

### EXPLORING RAW TIME SERIES | R

The most common first step when conducting time series analysis is to display your time series dataset in a visually intuitive format.

**print()** - displays the **Start**, **End**, and **Frequency** of your data along with the observations.

**length()** - tells you the total number of observations in your data.

Some datasets are very long, and previewing a subset of data is more suitable than displaying the entire series.

**head(\_\_\_\_, n =\_\_\_\_)** and **tail(\_\_\_\_, n =\_\_\_\_)** - which n is the number of items to display, focus on the first and last few elements of a given dataset respectively.

In this exercise, you'll explore the famous River Nile annual streamflow data, **Nile**. This time series dataset includes some metadata information. When calling **print(Nile)**, note that **Start = 1871** indicates that 1871 is the year of the first annual observation, and **End = 1970** indicates 1970 is the year of the last annual observation.

### INSTRUCTIONS:

- Use the following code to explore the famous River Nile annual streamflow data, Nile, and comment on the results you obtained.

```
###Print the Nile dataset
```

```
print(Nile)
```

```
### List the number of observations in the Nile dataset
```

```
length(Nile)
```

```
### Display the first 10 elements of the Nile dataset
```

```
head(Nile,10)
```

```
### Display the last 12 elements of the Nile dataset
```

```
tail(Nile,12)
```

### BASIC TIME SERIES PLOTS

plot the River Nile annual streamflow data, Nile and comment on the pattern of the graph.

#### INSTRUCTIONS:

# Plot the Nile data with xlab, ylab, main, and type arguments

```
plot(Nile, xlab = "Year", ylab = "River Volume (1e9 m3)", main = "Annual  
River Nile Volume at Aswan, 1871-1970", type = "b")
```

#### Problem 01

##### Air passenger bookings

The number of international passenger bookings (in thousands) per month on an airline (Pan Am) in the United States was obtained from the Federal Aviation Administration for the period 1949–1960 (Brown, 1963). The company used the data to predict future demand before ordering new aircraft and training aircrew.

Plot the AirPassenger bookings and comment on the pattern of the graph.

```
plot(AirPassengers,xlab='Year',ylab = "Passengers (1000's)",  
     main = "International air passenger bookings in the United States,  
     1949–1960.", type = "l")
```

#### Problem 02

##### Annual measurements of the water level

print the dataset of Annual measurements of the water level, in feet, of Lake Huron 1875–1972 (**LakeHuron**).

Generate a graph that shows the dependence of water levels of lake Huron on time. Comment on the pattern of the graph.

#### Problem 03

**UKDriverDeaths** is a time series giving the monthly totals of car drivers in Great Britain killed or seriously injured Jan 1969 to Dec 1984.

Print the dataset and generate a graph that shows the monthly totals of car drivers in Great Britain killed or seriously injured on time. Comment on the pattern of the graph.

#### Problem 04

**WWWusage** is a time series of the number of users connected to the Internet through a server every minute. Print the dataset and generate a plot of Internet users per minute. Comment on the pattern of the graph.

#### Problem 05

**sunspot.year** is about yearly numbers of sunspots from 1700 to 1988 (rounded to one digit). Print the dataset and generate a plot of sunspot numbers on time. Comment on the pattern of the graph.