Week-4: Code-along

Ng Chee Ting

2023-09-04

II. Code to edit and execute using the Code-along.Rmd file

A. Data Wrangling

1. Loading packages (Slide #16)

```r
# Load package tidyverse
library(tidyverse)
```

```
## Warning: package 'tidyverse' was built under R version 4.2.3
```

```
## Warning: package 'ggplot2' was built under R version 4.2.3
```

```
## Warning: package 'tibble' was built under R version 4.2.3
```

```
## Warning: package 'tidyr' was built under R version 4.2.3
```

```
## Warning: package 'readr' was built under R version 4.2.3
```

```
## Warning: package 'purrr' was built under R version 4.2.2
```

```
## Warning: package 'dplyr' was built under R version 4.2.3
```

```
## Warning: package 'stringr' was built under R version 4.2.2
```

```
## Warning: package 'forcats' was built under R version 4.2.3
```

```
## Warning: package 'lubridate' was built under R version 4.2.3
## ── Attaching core tidyverse packages ──────────────────────── tidyverse 2.0.0 ──
## ✔ dplyr     1.1.2     ✔ readr     2.1.4
## ✔ forcats   1.0.0     ✔ stringr   1.5.0
## ✔ ggplot2   3.4.3     ✔ tibble    3.2.1
## ✔ lubridate 1.9.2     ✔ tidyr     1.3.0
## ✔ purrr     1.0.1
## ── 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 be
come errors
```

2. Loading data-set (Slide #16)

```
# Read data from the hotels.csv file and assign it to a variable named, "hotels"
hotels<-read_csv("hotels.csv")
```

```
## Rows: 119390 Columns: 32
## ── Column specification ────────────────────────────────────────────────────────
## Delimiter: ","
## chr  (13): hotel, arrival_date_month, meal, country, market_segment, distrib...
## dbl  (18): is_canceled, lead_time, arrival_date_year, arrival_date_week_numb...
## date  (1): reservation_status_date
##
## ℹ Use `spec()` to retrieve the full column specification for this data.
## ℹ Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

3. List names of the variables in the data-set (Slide #19)

```
# Enter code here
names(hotels)
```

```
##  [1] "hotel"                          "is_canceled"
##  [3] "lead_time"                      "arrival_date_year"
##  [5] "arrival_date_month"             "arrival_date_week_number"
##  [7] "arrival_date_day_of_month"      "stays_in_weekend_nights"
##  [9] "stays_in_week_nights"           "adults"
## [11] "children"                       "babies"
## [13] "meal"                           "country"
## [15] "market_segment"                 "distribution_channel"
## [17] "is_repeated_guest"              "previous_cancellations"
## [19] "previous_bookings_not_canceled" "reserved_room_type"
## [21] "assigned_room_type"             "booking_changes"
## [23] "deposit_type"                   "agent"
## [25] "company"                        "days_in_waiting_list"
## [27] "customer_type"                  "adr"
## [29] "required_car_parking_spaces"    "total_of_special_requests"
## [31] "reservation_status"             "reservation_status_date"
```

4. Glimpse of contents of the data-set (Slide #20)

```
# Enter code here
glimpse(hotels)
```

```
## Rows: 119,390
## Columns: 32
## $ hotel                          <chr> "Resort Hotel", "Resort Hotel", "Resort…
## $ is_canceled                    <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 0, 0, …
## $ lead_time                      <dbl> 342, 737, 7, 13, 14, 14, 0, 9, 85, 75, …
## $ arrival_date_year              <dbl> 2015, 2015, 2015, 2015, 2015, 2015, 201…
## $ arrival_date_month             <chr> "July", "July", "July", "July", "July",…
## $ arrival_date_week_number       <dbl> 27, 27, 27, 27, 27, 27, 27, 27, 27, 27,…
## $ arrival_date_day_of_month      <dbl> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, …
## $ stays_in_weekend_nights        <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, …
## $ stays_in_week_nights           <dbl> 0, 0, 1, 1, 2, 2, 2, 2, 3, 3, 4, 4, 4, …
## $ adults                         <dbl> 2, 2, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, …
## $ children                       <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, …
## $ babies                         <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, …
## $ meal                           <chr> "BB", "BB", "BB", "BB", "BB", "BB", "BB…
## $ country                        <chr> "PRT", "PRT", "GBR", "GBR", "GBR", "GBR…
## $ market_segment                 <chr> "Direct", "Direct", "Direct", "Corporat…
## $ distribution_channel           <chr> "Direct", "Direct", "Direct", "Corporat…
## $ is_repeated_guest              <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, …
## $ previous_cancellations         <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, …
## $ previous_bookings_not_canceled <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, …
## $ reserved_room_type             <chr> "C", "C", "A", "A", "A", "A", "C", "C",…
## $ assigned_room_type             <chr> "C", "C", "C", "A", "A", "A", "C", "C",…
## $ booking_changes                <dbl> 3, 4, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, …
## $ deposit_type                   <chr> "No Deposit", "No Deposit", "No Deposit…
## $ agent                          <chr> "NULL", "NULL", "NULL", "304", "240", "…
## $ company                        <chr> "NULL", "NULL", "NULL", "NULL", "NULL",…
## $ days_in_waiting_list           <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, …
## $ customer_type                  <chr> "Transient", "Transient", "Transient", …
## $ adr                            <dbl> 0.00, 0.00, 75.00, 75.00, 98.00, 98.00,…
## $ required_car_parking_spaces    <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, …
## $ total_of_special_requests      <dbl> 0, 0, 0, 0, 1, 1, 0, 1, 1, 0, 0, 0, 3, …
## $ reservation_status             <chr> "Check-Out", "Check-Out", "Check-Out", …
## $ reservation_status_date        <date> 2015-07-01, 2015-07-01, 2015-07-02, 20…
```

B. Choosing rows or columns

5. Select a single column (Slide #24)

