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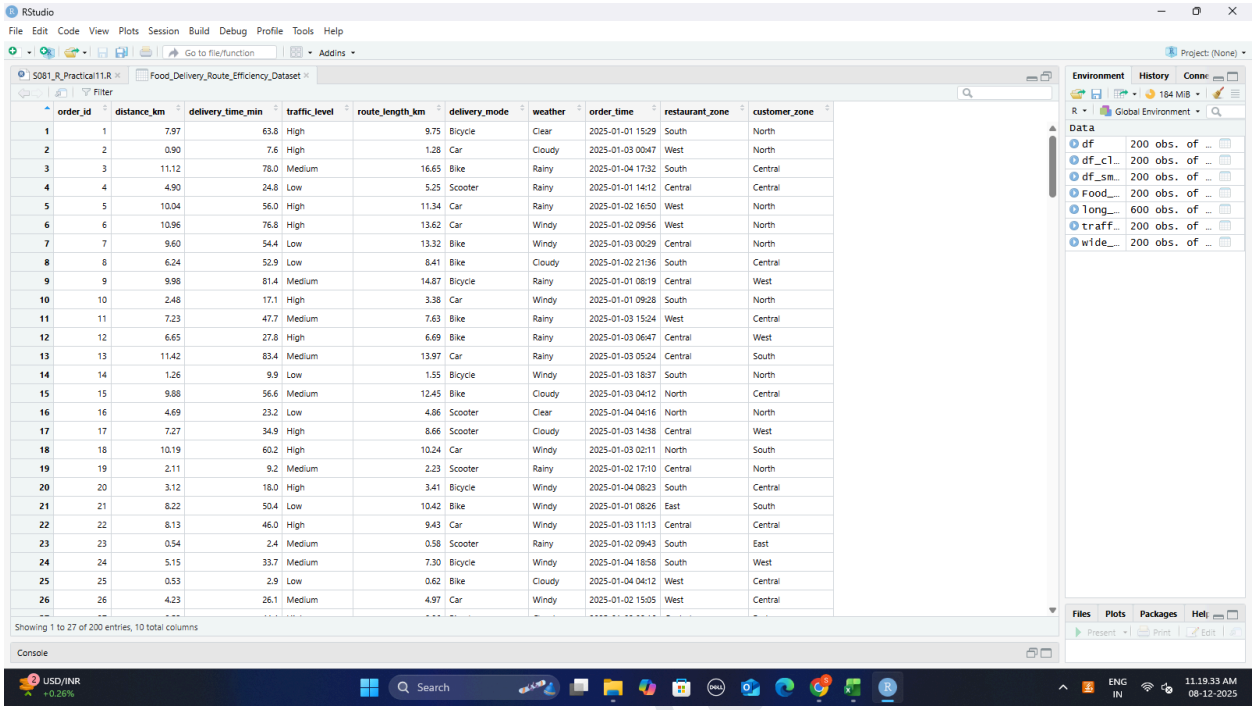
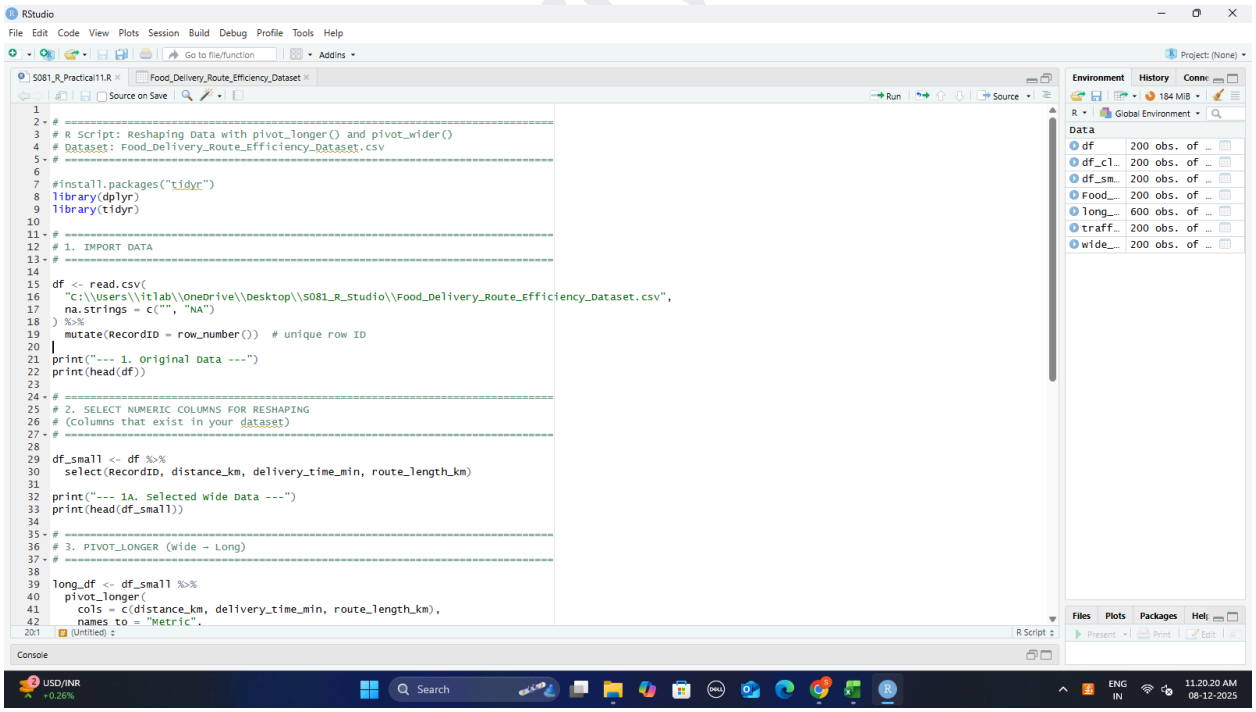
11. Reshaping data using pivot_longer() and pivot_wider() (R).



order_id	distance_km	delivery_time_min	traffic_level	route_length_km	delivery_mode	weather	order_time	restaurant_zone	customer_zone
1	7.97	63.8	High	9.75	Bicycle	Clear	2025-01-01 15:29	South	North
2	0.90	7.6	High	1.28	Car	Cloudy	2025-01-03 00:47	West	North
3	11.12	78.0	Medium	16.65	Bike	Rainy	2025-01-04 17:32	South	Central
4	4.90	24.8	Low	5.25	Scooter	Rainy	2025-01-01 14:12	Central	Central
5	10.04	56.0	High	11.34	Car	Rainy	2025-01-02 16:50	West	North
6	10.96	76.8	High	13.62	Car	Windy	2025-01-02 09:56	West	North
7	9.60	54.4	Low	13.32	Bike	Windy	2025-01-03 00:29	Central	North
8	6.24	52.9	Low	8.41	Bike	Cloudy	2025-01-02 21:36	South	Central
9	9.98	81.4	Medium	14.87	Bicycle	Rainy	2025-01-01 08:19	Central	West
10	2.48	17.1	High	3.38	Car	Windy	2025-01-01 09:28	South	North
11	7.23	47.7	Medium	7.63	Bike	Rainy	2025-01-03 15:24	West	Central
12	6.65	27.8	High	6.69	Bike	Rainy	2025-01-03 06:47	Central	West
13	11.42	83.4	Medium	13.97	Car	Rainy	2025-01-03 05:24	Central	South
14	1.26	9.9	Low	1.55	Bicycle	Windy	2025-01-03 18:37	South	North
