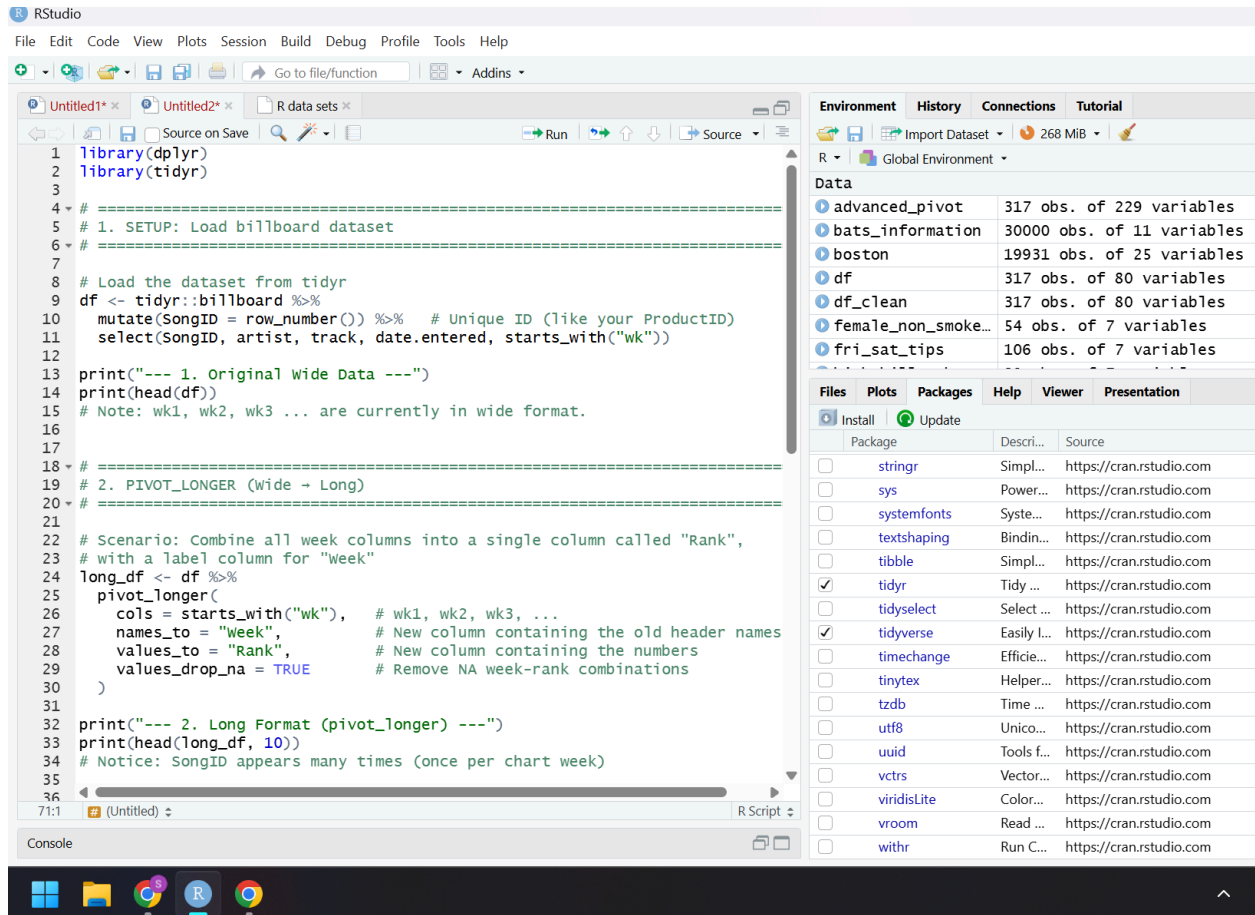


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SUBJECT - Data Analysis with SAS / SPSS / R

Aim :- Reshaping data using pivot_longer()/pivot_wider() (R).