```
# Enter code here
select(hotels, lead_time)
```

```
## # A tibble: 119,390 × 1
##    lead_time
##        <dbl>
##  1       342
##  2       737
##  3         7
##  4        13
##  5        14
##  6        14
##  7         0
##  8         9
##  9        85
## 10        75
## # ℹ 119,380 more rows
```

6. Select multiple columns (Slide #25)

```
# Enter code here
select(hotels, lead_time,agent,market_segment)
```

```
## # A tibble: 119,390 × 3
##    lead_time agent market_segment
##        <dbl> <chr> <chr>
##  1       342 NULL  Direct
##  2       737 NULL  Direct
##  3         7 NULL  Direct
##  4        13 304   Corporate
##  5        14 240   Online TA
##  6        14 240   Online TA
##  7         0 NULL  Direct
##  8         9 303   Direct
##  9        85 240   Online TA
## 10        75 15    Offline TA/TO
## # ℹ 119,380 more rows
```

7. Arrange entries of a column (Slide #28)

```
# Enter code here
arrange(hotels, lead_time)
```

```
## # A tibble: 119,390 × 32
##    hotel        is_canceled lead_time arrival_date_year arrival_date_month
##    <chr>              <dbl>     <dbl>             <dbl> <chr>
##  1 Resort Hotel           0         0              2015 July
##  2 Resort Hotel           0         0              2015 July
##  3 Resort Hotel           0         0              2015 July
##  4 Resort Hotel           0         0              2015 July
##  5 Resort Hotel           0         0              2015 July
##  6 Resort Hotel           0         0              2015 July
##  7 Resort Hotel           0         0              2015 July
##  8 Resort Hotel           0         0              2015 July
##  9 Resort Hotel           0         0              2015 July
## 10 Resort Hotel           0         0              2015 July
## # ℹ 119,380 more rows
## # ℹ 27 more variables: arrival_date_week_number <dbl>,
## #   arrival_date_day_of_month <dbl>, stays_in_weekend_nights <dbl>,
## #   stays_in_week_nights <dbl>, adults <dbl>, children <dbl>, babies <dbl>,
## #   meal <chr>, country <chr>, market_segment <chr>,
## #   distribution_channel <chr>, is_repeated_guest <dbl>,
## #   previous_cancellations <dbl>, previous_bookings_not_canceled <dbl>, …
```

8. Arrange entries of a column in the descending order (Slide #30)

```
# Enter code here
arrange(hotels, desc(lead_time))
```

```
## # A tibble: 119,390 × 32
##    hotel        is_canceled lead_time arrival_date_year arrival_date_month
##    <chr>              <dbl>     <dbl>             <dbl> <chr>
##  1 Resort Hotel           0       737              2015 July
##  2 Resort Hotel           0       709              2016 February
##  3 City Hotel             1       629              2017 March
##  4 City Hotel             1       629              2017 March
##  5 City Hotel             1       629              2017 March
##  6 City Hotel             1       629              2017 March
##  7 City Hotel             1       629              2017 March
##  8 City Hotel             1       629              2017 March
##  9 City Hotel             1       629              2017 March
## 10 City Hotel             1       629              2017 March
## # ℹ 119,380 more rows
## # ℹ 27 more variables: arrival_date_week_number <dbl>,
## #   arrival_date_day_of_month <dbl>, stays_in_weekend_nights <dbl>,
## #   stays_in_week_nights <dbl>, adults <dbl>, children <dbl>, babies <dbl>,
## #   meal <chr>, country <chr>, market_segment <chr>,
## #   distribution_channel <chr>, is_repeated_guest <dbl>,
## #   previous_cancellations <dbl>, previous_bookings_not_canceled <dbl>, …
```

9. Select columns and arrange the entries of a column (Slide

#31)

