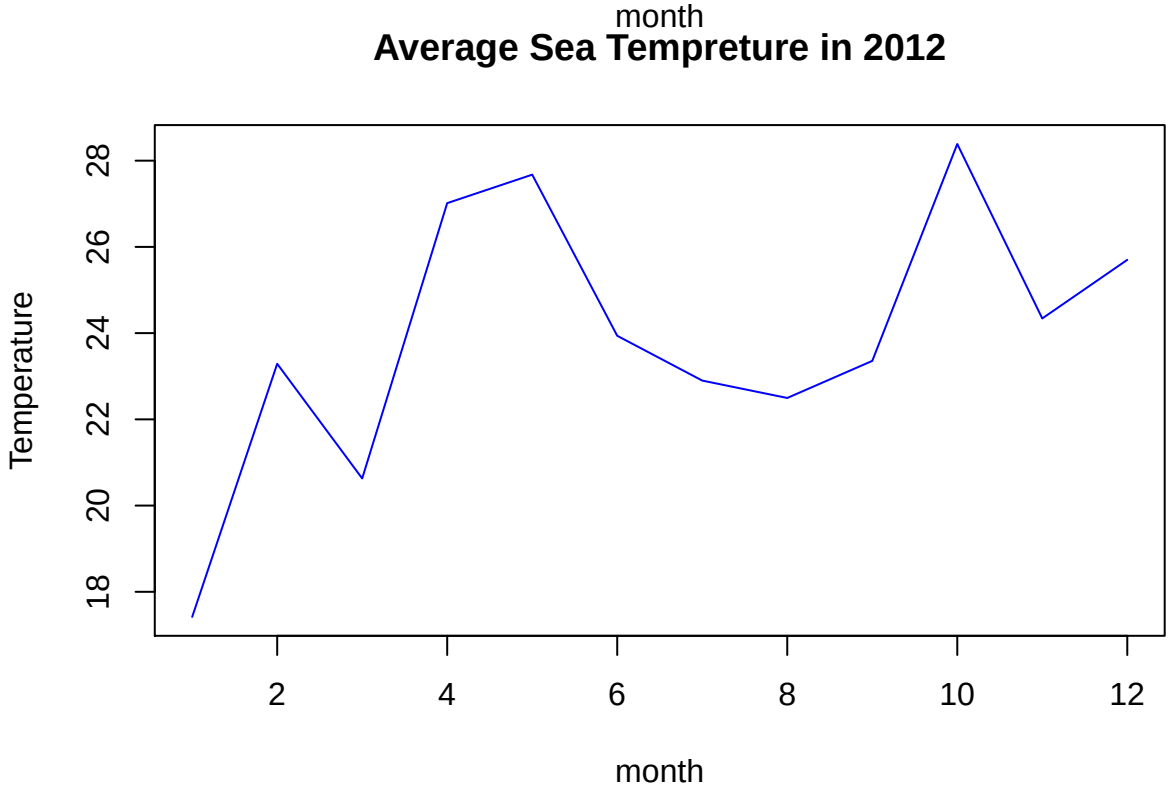

Average Air Tempreture in 2009
Temperature
27.0
27.5
28.0
28.5
29.0
2
4
6
8
10
12
month

