

# DSC 105 – Practice solutions

## File: 6\_subsetting\_practice.org: 10 questions on the Nile

1. Print the length of the pre-built data set `Nile` using an R function

```
length(Nile)
str(Nile)
```

```
[1] 100
Time-Series [1:100] from 1871 to 1970: 1120 1160 963 1210 1160 1160 813
1230 1370 1140 ...
```

2. Retrieve the second to fifth value of the `Nile` data set

```
Nile[c(2,3,4,5)]
Nile[2:5]
```

```
[1] 1160 963 1210 1160
[1] 1160 963 1210 1160
```

3. Which data science question does the last output answer? Write a full sentence

»What was the flow of the river Nile in the second through fifth year of observations?«

4. Extract the year that corresponds to the last value of `Nile`. Remember that the years are stored in `time(Nile)`.

```
time(Nile)[length(Nile)]
t <- time(Nile)
```

```
[1] 1970
```

5. What was the Nile flow in 1967?

```
Nile[97]
Nile[t==1967]
```

```
[1] 919
[1] 919
```

6. What is the index of the third-to-last element of `Nile`? Use `which` to answer this question.

```
which(Nile == Nile[length(Nile)-3])
```

```
[1] 97
```

7. How many values of `Nile` are larger than the third-to-last value of `Nile`?

```
length(which(Nile > Nile[t==1967]))
Nile > Nile[t==1967]
which(Nile > Nile[t==1967])
```

```
[1] 43
Time Series:
Start = 1871
End = 1970
Frequency = 1
[1] TRUE TRUE TRUE TRUE TRUE TRUE FALSE TRUE TRUE TRUE TRUE
TRUE
[13] TRUE TRUE TRUE TRUE TRUE FALSE TRUE TRUE TRUE TRUE TRUE
```

```

TRUE
[25] TRUE TRUE TRUE TRUE FALSE FALSE FALSE FALSE TRUE FALSE FALSE
FALSE
[37] FALSE TRUE TRUE TRUE FALSE FALSE FALSE FALSE FALSE TRUE TRUE
FALSE
[49] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE TRUE
FALSE
[61] FALSE FALSE FALSE TRUE TRUE FALSE FALSE TRUE FALSE FALSE FALSE
FALSE
[73] FALSE FALSE FALSE TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
TRUE
[85] FALSE TRUE FALSE TRUE TRUE FALSE TRUE FALSE FALSE TRUE FALSE
FALSE
[97] FALSE FALSE FALSE FALSE
[1] 1 2 3 4 5 6 8 9 10 11 12 13 14 15 16 17 19 20 21 22 23 24 25
26 27
[26] 28 33 38 39 40 46 47 59 64 65 68 76 84 86 88 89 91 94

```

8. How much water flowed down the Nile between 1871 and 1970?

```

sum(Nile)
paste("Nile flow 1871-1970:", sum(Nile), "million cubic metres.")

```

```

[1] 91935
[1] "Nile flow 1871-1970: 91935 million cubic metres."

```

9. In which year was the Nile at its lowest level? Use the `min` function for this task.

```

tmin <- t[Nile==min(Nile)]
tmin

```

```

[1] 1913

```

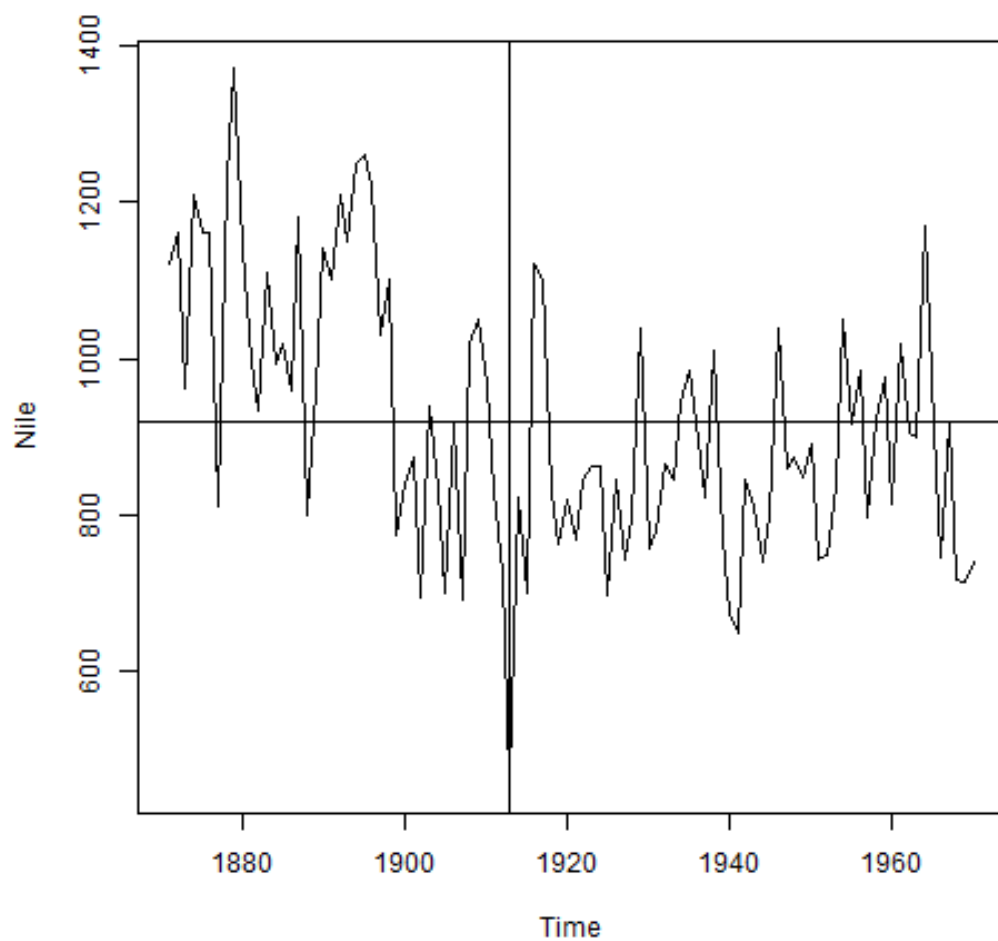
10. Make a line plot of all observations in the data set `Nile` using `plot`, mark the year of the lowest level of the Nile with a vertical line, and the average flow through the Nile with a horizontal line. The result is stored in `nile.png`.

You can draw a vertical line at point `x` with `abline(v=x)`, and a horizontal line at point `y` with `abline(h=y)`.

```

plot(Nile)
abline(v=tmin)
abline(h=mean(Nile))

```



Tip: You can change the appearance of lines with the parameters `col`, `lty`, `lwd`. E.g. `col="red", lty=2, lwd=2` for a red, dashed, thick line.

Customized with color, line, title, and label information:

```
plot(Nile,xlab="",ylab="")
abline(v=tmin, col="red", lty=2, lwd=2)
abline(h=mean(Nile), col="blue", lty=2, lwd=2)
title("Flow through the Nile 1871-1970",
      ylab="Mio cubic metres",
      xlab="Year")
```