Input :



The screenshot displays the RStudio interface. The main editor window contains R code for loading the 'billboard' dataset from the 'tidyr' package and reshaping it from wide to long format using the 'pivot_longer()' function. The code includes comments explaining the steps and the resulting data structure. The console at the bottom shows the execution of the code. On the right side, the 'Environment' pane lists the data objects in the global environment, and the 'Packages' pane shows a list of installed and available packages.

```
1 library(dplyr)
2 library(tidyr)
3
4 # =====
5 # 1. SETUP: Load billboard dataset
6 # =====
7
8 # Load the dataset from tidyr
9 df <- tidyr::billboard %>%
10   mutate(SongID = row_number()) %>% # Unique ID (like your ProductID)
11   select(SongID, artist, track, date.entered, starts_with("wk"))
12
13 print("--- 1. Original Wide Data ---")
14 print(head(df))
15 # Note: wk1, wk2, wk3 ... are currently in wide format.
16
17 # =====
18 # 2. PIVOT_LONGER (Wide -> Long)
19 # =====
20
21 # Scenario: Combine all week columns into a single column called "Rank",
22 # with a label column for "Week"
23 long_df <- df %>%
24   pivot_longer(
25     cols = starts_with("wk"), # wk1, wk2, wk3, ...
26     names_to = "week",        # New column containing the old header names
27     values_to = "Rank",       # New column containing the numbers
28     values_drop_na = TRUE     # Remove NA week-rank combinations
29   )
30
31 print("--- 2. Long Format (pivot_longer) ---")
32 print(head(long_df, 10))
33 # Notice: SongID appears many times (once per chart week)
34
35
36
```

Environment | History | Connections | Tutorial

R | Global Environment

Data

Object	Size
advanced_pivot	317 obs. of 229 variables
bats_information	30000 obs. of 11 variables
boston	19931 obs. of 25 variables
df	317 obs. of 80 variables
df_clean	317 obs. of 80 variables
female_non_smoke...	54 obs. of 7 variables
fri_sat_tips	106 obs. of 7 variables

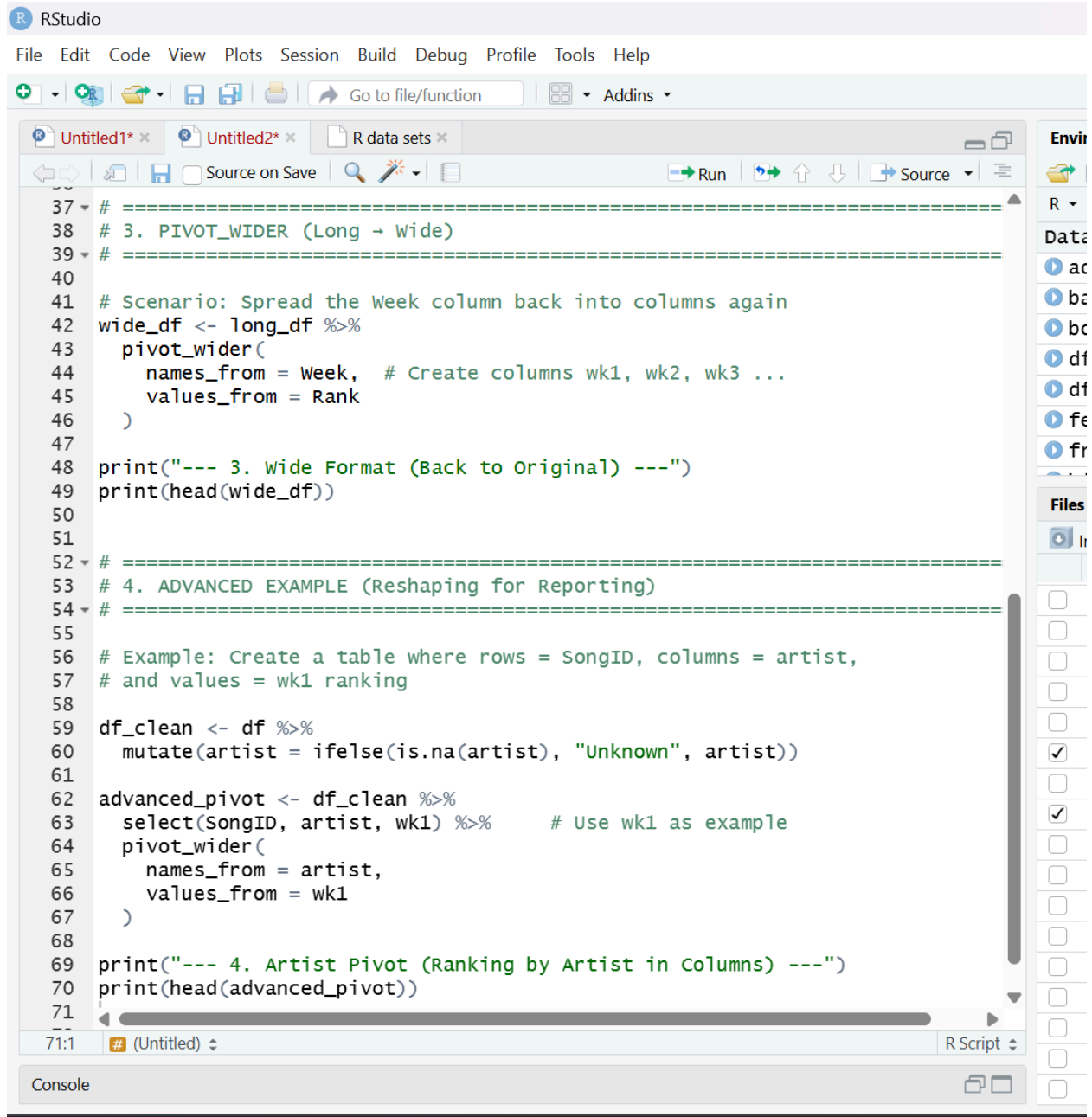
Files | **Plots** | **Packages** | **Help** | **Viewer** | **Presentation**