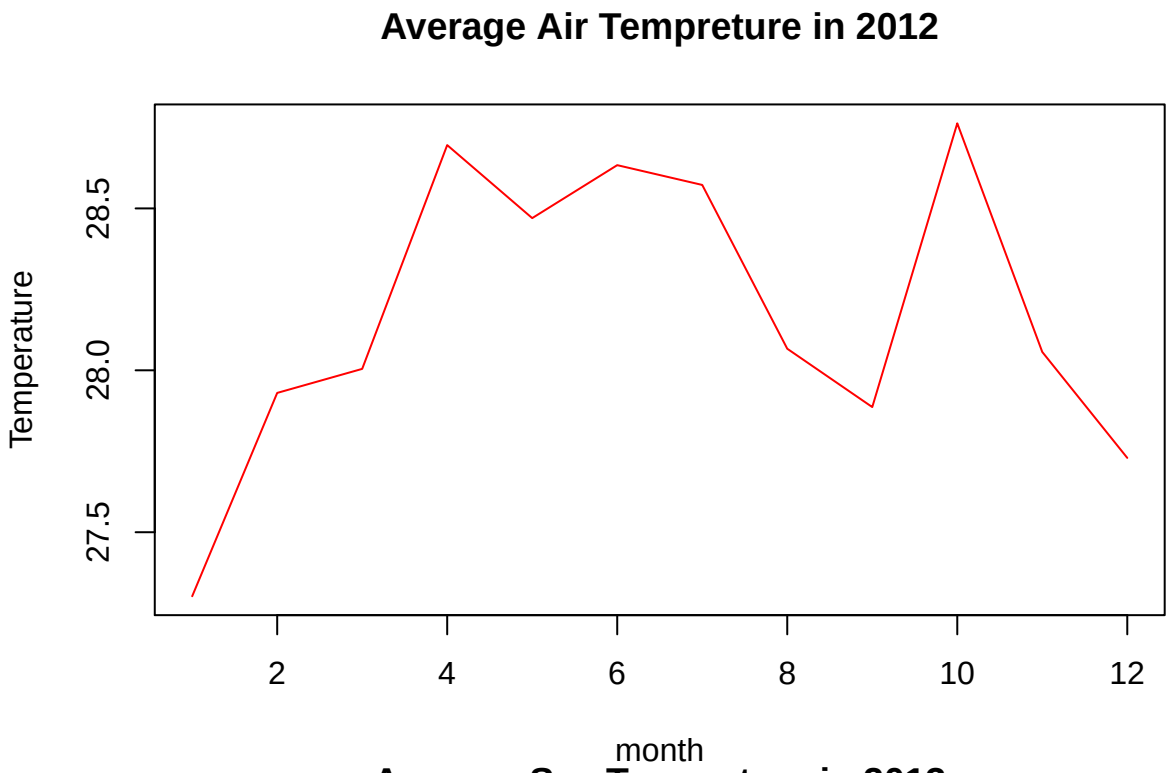

Average Sea Tempreture in 2010
Temperature
22
24
26
28
30
2
4
6
8
10
12
month

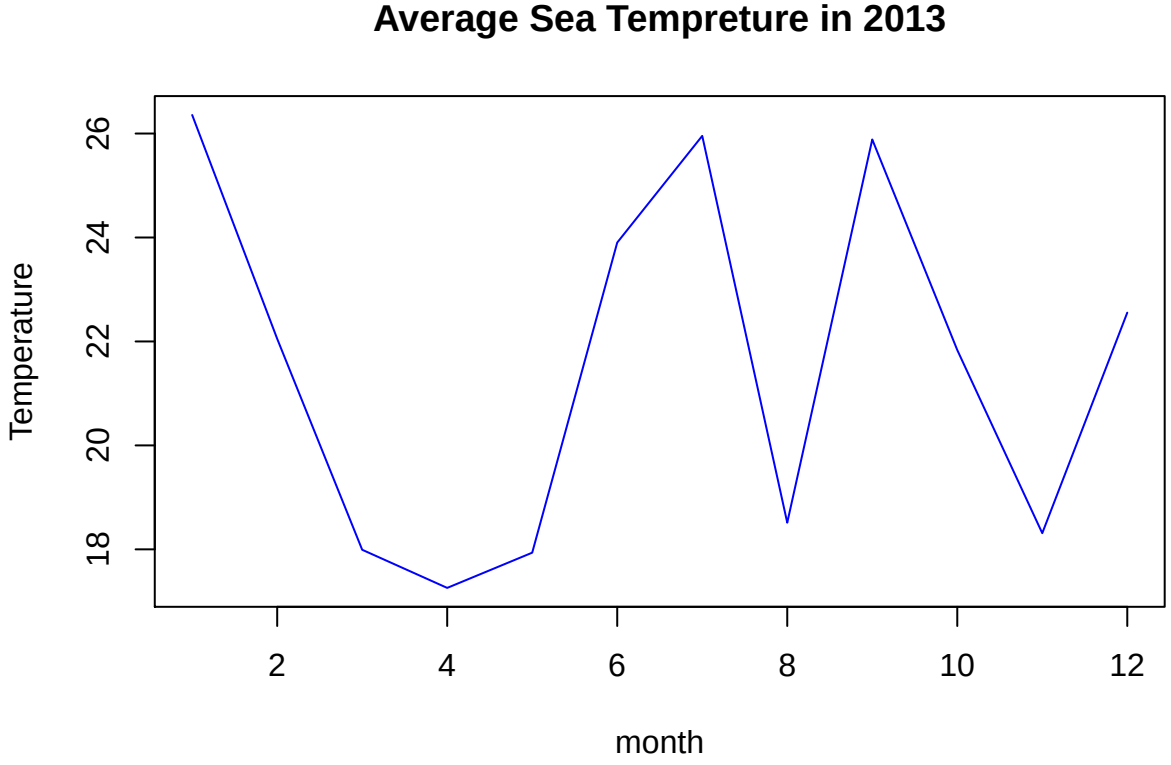

Average Air Tempreture in 2010
Temperature
25
26
27
28
29
30
2
4
6
8
10
12
month

