M11 Exercises

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M11 Exercises - Hilde Younce

Exercise 11.1

```
library(tidyverse)
```

```
## ── Attaching core tidyverse packages ──────────────────────── tidyverse 2.0.0 ──
## ✔ dplyr     1.1.4     ✔ readr     2.1.5
## ✔ forcats   1.0.0     ✔ stringr   1.5.1
## ✔ ggplot2   3.5.1     ✔ tibble    3.2.1
## ✔ lubridate 1.9.3     ✔ tidyr     1.3.1
## ✔ purrr     1.0.2
## ── Conflicts ────────────────────────────────────────── tidyverse_conflicts() ──
## ✖ dplyr::filter() masks stats::filter()
## ✖ dplyr::lag()    masks stats::lag()
## ℹ Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts
to become errors
```

Exercise 11.2:

```
scores <-
  tibble(
    name = c("mike", "carol", "greg", "marcia", "peter", "jan", "bobby", "cindy", "alic
e"),
    school = c("south", "south", "south", "south", "north", "north", "north", "south",
"south"),
    teacher = c("johnson", "johnson", "johnson", "johnson",  "smith", "smith", "smith",
"perry", "perry"),
    sex = c("male", "female", "male", "female", "male", "female", "male", "female", "fem
ale"),
    math_score = c(4, 3, 2, 4, 3, 4, 5, 4, 5),
    reading_score = c(1, 5, 2, 4, 5, 4, 1, 5, 4)
)
```

Exercise 11.3:

```
scores
```

name	school	teacher	sex	math_score	reading_score
<chr>	<chr>	<chr>	<chr>	<dbl>	<dbl>
mike	south	johnson	male	4	1
carol	south	johnson	female	3	5
greg	south	johnson	male	2	2
marcia	south	johnson	female	4	4
peter	north	smith	male	3	5
jan	north	smith	female	4	4
bobby	north	smith	male	5	1
cindy	south	perry	female	4	5
alice	south	perry	female	5	4

9 rows

Exercise 11.4:

```
scores %>%
  slice(1:3)
```

name	school	teacher	sex	math_score	reading_score
<chr>	<chr>	<chr>	<chr>	<dbl>	<dbl>
mike	south	johnson	male	4	1
carol	south	johnson	female	3	5
greg	south	johnson	male	2	2

3 rows

```
first_three <- scores %>%
  slice(1:3)
first_three
```

name	school	teacher	sex	math_score	reading_score
<chr>	<chr>	<chr>	<chr>	<dbl>	<dbl>
mike	south	johnson	male	4	1
carol	south	johnson	female	3	5
greg	south	johnson	male	2	2

3 rows

Exercise 11.5:

```
scores %>%
  arrange(desc(math_score))
```

name <chr>	school <chr>	teacher <chr>	sex <chr>	math_score <dbl>	reading_score <dbl>
bobby	north	smith	male	5	1
alice	south	perry	female	5	4
mike	south	johnson	male	4	1
marcia	south	johnson	female	4	4
jan	north	smith	female	4	4
cindy	south	perry	female	4	5
carol	south	johnson	female	3	5
peter	north	smith	male	3	5
greg	south	johnson	male	2	2

9 rows

Exercise 11.6:

```
scores %>%
  arrange(name)
```

name <chr>	school <chr>	teacher <chr>	sex <chr>	math_score <dbl>	reading_score <dbl>
alice	south	perry	female	5	4
bobby	north	smith	male	5	1
carol	south	johnson	female	3	5
cindy	south	perry	female	4	5
greg	south	johnson	male	2	2
jan	north	smith	female	4	4
marcia	south	johnson	female	4	4
mike	south	johnson	male	4	1
peter	north	smith	male	3	5

9 rows

Exercise 11.7:

```
scores %>%
  arrange(sex)
```

name <chr>	school <chr>	teacher <chr>	sex <chr>	math_score <dbl>	reading_score <dbl>
carol	south	johnson	female	3	5
marcia	south	johnson	female	4	4
jan	north	smith	female	4	4
cindy	south	perry	female	4	5
alice	south	perry	female	5	4
mike	south	johnson	male	4	1
greg	south	johnson	male	2	2
peter	north	smith	male	3	5
bobby	north	smith	male	5	1