Install | Update

Package	Descri...	Source
<input type="checkbox"/> stringr	Simpl...	https://cran.rstudio.com
<input type="checkbox"/> sys	Power...	https://cran.rstudio.com
<input type="checkbox"/> systemfonts	Syste...	https://cran.rstudio.com
<input type="checkbox"/> textshaping	Bindin...	https://cran.rstudio.com
<input type="checkbox"/> tibble	Simpl...	https://cran.rstudio.com
<input checked="" type="checkbox"/> tidyr	Tidy ...	https://cran.rstudio.com
<input type="checkbox"/> tidyselect	Select ...	https://cran.rstudio.com
<input checked="" type="checkbox"/> tidyverse	Easily l...	https://cran.rstudio.com
<input type="checkbox"/> timechange	Efficie...	https://cran.rstudio.com
<input type="checkbox"/> tinytex	Helper...	https://cran.rstudio.com
<input type="checkbox"/> tzdb	Time ...	https://cran.rstudio.com
<input type="checkbox"/> utf8	Unico...	https://cran.rstudio.com
<input type="checkbox"/> uuid	Tools f...	https://cran.rstudio.com
<input type="checkbox"/> vctrs	Vector...	https://cran.rstudio.com
<input type="checkbox"/> viridisLite	Color...	https://cran.rstudio.com
<input type="checkbox"/> vroom	Read ...	https://cran.rstudio.com
<input type="checkbox"/> withr	Run C...	https://cran.rstudio.com

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The screenshot shows the RStudio environment with a script editor containing R code for data reshaping. The code is as follows:

```
37 # =====
38 # 3. PIVOT_WIDER (Long → Wide)
39 # =====
40
41 # Scenario: Spread the Week column back into columns again
42 wide_df <- long_df %>%
43   pivot_wider(
44     names_from = Week, # Create columns wk1, wk2, wk3 ...
45     values_from = Rank
46   )
47
48 print("--- 3. Wide Format (Back to Original) ---")
49 print(head(wide_df))
50
51
52 # =====
53 # 4. ADVANCED EXAMPLE (Reshaping for Reporting)
54 # =====
55
56 # Example: Create a table where rows = SongID, columns = artist,
57 # and values = wk1 ranking
58
59 df_clean <- df %>%
60   mutate(artist = ifelse(is.na(artist), "Unknown", artist))
61
62 advanced_pivot <- df_clean %>%
63   select(SongID, artist, wk1) %>% # Use wk1 as example
64   pivot_wider(
65     names_from = artist,
66     values_from = wk1
67   )
68
69 print("--- 4. Artist Pivot (Ranking by Artist in Columns) ---")
70 print(head(advanced_pivot))
71
```

The RStudio interface includes a menu bar (File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, Help), a toolbar with icons for file operations and running code, and a sidebar on the right with 'Environment' and 'Files' panels. The console at the bottom is currently empty.

Output :