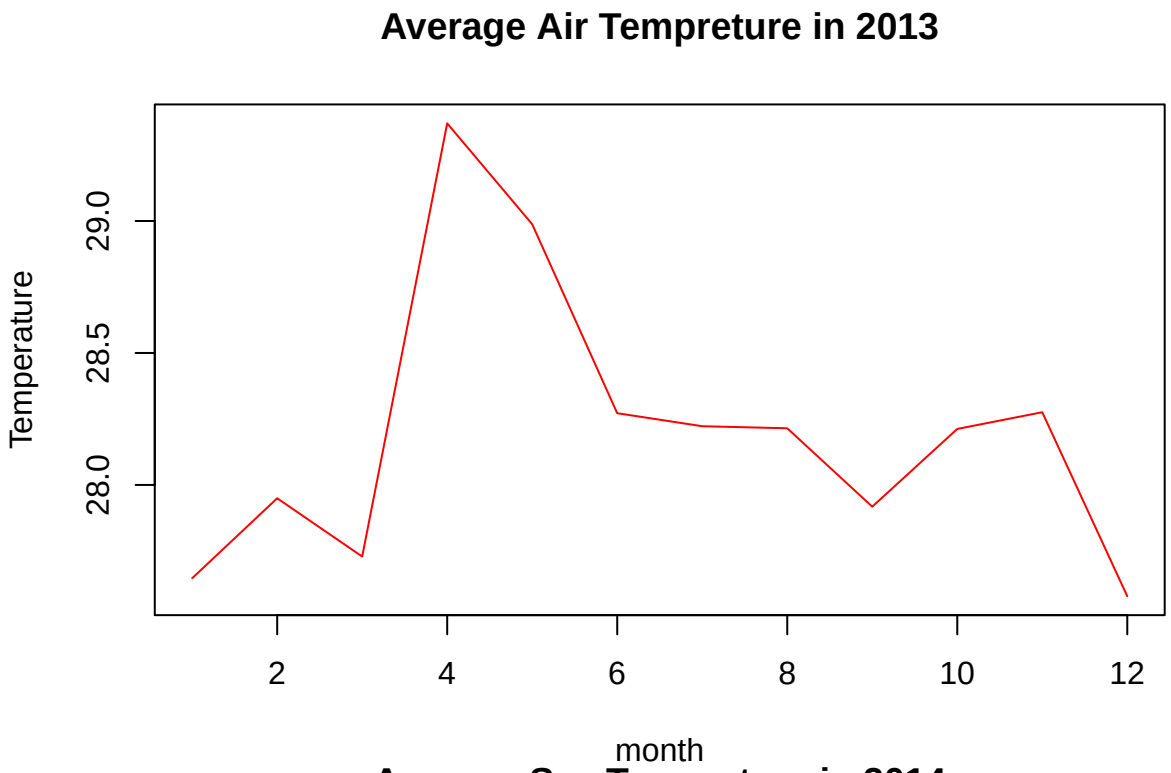

Average Sea Tempreture in 2011
Temperature
16
18
20
22
24
26
2
4
6
8
10
12
month

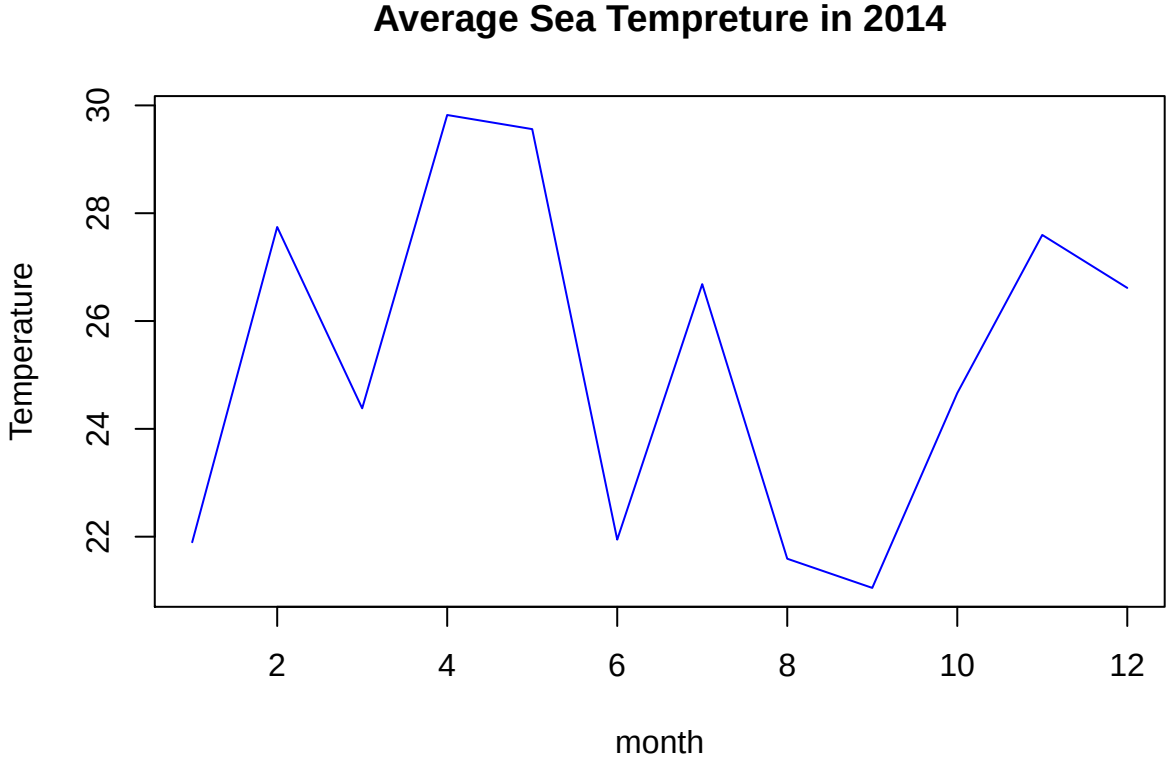

Average Air Tempreture in 2011
Temperature
28.0
28.4
28.8
29.2
2
4
6
8
10
12
month