9 rows

Exercise 11.8:

```
scores %>%
  arrange(school, teacher, sex, math_score, reading_score)
```

name <chr>	school <chr>	teacher <chr>	sex <chr>	math_score <dbl>	reading_score <dbl>
jan	north	smith	female	4	4
peter	north	smith	male	3	5
bobby	north	smith	male	5	1
carol	south	johnson	female	3	5
marcia	south	johnson	female	4	4
greg	south	johnson	male	2	2
mike	south	johnson	male	4	1
cindy	south	perry	female	4	5
alice	south	perry	female	5	4

9 rows

Exercise 11.9:

```
scores %>%
  select(name, math_score, reading_score)
```

name <chr>	math_score <dbl>	reading_score <dbl>
mike	4	1
carol	3	5
greg	2	2
marcia	4	4
peter	3	5
jan	4	4
bobby	5	1
cindy	4	5
alice	5	4

9 rows

Exercise 11.10:

```
scores %>%
  select(-sex)
```

name <chr>	school <chr>	teacher <chr>	math_score <dbl>	reading_score <dbl>
mike	south	johnson	4	1
carol	south	johnson	3	5
greg	south	johnson	2	2
marcia	south	johnson	4	4
peter	north	smith	3	5
jan	north	smith	4	4
bobby	north	smith	5	1
cindy	south	perry	4	5
alice	south	perry	5	4

9 rows

Exercise 11.11:

```
scores %>%
  select(-math_score, -reading_score)
```

name <chr>	school <chr>	teacher <chr>	sex <chr>
mike	south	johnson	male
carol	south	johnson	female
greg	south	johnson	male
marcia	south	johnson	female
peter	north	smith	male
jan	north	smith	female
bobby	north	smith	male
cindy	south	perry	female
alice	south	perry	female

9 rows

Exercise 11.12:

```
scores %>%
  select(sex, everything())
```

sex <chr>	name <chr>	school <chr>	teacher <chr>	math_score <dbl>	reading_score <dbl>
male	mike	south	johnson	4	1
female	carol	south	johnson	3	5
male	greg	south	johnson	2	2
female	marcia	south	johnson	4	4
male	peter	north	smith	3	5
female	jan	north	smith	4	4
male	bobby	north	smith	5	1
female	cindy	south	perry	4	5
female	alice	south	perry	5	4

9 rows

Exercise 11.13:

```
scores %>%
  filter(sex == "male" & school=="south")
```

name	school	teacher	sex	math_score	reading_score
<chr>	<chr>	<chr>	<chr>	<dbl>	<dbl>
mike	south	johnson	male	4	1
greg	south	johnson	male	2	2

2 rows

Exercise 11.14:

```
scores %>%
  filter(math_score > mean(math_score))
```

name	school	teacher	sex	math_score	reading_score
<chr>	<chr>	<chr>	<chr>	<dbl>	<dbl>
mike	south	johnson	male	4	1
marcia	south	johnson	female	4	4
jan	north	smith	female	4	4
bobby	north	smith	male	5	1
cindy	south	perry	female	4	5
alice	south	perry	female	5	4

6 rows

Exercise 11.15:

```
scores %>%
  filter(math_score >= 4 & reading_score >= 3)
```

name	school	teacher	sex	math_score	reading_score
<chr>	<chr>	<chr>	<chr>	<dbl>	<dbl>
marcia	south	johnson	female	4	4
jan	north	smith	female	4	4
cindy	south	perry	female	4	5
alice	south	perry	female	5	4

4 rows

Exercise 11.16:

```
scores %>%
  filter(math_score <= 3 | reading_score <= 3)
```

name	school	teacher	sex	math_score	reading_score
<chr>	<chr>	<chr>	<chr>	<dbl>	<dbl>
mike	south	johnson	male	4	1
carol	south	johnson	female	3	5
greg	south	johnson	male	2	2
peter	north	smith	male	3	5
bobby	north	smith	male	5	1

5 rows

Exercise 11.17:

```
scores %>%
  filter(reading_score %in% 2:4)
```

name	school	teacher	sex	math_score	reading_score
<chr>	<chr>	<chr>	<chr>	<dbl>	<dbl>
greg	south	johnson	male	2	2
marcia	south	johnson	female	4	4
jan	north	smith	female	4	4
alice	south	perry	female	5	4

