

# Day 4 Cheatsheet

## Data Summarization

### Functions

| Library/Package | Piece of code            | Example of usage                     | What it does  |
|-----------------|--------------------------|--------------------------------------|---|
| Base R          | <code>min(x)</code>      | <code>min(x)</code>                  | Returns the minimum value of all values in an object <code>x</code> .   |
| Base R          | <code>sum(x)</code>      | <code>sum(x)</code>                  | Returns the sum of all values (values must be integer, numeric, or logical) in object <code>x</code> .  |
| Base R          | <code>mean(x)</code>     | <code>mean(x)</code>                 | Returns the arithmetic mean of all values (values must be integer or numeric) in object <code>x</code> or logical vector <code>x</code> .   |
| Base R          | <code>log(x)</code>      | <code>log(x)</code>                  | Gives the natural logarithm of object <code>x</code> . <code>log2(x)</code> can be used to give the logarithm of the object in base 2. Or the base can be specified as an argument. |
| Base R          | <code>range(x)</code>    | <code>range(x)</code>                | Gives the min and max for object <code>x</code> .   |
| Base R          | <code>sd(x)</code>       | <code>sd(x)</code>                   | Gives the standard deviation for object <code>x</code> .  |
| Base R          | <code>sqrt(x)</code>     | <code>sqrt(x)</code>                 | Gives the square root for object <code>x</code> .   |
| Base R          | <code>quantile(x)</code> | <code>quantile(x, probs = .5)</code> | Produces sample quantiles corresponding to the given probabilities <code>x</code> .   |
| Base R          | <code>summary(x)</code>  | <code>summary(x)</code>              | Returns a summary of the values in object <code>x</code> .  |
| Base R          | <code>rowSums()</code>   | <code>rowSums(df)</code>             | Calculates sums for each row  |
| Base R          | <code>colSums()</code>   | <code>colSums(df)</code>             | Calculates sums for each column   |
| Base R          | <code>rowMeans()</code>  | <code>rowMeans(df)</code>            | Calculates means for each row   |
| Base R          | <code>colMeans()</code>  | <code>colMeans(df)</code>            | Calculates means for each column  |

| Library/Package | Piece of code            | Example of usage  | What it does   |
|-----------------|--------------------------|---|--|
| dplyr           | <code>summarize()</code> | <pre>df &lt;- df %&gt;% summarize(mean_x = mean(x))</pre>               | Summarizes multiple values in an object into a single value. This function can be used with other functions to retrieve a single output value for the grouped values. <code>summarize</code> and <code>summarise</code> are synonyms in this package. However, note that this function does not work in the same manner as the base R <code>summary</code> function. |
| dplyr           | <code>across()</code>    | <pre>df %&gt;% summarize(across( c('col_a', 'col_b'), ~ sum(.x)))</pre> | Use the across function with summarize to summarize across multiple columns of your data.  |
| Base R          | <code>unique()</code>    | <code>unique(df)</code>   | Returns a vector, data frame or array like x but with duplicate elements/rows removed.   |
| Base R          | <code>table()</code>     | <code>table(x)</code>   | Builds a contingency table of the counts at each combination of factor levels.   |
| dplyr           | <code>count()</code>     | <pre>df %&gt;% count(factor_name)</pre>                                 | Count the number of groups in a factor variable of a data frame or tibble  |
| dplyr           | <code>group_by()</code>  | <pre>df %&gt;% count(factor_name)</pre>                                 | Groups data into rows that contain the same specified value(s)   |
| dplyr           | <code>ungroup()</code>   | <pre>df %&gt;% count(factor_name)</pre>                                 | Undo a grouping that was done by <code>dplyr::group_by()</code>  |
| Base R          | <code>plot()</code>      | <code>plot(x, y)</code>   | Creates a scatterplot of x and y vector data   |
| Base R          | <code>boxplot()</code>   | <code>boxplot(x, y)</code>  | Creates a boxplot of y against levels of x   |
| Base R          | <code>hist()</code>      | <code>hist(x)</code>  | Creates a histogram of x   |
| Base R          | <code>density()</code>   | <code>plot(density(x))</code>   | Creates a kernel density plot of x when used with <code>plot()</code>  |

## Data Classes

### Major concepts

- **Character** - strings or individual characters, quoted
- **Numeric** - any real number(s)
- **Double** - a special subset of numeric that contains fractional values.
- **Integer** - any integer(s)/whole numbers
- **Factor** - categorical/qualitative variables
- **Logical** - variables composed of TRUE or FALSE
- **Date/POSIXct** - represents calendar dates and times
- **matrix** - Two-dimensional class of data where all rows and columns consist of the same data type.
- **data frame** - Two-dimensional class of data where all columns can be of different data types.
- **list** - Can be of varying dimensions and can hold any kind of data type. Can hold vectors, strings, matrices, models, list of other lists.

### Functions

| Library/Package | Piece of code  | Example of usage                             | What it does  |
|-----------------|--|--|---|
| Base R          | <code>factor(x)</code> or<br><code>as.factor(x)</code> | Factor                                       | Coerces object <code>x</code> into a factor (which is used to represent categorical data). This function can be used to coerce object <code>x</code> into other data types, i.e., <code>as.character</code> , <code>as.numeric</code> , <code>as.data.frame</code> , <code>as.matrix</code> , <code>as.Date</code> etc. |
| Base R          | <code>levels(x)</code>                                 | <code>levels(factor_obj)</code>              | Returns or sets the value of the levels in an object <code>x</code> .   |
| Base R          | <code>rep()</code>                                     | <code>rep(1:3)</code>                        | Replicates the values in <code>x</code> to make a vector.   |
| Base R          | <code>seq()</code>                                     | <code>seq(from = 0, to = 1, by = 0.2)</code> | Creates a vector of a sequence of numbers based on the specified arguments.   |

- `lubridate` is a powerful, widely used R package from “tidyverse” family to work with Date / POSIXct class objects

\* This format was adapted from the cheatsheet format from AlexsLemonade.