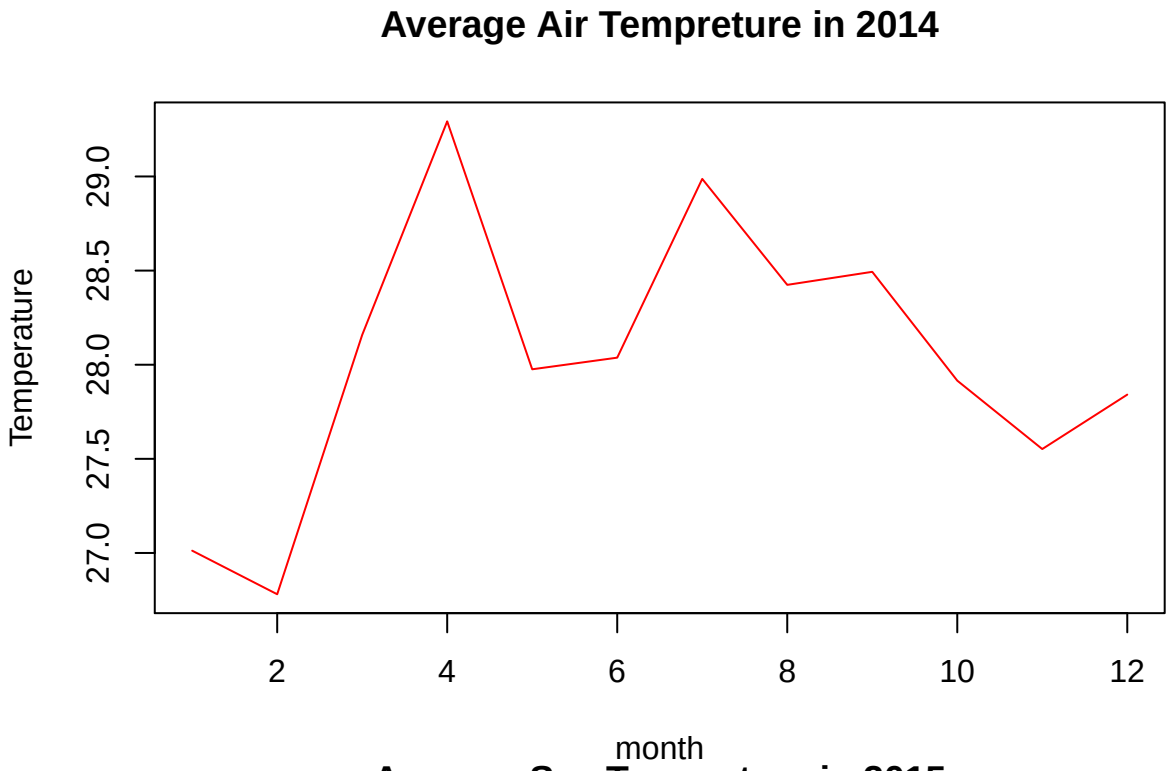

Average Sea Tempreture in 2012
Temperature
18
20
22
24
26
28
2
4
6
8
10
12
month

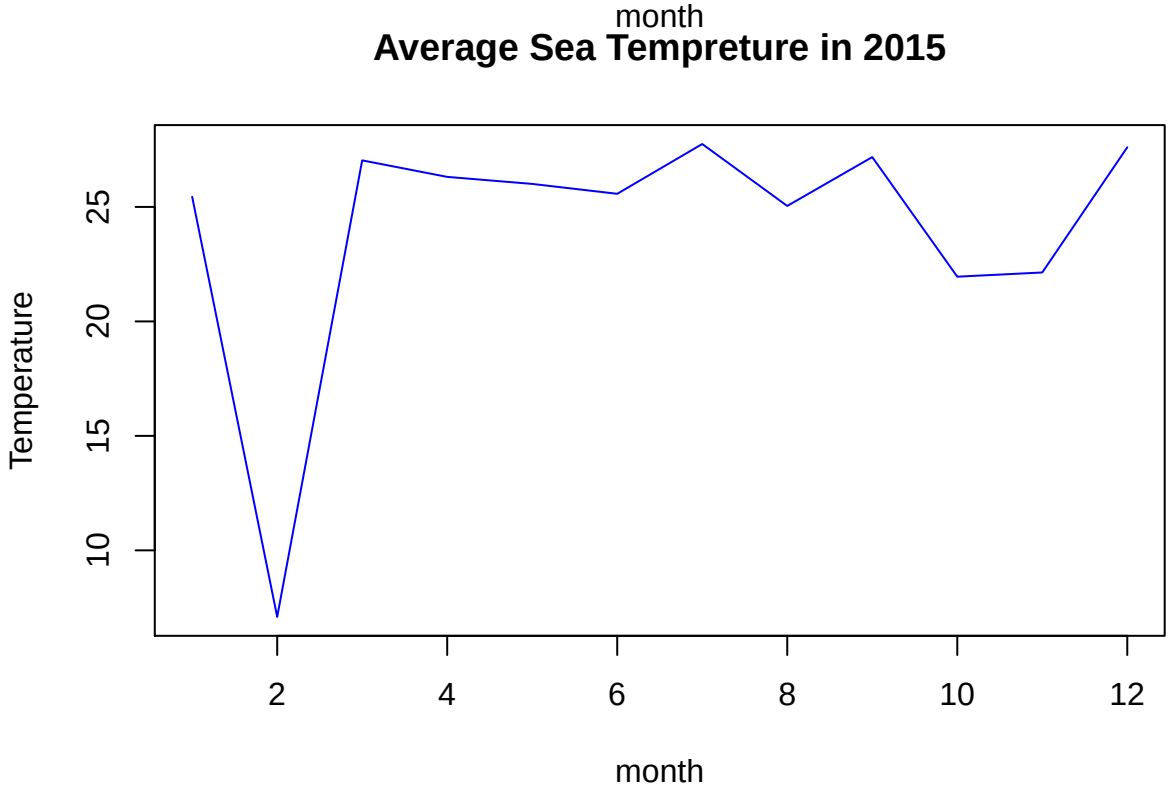

Average Air Tempreture in 2012
Temperature
27.5
28.0
28.5
2
4
6
8
10
12
month

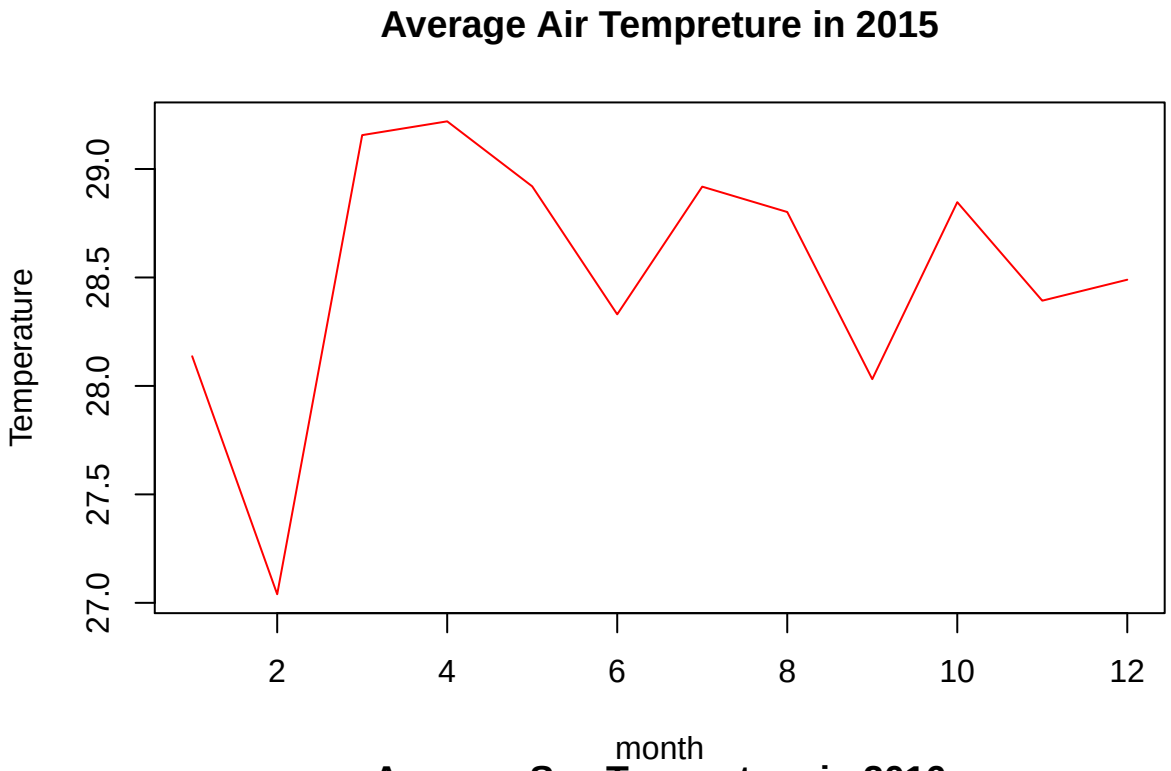

Average Sea Tempreture in 2013
Temperature
18
20
22
24
26
2
4
6
8
10
12
month

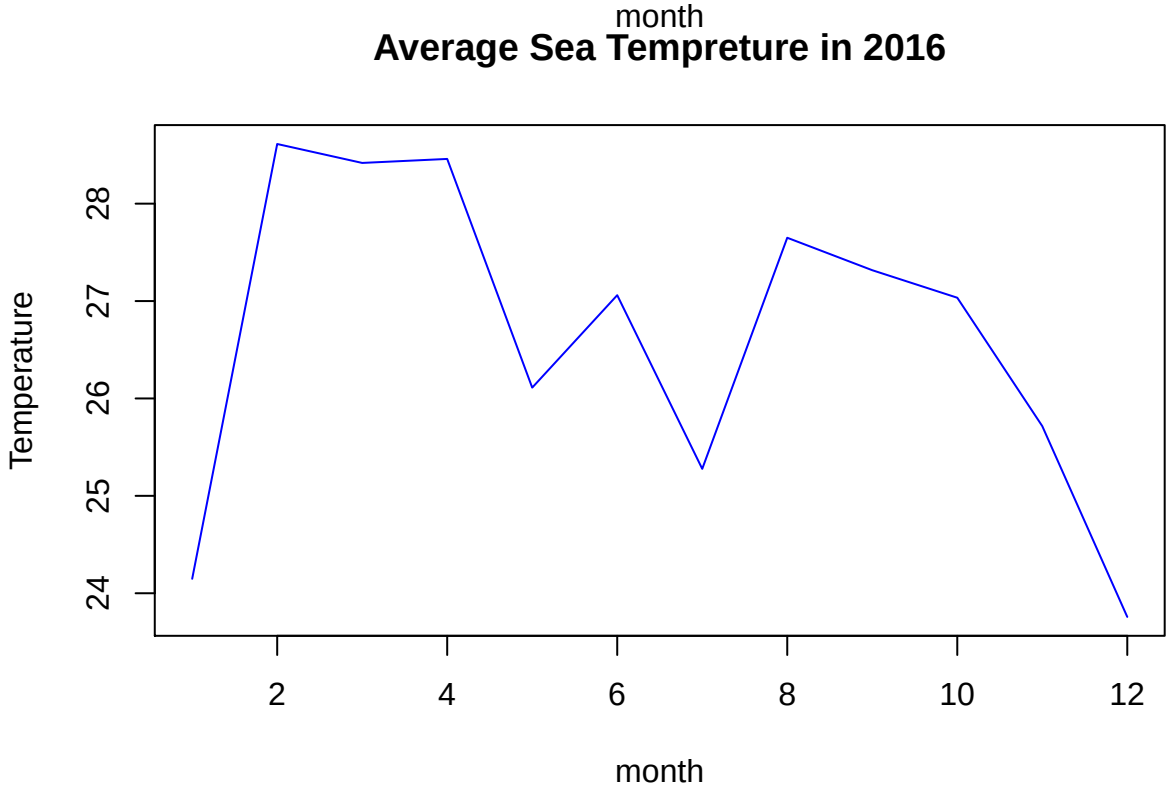

Average Air Tempreture in 2013
Temperature
28.0
28.5