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The screenshot displays the R Studio interface with the console and package manager. The console shows the following R code and output:

```
> print("--- 1. Original Wide Data ---")
[1] "--- 1. Original Wide Data ---"
> print(head(df))
# A tibble: 6 x 80
  SongID artist track date.entered wk1 wk2 wk3 wk4 wk5 wk6 wk7
  <int> <chr> <chr> <date> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
1 1 2 Pac Baby Don't Cry (Keep... 2000-02-26 87 82 72 77 87 94 99
2 2 2Ge+her The Hardest Part Of ... 2000-09-02 91 87 92 NA NA NA NA
3 3 3 Doors... Kryp... 2000-04-08 81 70 68 67 66 57 54
4 4 3 Doors... Loser 2000-10-21 76 76 72 69 67 65 55
5 5 504 Boyz Wobb... 2000-04-15 57 34 25 17 17 31 36
6 6 98A0 Give... 2000-08-19 51 39 34 26 26 19 2

# i 69 more variables: wk8 <dbl>, wk9 <dbl>, wk10 <dbl>, wk11 <dbl>,
# wk12 <dbl>, wk13 <dbl>, wk14 <dbl>, wk15 <dbl>, wk16 <dbl>, wk17 <dbl>,
# wk18 <dbl>, wk19 <dbl>, wk20 <dbl>, wk21 <dbl>, wk22 <dbl>, wk23 <dbl>,
# wk24 <dbl>, wk25 <dbl>, wk26 <dbl>, wk27 <dbl>, wk28 <dbl>, wk29 <dbl>,
# wk30 <dbl>, wk31 <dbl>, wk32 <dbl>, wk33 <dbl>, wk34 <dbl>, wk35 <dbl>,
# wk36 <dbl>, wk37 <dbl>, wk38 <dbl>, wk39 <dbl>, wk40 <dbl>, wk41 <dbl>,
# wk42 <dbl>, wk43 <dbl>, wk44 <dbl>, wk45 <dbl>, wk46 <dbl>, wk47 <dbl>, ...

> # Scenario: Combine all week columns into a single column called "Rank",
> # with a label column for "Week"
> long_df <- df %>%
+ pivot_longer(
+ cols = starts_with("wk"), # wk1, wk2, wk3, ...
+ names_to = "week", # New column containing the old header names
+ values_to = "Rank", # New column containing the numbers
+ values_drop_na = TRUE # Remove NA week-rank combinations
+ )
> print("--- 2. Long Format (pivot_longer) ---")
[1] "--- 2. Long Format (pivot_longer) ---"
> print(head(long_df, 10))
# A tibble: 10 x 6
  SongID artist track date.entered Week Rank
  <int> <chr> <chr> <date> <chr> <dbl>
1 1 2 Pac Baby Don't Cry (Keep... 2000-02-26 wk1 87
2 1 2 Pac Baby Don't Cry (Keep... 2000-02-26 wk2 82
3 1 2 Pac Baby Don't Cry (Keep... 2000-02-26 wk3 72
4 1 2 Pac Baby Don't Cry (Keep... 2000-02-26 wk4 77
5 1 2 Pac Baby Don't Cry (Keep... 2000-02-26 wk5 87
6 1 2 Pac Baby Don't Cry (Keep... 2000-02-26 wk6 94
7 1 2 Pac Baby Don't Cry (Keep... 2000-02-26 wk7 99
8 2 2Ge+her The Hardest Part Of ... 2000-09-02 wk1 91
9 2 2Ge+her The Hardest Part Of ... 2000-09-02 wk2 87
10 2 2Ge+her The Hardest Part Of ... 2000-09-02 wk3 92

> # scenario: Spread the Week column back into columns again
> wide_df <- long_df %>%
+ pivot_wider(
+ names_from = Week, # Create columns wk1, wk2, wk3 ...
+ values_from = Rank
+ )
> print("--- 3. Wide Format (Back to Original) ---")
[1] "--- 3. Wide Format (Back to Original) ---"
> print(head(wide_df))
# A tibble: 6 x 80
```

The package manager on the right shows installed and available packages. The following table lists the packages shown in the image:

Package	Source
stringr	https://cran.rstudio.com/web/packages/stringr/index.html
sys	https://cran.rstudio.com/web/packages/sys/index.html
systemfonts	https://cran.rstudio.com/web/packages/systemfonts/index.html
textshaping	https://cran.rstudio.com/web/packages/textshaping/index.html
tibble	https://cran.rstudio.com/web/packages/tibble/index.html
tidyr	https://cran.rstudio.com/web/packages/tidyr/index.html
tidyselect	https://cran.rstudio.com/web/packages/tidyselect/index.html
tidyverse	https://cran.rstudio.com/web/packages/tidyverse/index.html
timechange	https://cran.rstudio.com/web/packages/timechange/index.html
tinytex	https://cran.rstudio.com/web/packages/tinytex/index.html
tzdb	https://cran.rstudio.com/web/packages/tzdb/index.html
utf8	https://cran.rstudio.com/web/packages/utf8/index.html
uuid	https://cran.rstudio.com/web/packages/uuid/index.html
vctrs	https://cran.rstudio.com/web/packages/vctrs/index.html
viridisLite	https://cran.rstudio.com/web/packages/viridisLite/index.html
vroom	https://cran.rstudio.com/web/packages/vroom/index.html
withr	https://cran.rstudio.com/web/packages/withr/index.html

