TEB2164 Introduction to Data Science
Lab 2a-Logical and relational operators, string, and string manipulations

Learning Outcomes

At the end of the session, you will be able to:

- Write, run, and explain logical and relational manipulations.
- Write, run, and explain string operations and perform string manipulations

Activity

1. Logical Operations

Operator	Description
!	Logical NOT
&	Logical AND
|	Logical OR

- Write and run the following in R Console. Make your conclusion about the code:

```
a=TRUE
b=FALSE
print(a&b)
print(a&!b)
print(a|b)
print(!a|b)
c=c(TRUE, FALSE)
d=c(FALSE, FALSE)
print(c&&d)
print(c||d)
v <- c(3,1.5,TRUE)
t <- c(4,2.1,FALSE)
print (!v)
print (!t)
print(v&t)
print(v|t)
print(v&&t)
print(v||t)
```

2. Relational Operations

Operator	Description
<	Less than
>	Greater than
<=	Less than or equal to
>=	Greater than or equal to
==	Equal to
!=	Not equal to

- Write and run the following in R Console. Make your conclusion about the code:

```
x=5
y=9
z=2+3
print(x>y)
print(x<y)
```

```
print(x<=z)
print(y>=z)
print(x==z)
print(x!=y)
v <- c(2,5.5,6,9)
t <- c(8,2.5,14,9)
print(v>t)
print(v<t)
print(v<=t)
print(v>=t)
print(v==t)
print(v!=t)
```

3. String Construction
   - Write and run the following in R Console. Make your conclusion about the code:

```
a <- 'Start and end with single quote'
print(a)
b <- "Start and end with double quotes"
print(b)
c <- "single quote ' in between double quotes"
print(c)
d <- 'Double quotes " in between single quote'
print(d)
e <- 'Mixed quotes"
print(e)
f <- 'Single quote ' inside single quote'
print(f)
g <- "Double quotes " inside double quotes"
print(g)
```

4. Escape Characters

Escape sequence	Description
\”	Double quote
\\	Backslash
\n	New line
\r	Carriage return
\t	Tab

   - Write and run the following in R Console. Make your conclusion about the code:

```
str <- "We are the so-called \"Vikings\", from the north."
cat(str)
str <- "We are the so-called \\Vikings\\, from the north."
cat(str)
str <- "We are the \rso-called Vikings\nfrom the north."
cat(str)
str <- "\tWe are the so-called Vikings from the north."
cat(str)
```

5. String Manipulation

5.1. Concatenating Strings

- Write and run the following in R Console. Make your conclusion about the code:

```
a <- "Hello"
b <- 'How'
c <- "are you? "
print(paste(a,b,c))
print(paste(a,b,c, sep = "-"))
print(paste(a,b,c, sep = "", collapse = ""))
```

5.2. Formatting numbers & strings

- Write and run the following in R Console. Make your conclusion about the code:

```
# Total number of digits displayed. Last digit rounded off.
result <- format(23.123456789, digits = 9)
print(result)
# Display numbers in scientific notation.
result <- format(c(6, 13.14521), scientific = TRUE)
print(result)
# The minimum number of digits to the right of the decimal point.
result <- format(23.47, nsmall = 5)
print(result)
# Format treats everything as a string.
result <- format(6)
print(result)
# Numbers are padded with blank in the beginning for width.
result <- format(13.7, width = 6)
print(result)
# Left justify strings.
result <- format("Hello", width = 8, justify = "l")
print(result)
# Justify string with center.
result <- format("Hello", width = 8, justify = "c")
print(result)
```

5.3. Counting number of characters in a string

- Write and run the following in R Console. Make your conclusion about the code:

```
str<-("Count the number of characters")
result <- nchar(str)
print(result)
# Installing and importing package (only done once)
install.packages(“stringr”)
library(stringr)
# Calculating length of string
str_length(str)
```

5.4. Changing the case

- Write and run the following in R Console. Make your conclusion about the code:

```
result <- toupper("Changing To Upper")
print(result)
```

```
result <- tolower("Changing To Lower")
print(result)
```

5.5. Extracting parts of a string

- Write and run the following in R Console. Make your conclusion about the code:

```
# Extract characters from 5th to 7th position.
result <- substring("Extract", 5, 7)
print(result)
# Extract characters in 1st position.
result <- substr("Learn Code Tech", 1, 1)
print(result)
```