29.0
2
4
6
8
10
12
month

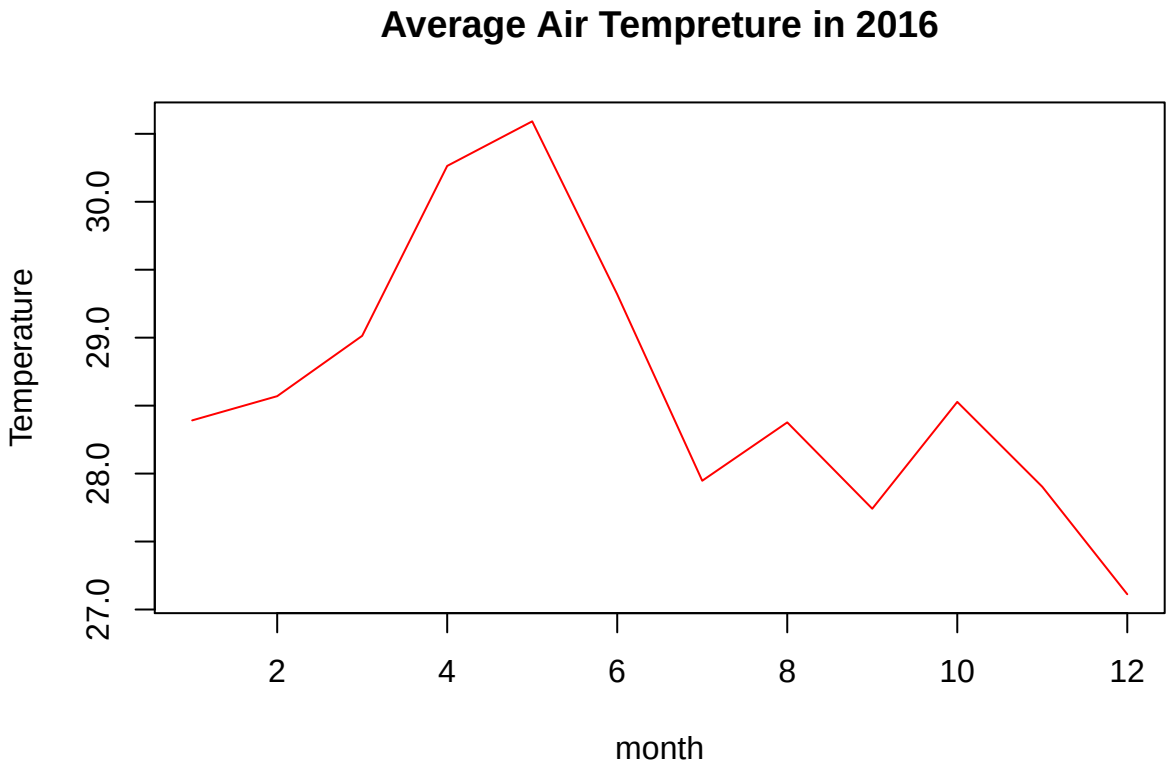

Average Sea Tempreture in 2014
Temperature
22
24
26
28
30
2
4
6
8
10
12
month


Average Air Tempreture in 2014
Temperature
27.0
27.5
28.0
28.5
29.0
2
4
6
8
10
12
month


Average Sea Tempreture in 2015
Temperature
10
15
20
25
2
4
6
8
10
12
month


Average Air Tempreture in 2015
Temperature
27.0
27.5
28.0
28.5
29.0
2
4
6
8
10
12
month


Average Sea Tempreture in 2016
Temperature
24
25
26
27
28
2