4 rows

Exercise 11.19:

```
scores %>%
  group_by(teacher) %>%
  filter(max(math_score) == 5)
```

name	school	teacher	sex	math_score	reading_score
<chr>	<chr>	<chr>	<chr>	<dbl>	<dbl>
peter	north	smith	male	3	5

name	school	teacher	sex	math_score	reading_score
<chr>	<chr>	<chr>	<chr>	<dbl>	<dbl>
jan	north	smith	female	4	4
bobby	north	smith	male	5	1
cindy	south	perry	female	4	5
alice	south	perry	female	5	4

5 rows

Exercise 11.20:

```
scores %>%
  group_by(sex) %>%
  filter(mean(math_score) == 4)
```

name	school	teacher	sex	math_score	reading_score
<chr>	<chr>	<chr>	<chr>	<dbl>	<dbl>
carol	south	johnson	female	3	5
marcia	south	johnson	female	4	4
jan	north	smith	female	4	4
cindy	south	perry	female	4	5
alice	south	perry	female	5	4

5 rows

Exercise 11.21:

```
scores %>%
  mutate(math_score = math_score * 10, reading_score = reading_score * 10)
```

name	school	teacher	sex	math_score	reading_score
<chr>	<chr>	<chr>	<chr>	<dbl>	<dbl>
mike	south	johnson	male	40	10
carol	south	johnson	female	30	50
greg	south	johnson	male	20	20
marcia	south	johnson	female	40	40
peter	north	smith	male	30	50
jan	north	smith	female	40	40

name	school	teacher	sex	math_score	reading_score
<chr>	<chr>	<chr>	<chr>	<dbl>	<dbl>
bobby	north	smith	male	50	10
cindy	south	perry	female	40	50
alice	south	perry	female	50	40

9 rows

Exercise 11.22:

```
scores %>%
  mutate(math_reading_avg = (math_score + reading_score) / 2)
```

name	school	teacher	sex	math_score	reading_score	math_reading_avg
<chr>	<chr>	<chr>	<chr>	<dbl>	<dbl>	<dbl>
mike	south	johnson	male	4	1	2.5
carol	south	johnson	female	3	5	4.0
greg	south	johnson	male	2	2	2.0
marcia	south	johnson	female	4	4	4.0
peter	north	smith	male	3	5	4.0
jan	north	smith	female	4	4	4.0
bobby	north	smith	male	5	1	3.0
cindy	south	perry	female	4	5	4.5
alice	south	perry	female	5	4	4.5

9 rows

Exercise 11.26:

```
scores %>%
  group_by(sex) %>%
  mutate(math_score_centered_by_sex = mean(math_score) - math_score) %>%
  arrange(desc(math_score_centered_by_sex))
```

name	school	teacher	sex	math_score	reading_score	math_score_centered_by_sex
<chr>	<chr>	<chr>	<chr>	<dbl>	<dbl>	<dbl>
greg	south	johnson	male	2	2	1.5
carol	south	johnson	female	3	5	1.0

name <chr>	school <chr>	teacher <chr>	sex <chr>	math_score <dbl>	reading_score <dbl>	math_score_centered_by_sex <dbl>
peter	north	smith	male	3	5	0.5
marcia	south	johnson	female	4	4	0.0
jan	north	smith	female	4	4	0.0
cindy	south	perry	female	4	5	0.0
mike	south	johnson	male	4	1	-0.5
alice	south	perry	female	5	4	-1.0
bobby	north	smith	male	5	1	-1.5

9 rows

Exercise 11.27:

```
scores %>%
  group_by(teacher)
```

name <chr>	school <chr>	teacher <chr>	sex <chr>	math_score <dbl>	reading_score <dbl>
mike	south	johnson	male	4	1
carol	south	johnson	female	3	5
greg	south	johnson	male	2	2
marcia	south	johnson	female	4	4
peter	north	smith	male	3	5
jan	north	smith	female	4	4
bobby	north	smith	male	5	1
cindy	south	perry	female	4	5
alice	south	perry	female	5	4

9 rows