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```
Console Terminal Background Jobs
R 4.5.2 ~ /
> print("--- 3. Wide Format (Back to Original) ---")
[1] "--- 3. Wide Format (Back to Original) ---"
> print(head(wide_df))
# A tibble: 6 x 69
  SongID artist track date.entered wk1 wk2 wk3 wk4 wk5 wk6 wk7
  <int> <chr> <chr> <date> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
1 1 2 Pac Baby... 2000-02-26 87 82 72 77 87 94 99
2 2 2Ge+her The ... 2000-09-02 91 87 92 NA NA NA NA
3 3 3 Doors... Kryp... 2000-04-08 81 70 68 67 66 57 54
4 4 3 Doors... Loser 2000-10-21 76 76 72 69 67 65 55
5 5 504 Boyz Wobb... 2000-04-15 57 34 25 17 17 31 36
6 6 98^0 Give... 2000-08-19 51 39 34 26 26 19 2
# i 58 more variables: wk8 <dbl>, wk9 <dbl>, wk10 <dbl>, wk11 <dbl>,
# wk12 <dbl>, wk13 <dbl>, wk14 <dbl>, wk15 <dbl>, wk16 <dbl>, wk17 <dbl>,
# wk18 <dbl>, wk19 <dbl>, wk20 <dbl>, wk21 <dbl>, wk22 <dbl>, wk23 <dbl>,
# wk24 <dbl>, wk25 <dbl>, wk26 <dbl>, wk27 <dbl>, wk28 <dbl>, wk29 <dbl>,
# wk30 <dbl>, wk31 <dbl>, wk32 <dbl>, wk33 <dbl>, wk34 <dbl>, wk35 <dbl>,
# wk36 <dbl>, wk37 <dbl>, wk38 <dbl>, wk39 <dbl>, wk40 <dbl>, wk41 <dbl>,
# wk42 <dbl>, wk43 <dbl>, wk44 <dbl>, wk45 <dbl>, wk46 <dbl>, wk47 <dbl>, ...
> df_clean <- df %>%
+ mutate(artist = ifelse(is.na(artist), "Unknown", artist))
> advanced_pivot <- df_clean %>%
+ select(SongID, artist, wk1) %>% # Use wk1 as example
+ pivot_wider(
+ names_from = artist,
+ values_from = wk1
+ )
> print("--- 4. Artist Pivot (Ranking by Artist in Columns) ---")
[1] "--- 4. Artist Pivot (Ranking by Artist in Columns) ---"
```

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```
1 pivot_wider(  
+   names_from = artist,  
+   values_from = wk1  
+ )  
> print("--- 4. Artist Pivot (Ranking by Artist in Columns) ---")  
[1] "--- 4. Artist Pivot (Ranking by Artist in Columns) ---"  
> print(head(advanced_pivot))  
# A tibble: 6 × 229  
  SongID `2 Pac` `2Ge+her` `3 Doors Down` `504 Boyz` `98^0` `A*Teens` Aaliyah  
  <int>   <dbl>   <dbl>         <dbl>   <dbl>   <dbl>   <dbl>  
1     1     87     NA           NA       NA     NA     NA  
2     2     NA     91           NA       NA     NA     NA  
3     3     NA     NA           81       NA     NA     NA  
4     4     NA     NA           76       NA     NA     NA  
5     5     NA     NA           NA       57     NA     NA  
6     6     NA     NA           NA       NA     51     NA  
# i 221 more variables: `Adams, Yolanda` <dbl>, `Adkins, Trace` <dbl>,  
# `Aguilera, Christina` <dbl>, `Alice DeeJay` <dbl>, `Allan, Gary` <dbl>,  
# `Amber` <dbl>, `Anastacia` <dbl>, `Anthony, Marc` <dbl>, `Avant` <dbl>,  
# `BBMak` <dbl>, `Backstreet Boys, The` <dbl>, `Badu, Erkyah` <dbl>,  
# `Baha Men` <dbl>, `Barenaked Ladies` <dbl>, `Beenie Man` <dbl>,  
# `Before Dark` <dbl>, `Bega, Lou` <dbl>, `Big Punisher` <dbl>,  
# `Black Rob` <dbl>, `Black, Clint` <dbl>, `Blaque` <dbl>, ...  
# i Use `colnames()` to see all variable names  
>  
>  
>  
>
```