```
# Enter code here
arrange(
  select(hotels, lead_time),
  desc(lead_time)
)
```

```
## # A tibble: 119,390 × 1
##    lead_time
##        <dbl>
##  1       737
##  2       709
##  3       629
##  4       629
##  5       629
##  6       629
##  7       629
##  8       629
##  9       629
## 10       629
## # ℹ 119,380 more rows
```

10. Select columns and arrange the entries of a column using the pipe operator (Slide #37)

```
# Enter code here
hotels %>%
  select(lead_time) %>%
  arrange(desc(lead_time))
```

```
## # A tibble: 119,390 × 1
##    lead_time
##        <dbl>
##  1       737
##  2       709
##  3       629
##  4       629
##  5       629
##  6       629
##  7       629
##  8       629
##  9       629
## 10       629
## # ℹ 119,380 more rows
```

11. Pick rows matching a condition (Slide #44)

```
# Enter code here
hotels %>%
  filter(
    children >= 1
  ) %>%
  select(hotel, children)
```

```
## # A tibble: 8,590 × 2
##    hotel        children
##    <chr>           <dbl>
##  1 Resort Hotel        1
##  2 Resort Hotel        2
##  3 Resort Hotel        2
##  4 Resort Hotel        2
##  5 Resort Hotel        1
##  6 Resort Hotel        1
##  7 Resort Hotel        2
##  8 Resort Hotel        2
##  9 Resort Hotel        1
## 10 Resort Hotel        2
## # ℹ 8,580 more rows
```

12. Pick rows matching multiple conditions (Slide #46)

```
# Enter code here
hotels %>%
  filter(
    children >= 1,
    hotel == "City Hotel"
  ) %>%
  select(hotel, children)
```

```
## # A tibble: 5,106 × 2
##    hotel      children
##    <chr>         <dbl>
##  1 City Hotel        1
##  2 City Hotel        2
##  3 City Hotel        1
##  4 City Hotel        1
##  5 City Hotel        1
##  6 City Hotel        1
##  7 City Hotel        1
##  8 City Hotel        1
##  9 City Hotel        1
## 10 City Hotel        1
## # ℹ 5,096 more rows
```

13. Non-conditional selection of rows: sequence of indices (Slide

#49)

```
# Enter code here
hotels %>% slice(1:5)
```

```
## # A tibble: 5 × 32
##   hotel        is_canceled lead_time arrival_date_year arrival_date_month
##   <chr>              <dbl>     <dbl>             <dbl> <chr>
## 1 Resort Hotel           0       342              2015 July
## 2 Resort Hotel           0       737              2015 July
## 3 Resort Hotel           0         7              2015 July
## 4 Resort Hotel           0        13              2015 July
## 5 Resort Hotel           0        14              2015 July
## # ℹ 27 more variables: arrival_date_week_number <dbl>,
## #   arrival_date_day_of_month <dbl>, stays_in_weekend_nights <dbl>,
## #   stays_in_week_nights <dbl>, adults <dbl>, children <dbl>, babies <dbl>,
## #   meal <chr>, country <chr>, market_segment <chr>,
## #   distribution_channel <chr>, is_repeated_guest <dbl>,
## #   previous_cancellations <dbl>, previous_bookings_not_canceled <dbl>,
## #   reserved_room_type <chr>, assigned_room_type <chr>, …
```

14. Non-conditional selection of rows: non-consecutive/specific indices (Slide #50)

```
# Enter code here
hotels %>% slice(1,3,5)
```

```
## # A tibble: 3 × 32
##   hotel        is_canceled lead_time arrival_date_year arrival_date_month
##   <chr>              <dbl>     <dbl>             <dbl> <chr>
## 1 Resort Hotel           0       342              2015 July
## 2 Resort Hotel           0         7              2015 July
## 3 Resort Hotel           0        14              2015 July
## # ℹ 27 more variables: arrival_date_week_number <dbl>,
## #   arrival_date_day_of_month <dbl>, stays_in_weekend_nights <dbl>,
## #   stays_in_week_nights <dbl>, adults <dbl>, children <dbl>, babies <dbl>,
## #   meal <chr>, country <chr>, market_segment <chr>,
## #   distribution_channel <chr>, is_repeated_guest <dbl>,
## #   previous_cancellations <dbl>, previous_bookings_not_canceled <dbl>,
## #   reserved_room_type <chr>, assigned_room_type <chr>, …
```

15. Pick unique rows using distinct() (Slide #52)