4
6
8
10
12
month

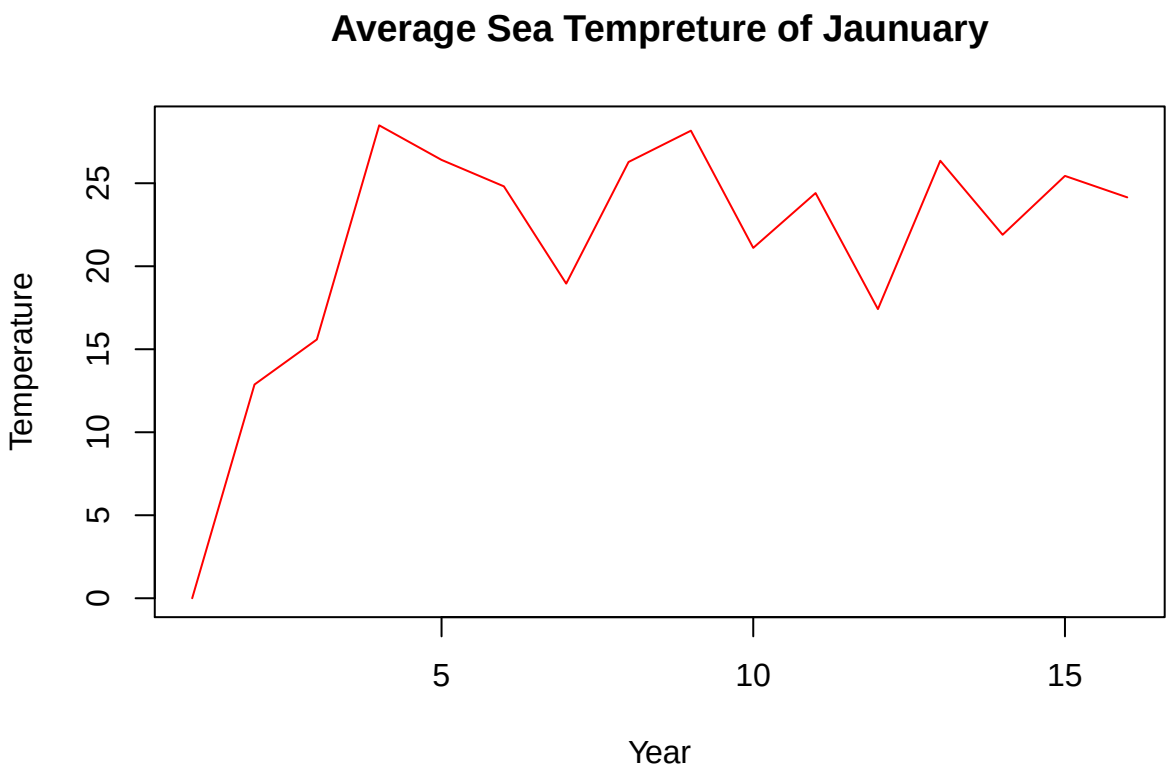



```
colnames(matrix.jan.temp) = c("SEA" , "AIR")
rownames(matrix.jan.temp) =
  c("2001","2002","2003","2004","2005","2006","2007","2008",
    "2009","2010","2011","2012","2013","2014","2015","2016")

colnames(matrix.jul.temp) = c("SEA" , "AIR")
rownames(matrix.jul.temp) =
  c("2001","2002","2003","2004","2005","2006","2007","2008",
    "2009","2010","2011","2012","2013","2014","2015","2016")
```