15	9.88	56.6	Medium	12.45	Bike	Cloudy	2025-01-03 04:12	North	Central
16	4.69	23.2	Low	4.86	Scooter	Clear	2025-01-04 04:16	North	North
17	7.27	34.9	High	8.66	Scooter	Cloudy	2025-01-03 14:38	Central	West
18	10.19	60.2	High	10.24	Car	Windy	2025-01-03 02:11	North	South
19	2.11	9.2	Medium	2.23	Scooter	Rainy	2025-01-02 17:10	Central	North
20	3.12	18.0	High	3.41	Bicycle	Windy	2025-01-04 08:23	South	Central
21	8.22	50.4	Low	10.42	Bike	Windy	2025-01-01 08:26	East	South
22	8.13	46.0	High	9.43	Car	Windy	2025-01-03 11:13	Central	Central
23	0.54	2.4	Medium	0.58	Scooter	Rainy	2025-01-02 09:43	South	East
24	5.15	33.7	Medium	7.30	Bicycle	Windy	2025-01-04 18:58	South	West
25	0.53	2.9	Low	0.62	Bike	Cloudy	2025-01-04 04:12	West	Central
26	4.23	26.1	Medium	4.97	Car	Windy	2025-01-02 15:05	West	Central



```
# ================================================================
# R Script: Reshaping Data with pivot_longer() and pivot_wider()
# Dataset: Food_Delivery_Route_Efficiency_Dataset.csv
# ================================================================

#install.packages("tidyr")
library(dplyr)
library(tidyr)