```
# Enter code here
hotels %>%
  distinct(hotel)
```

```
## # A tibble: 2 × 1
##   hotel
##   <chr>
## 1 Resort Hotel
## 2 City Hotel
```

C. Creating new columns

16. Creating a single column with mutate() (Slide #56)

```
# Enter code here
hotels %>%
  mutate(little_ones= children+babies) %>%
  select(hotel, little_ones, children,babies)
```

```
## # A tibble: 119,390 × 4
##    hotel        little_ones children babies
##    <chr>              <dbl>    <dbl>  <dbl>
##  1 Resort Hotel           0        0      0
##  2 Resort Hotel           0        0      0
##  3 Resort Hotel           0        0      0
##  4 Resort Hotel           0        0      0
##  5 Resort Hotel           0        0      0
##  6 Resort Hotel           0        0      0
##  7 Resort Hotel           0        0      0
##  8 Resort Hotel           0        0      0
##  9 Resort Hotel           0        0      0
## 10 Resort Hotel           0        0      0
## # ℹ 119,380 more rows
```

17. Creating multiple columns with mutate() (Slide #58)

```
# Enter code here
hotels %>%
  mutate(little_ones= children+babies,
         average_little_ones=mean(little_ones)) %>%
  select(hotel,little_ones,average_little_ones,children,babies)
```

```
## # A tibble: 119,390 × 5
##    hotel        little_ones average_little_ones children babies
##    <chr>              <dbl>               <dbl>    <dbl>  <dbl>
##  1 Resort Hotel           0                  NA        0      0
##  2 Resort Hotel           0                  NA        0      0
##  3 Resort Hotel           0                  NA        0      0
##  4 Resort Hotel           0                  NA        0      0
##  5 Resort Hotel           0                  NA        0      0
##  6 Resort Hotel           0                  NA        0      0
##  7 Resort Hotel           0                  NA        0      0
##  8 Resort Hotel           0                  NA        0      0
##  9 Resort Hotel           0                  NA        0      0
## 10 Resort Hotel           0                  NA        0      0
## # ℹ 119,380 more rows
```

D. More operations with examples

18. count() to get frequencies (Slide #60)

```
# Enter code here
hotels %>%
  count(market_segment)
```

```
## # A tibble: 8 × 2
##   market_segment     n
##   <chr>          <int>
## 1 Aviation         237
## 2 Complementary    743
## 3 Corporate       5295
## 4 Direct         12606
## 5 Groups         19811
## 6 Offline TA/TO  24219
## 7 Online TA      56477
## 8 Undefined          2
```

19. count() to get frequencies with sorting of count (Slide #61)

```
# Enter code here
hotels %>%
  count(market_segment, sort=TRUE)
```

```
## # A tibble: 8 × 2
##   market_segment     n
##   <chr>          <int>
## 1 Online TA      56477
## 2 Offline TA/TO  24219
## 3 Groups         19811
## 4 Direct         12606
## 5 Corporate       5295
## 6 Complementary    743
## 7 Aviation         237
## 8 Undefined          2
```

20. count() multiple variables (Slide #62)

```
# Enter code here
hotels %>%
  count(hotel, market_segment)
```

```
## # A tibble: 14 × 3
##    hotel        market_segment     n
##    <chr>        <chr>          <int>
##  1 City Hotel   Aviation         237
##  2 City Hotel   Complementary    542
##  3 City Hotel   Corporate       2986
##  4 City Hotel   Direct          6093
##  5 City Hotel   Groups         13975
##  6 City Hotel   Offline TA/TO  16747
##  7 City Hotel   Online TA      38748
##  8 City Hotel   Undefined          2
##  9 Resort Hotel Complementary    201
## 10 Resort Hotel Corporate       2309
## 11 Resort Hotel Direct          6513
## 12 Resort Hotel Groups          5836
## 13 Resort Hotel Offline TA/TO   7472
## 14 Resort Hotel Online TA      17729
```

21. summarise() for summary statistics (Slide #63)

```
# Enter code here
hotels %>%
  summarise(mean_adr = mean(adr))
```

```
## # A tibble: 1 × 1
##   mean_adr
##      <dbl>
## 1     102.
```

22. summarise() by using group_by to find mean (Slide #64)

```
# Enter code here
hotels %>%
  group_by(hotel) %>%
  summarise(mean_adr = mean(adr))
```