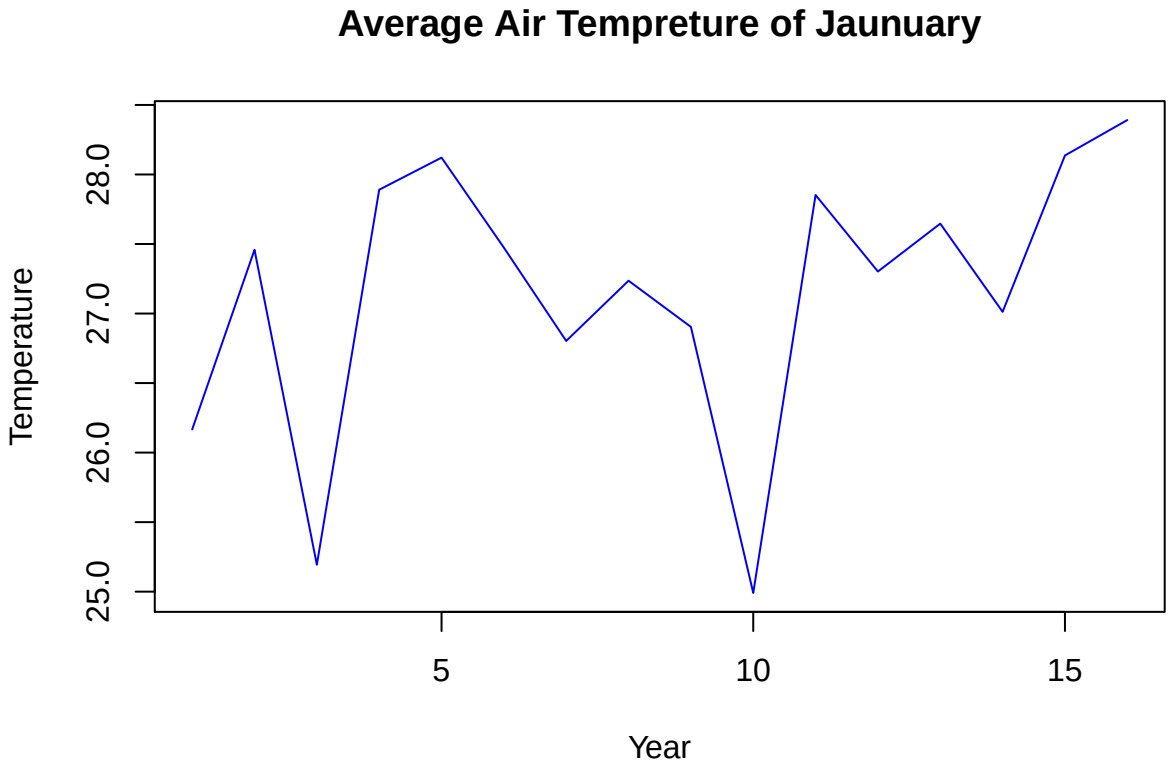
Average Month Plots

In this section, we create separate plots for each year both for the sea temperature and the air temperature. The plots are structured so that average temperature for each month is calculated and each data point on the plot shows the average temperature in each month. The lowest temperatures at sea are usually observed between December and January and for the rest of the months on average we are looking at slightly higher temperature. Since Subcontinental East is close to the equator and the sunshine is overhead the range of the temperatures is pretty condensed and small. Between 2001 and 2016 this range has been around 15 degrees Celsius for the sea temperature. However, for the air temperature we observe that the range is even more limited around 10 degrees all year round. *notice: The sharp points that indicate extremely cold temperatures indicate months that have missing data that the average temperature could not be calculated.

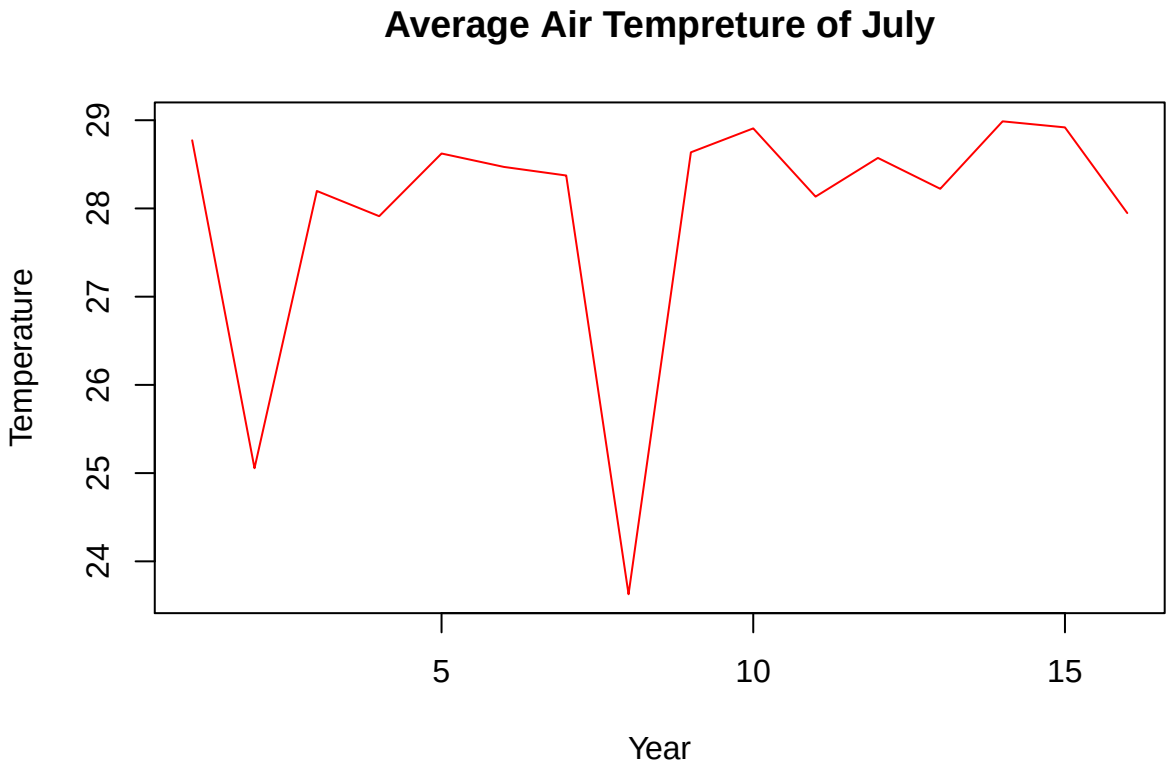
```
# graphing the average tempruturs of JAN AND JUL across 16 years in a gragh.

#lines(matrix.jan.temp[,1])
plot(matrix.jan.temp[,1], type = "l",  main = "Average Sea Tempreture of Jaunuary",
     xlab = "Year", ylab = "Temperature", col = "red")
```



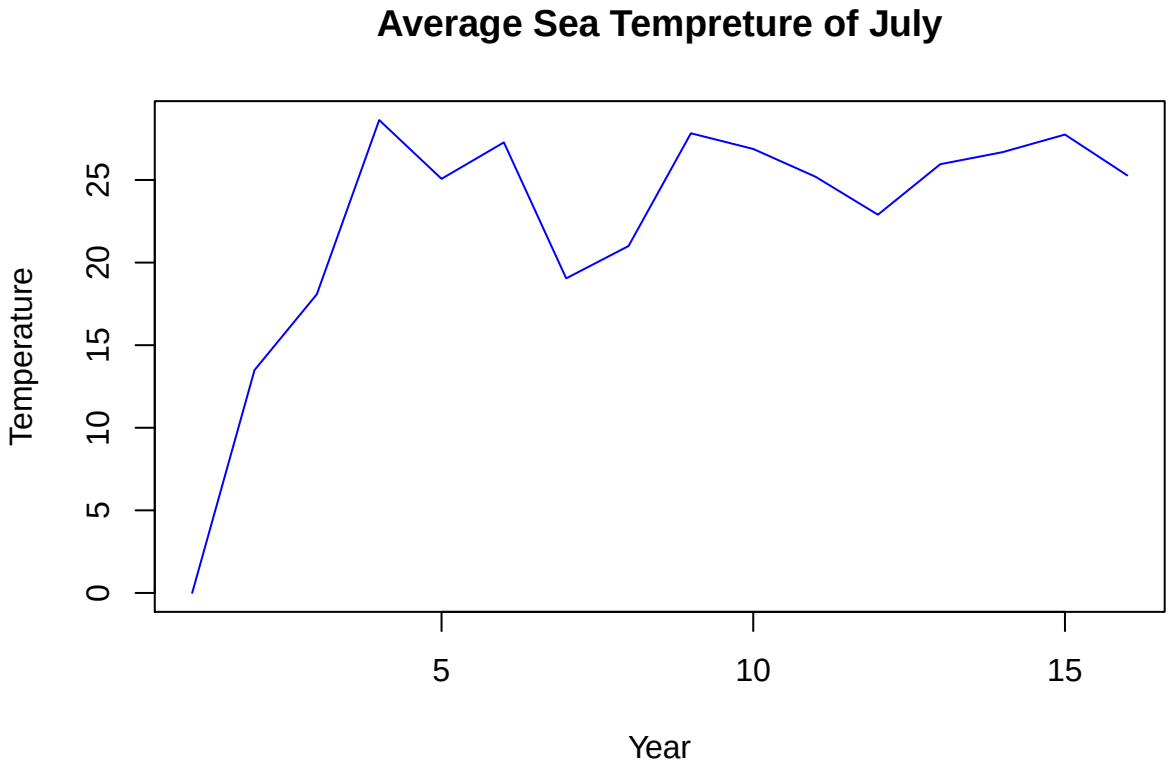

```
plot(matrix.jan.temp[,2], type = "l",  main = "Average Air Tempreture of Jaunuary",
     xlab = "Year", ylab = "Temperature", col = "blue")
```




```
plot(matrix.jul.temp[,2], type = "l",  main = "Average Air Tempreture of July",
     xlab = "Year", ylab = "Temperature", col = "red")
```




```
plot(matrix.jul.temp[,1], type = "l",  main = "Average Sea Tempreture of July",
     xlab = "Year", ylab = "Temperature", col = "blue")
```



For the second set of plots we chose January and July, and got the average temperature for all of the years for these specific months. January and July were chosen so our plots could be better illustrator of the coldest and the warmest months of the year. Again here we observe patterns that show Air temperature has a smaller

range than that of Sea. However, in the plots we don't see any patterned movement that indicates increase or decrease of temperature over these 16 years.