```
## # A tibble: 2 × 2
##   hotel        mean_adr
##   <chr>           <dbl>
## 1 City Hotel      105. 
## 2 Resort Hotel     95.0
```

23. summarise() by using group_by to get count (Slide #65)

```
# Enter code here
hotels %>%
  group_by(hotel) %>%
  summarise(count = n())
```

```
## # A tibble: 2 × 2
##   hotel        count
##   <chr>        <int>
## 1 City Hotel   79330
## 2 Resort Hotel 40060
```

24. summarise() for multiple summary statistics (Slide #67)

```
# Enter code here
hotels %>%
  summarise(
    min_adr =min(adr),
    mean_adr = mean(adr),
    median_adr = median(adr),
    max_adr = max(adr)
  )
```

```
## # A tibble: 1 × 4
##   min_adr mean_adr median_adr max_adr
##     <dbl>    <dbl>      <dbl>   <dbl>
## 1   -6.38     102.       94.6    5400
```

25. select(), slice() and arrange() (Slide #68)

```
# Enter code here
hotels %>%
  select(hotel, lead_time) %>%
  slice(1:5) %>%
  arrange(lead_time)
```

```
## # A tibble: 5 × 2
##   hotel        lead_time
##   <chr>            <dbl>
## 1 Resort Hotel         7
## 2 Resort Hotel        13
## 3 Resort Hotel        14
## 4 Resort Hotel       342
## 5 Resort Hotel       737
```

26. select(), arrange() and slice() (Slide #69)

```
# Enter code here
hotels %>%
  select(hotel, lead_time) %>%
  arrange(lead_time) %>%
  slice(1:5)
```

```
## # A tibble: 5 × 2
##   hotel        lead_time
##   <chr>            <dbl>
## 1 Resort Hotel         0
## 2 Resort Hotel         0
## 3 Resort Hotel         0
## 4 Resort Hotel         0
## 5 Resort Hotel         0
```

27. filter() to select rows based on conditions (Slide #73)

```
# Enter code here
hotels %>%
  filter(
    adults ==0,
    children >= 1
  ) %>%
  select(adults,babies,children)
```

```
## # A tibble: 223 × 3
##    adults babies children
##     <dbl>  <dbl>    <dbl>
##  1      0      0        3
##  2      0      0        2
##  3      0      0        2
##  4      0      0        2
##  5      0      0        2
##  6      0      0        3
##  7      0      1        2
##  8      0      0        2
##  9      0      0        2
## 10      0      0        2
## # ℹ 213 more rows
```

28. filter() to select rows based on complicated conditions (Slide #74)

```
# Enter code here
hotels %>%
  filter(
    adults ==1,
    children >= 1 | babies>= 1
  ) %>%
  select(adults,babies,children)
```

```
## # A tibble: 450 × 3
##    adults babies children
##     <dbl>  <dbl>    <dbl>
##  1      1      0        2
##  2      1      0        2
##  3      1      0        1
##  4      1      1        0
##  5      1      0        1
##  6      1      0        1
##  7      1      0        2
##  8      1      0        2
##  9      1      0        1
## 10      1      0        1
## # ℹ 440 more rows
```

29. count() and arrange() (Slide #76)

```
# Enter code here
hotels %>%
  count(market_segment) %>%
  arrange(desc(n))
```

```
## # A tibble: 8 × 2
##   market_segment     n
##   <chr>          <int>
## 1 Online TA      56477
## 2 Offline TA/TO  24219
## 3 Groups         19811
## 4 Direct         12606
## 5 Corporate       5295
## 6 Complementary    743
## 7 Aviation         237
## 8 Undefined          2
```

30. mutate(), select() and arrange() (Slide #77)

```
# Enter code here
hotels %>%
  mutate(little_ones = children + babies) %>%
  select(children, babies, little_ones) %>%
arrange(desc(little_ones))
```

```
## # A tibble: 119,390 × 3
##    children babies little_ones
##       <dbl>  <dbl>       <dbl>
##  1       10      0          10
##  2        0     10          10
##  3        0      9           9
##  4        2      1           3
##  5        2      1           3
##  6        2      1           3
##  7        3      0           3
##  8        2      1           3
##  9        2      1           3
## 10        3      0           3
## # ℹ 119,380 more rows
```

31. mutate(), filter() and select() (Slide #78)

```
# Enter code here
hotels %>%
  mutate(little_ones= children+babies) %>%
  filter(
    little_ones >= 1,
    hotel =="Resorts Hotel"
  ) %>%
  select(hotel, little_ones)
```

```
## # A tibble: 0 × 2
## # ℹ 2 variables: hotel <chr>, little_ones <dbl>
```