# ================================================================
# 1. IMPORT DATA
# ================================================================

df <- read.csv(
  "C:\\Users\\itlab\\OneDrive\\Desktop\\S081_R_Studio\\Food_Delivery_Route_Efficiency_Dataset.csv",
  na.strings = c("", "NA")
) %>%
  mutate(RecordID = row_number())  # unique row ID

print("--- 1. Original Data ---")
print(head(df))

# ================================================================
# 2. SELECT NUMERIC COLUMNS FOR RESHAPING
# (Columns that exist in your dataset)
# ================================================================

df_small <- df %>%
  select(RecordID, distance_km, delivery_time_min, route_length_km)

print("--- 1A. Selected Wide Data ---")
print(head(df_small))

# ================================================================
# 3. PIVOT_LONGER (Wide → Long)
# ================================================================

long_df <- df_small %>%
  pivot_longer(
    cols = c(distance_km, delivery_time_min, route_length_km),
    names_to = "Metric",
```

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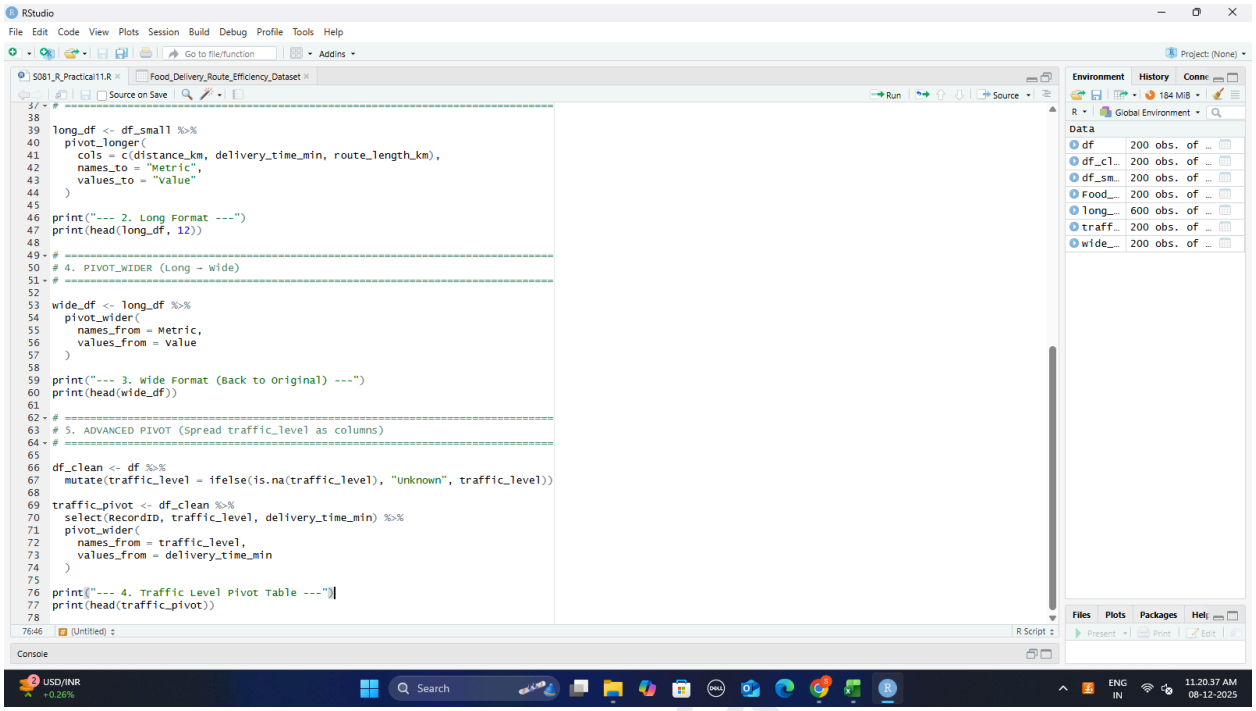
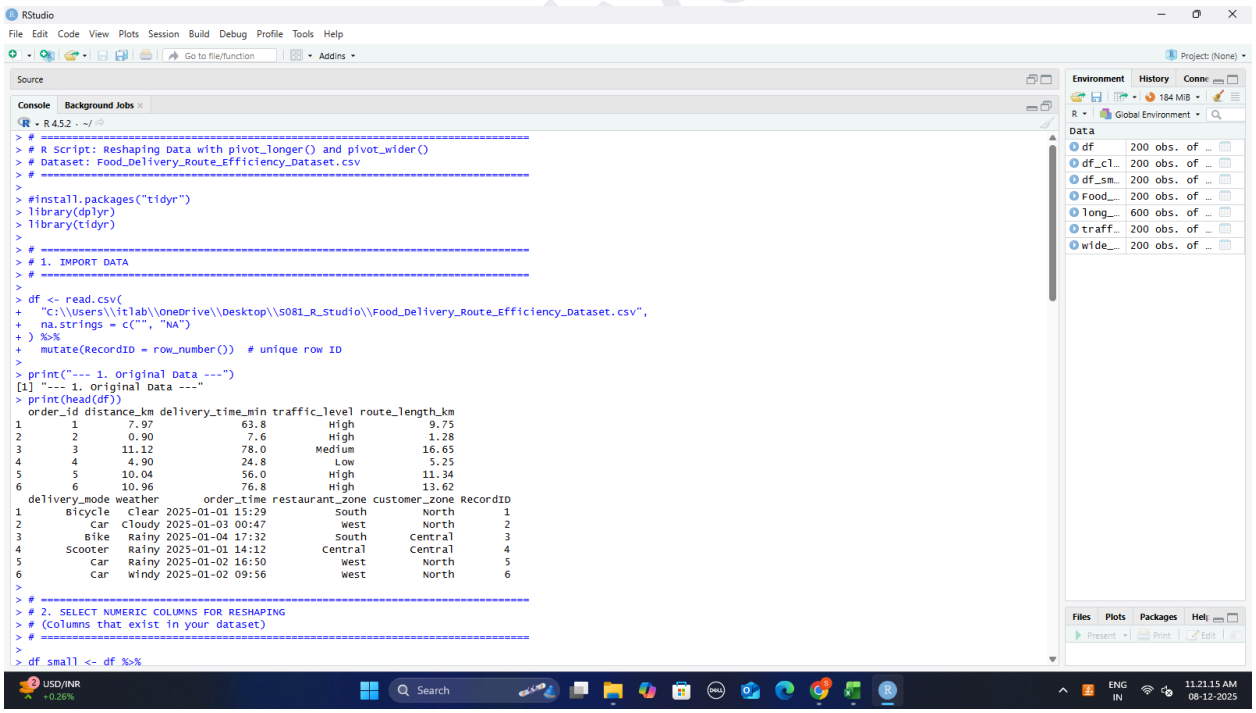


```
# ================================================================

long_df <- df_small %>%
  pivot_longer(
    cols = c(distance_km, delivery_time_min, route_length_km),
    names_to = "Metric",
    values_to = "Value"
  )

print("--- 2. Long Format ---")
print(head(long_df, 12))

# ================================================================
# 4. PIVOT_WIDER (Long → Wide)
# ================================================================

wide_df <- long_df %>%
  pivot_wider(
    names_from = Metric,
    values_from = value
  )

print("--- 3. Wide Format (Back to Original) ---")
print(head(wide_df))

# ================================================================
# 5. ADVANCED PIVOT (Spread traffic_level as columns)
# ================================================================

df_clean <- df %>%
  mutate(traffic_level = ifelse(is.na(traffic_level), "Unknown", traffic_level))

traffic_pivot <- df_clean %>%
  select(RecordID, traffic_level, delivery_time_min) %>%
  pivot_wider(
    names_from = traffic_level,
    values_from = delivery_time_min
  )

print("--- 4. Traffic Level Pivot Table ---")
print(head(traffic_pivot))
```



```
> # ================================================================
> # R Script: Reshaping Data with pivot_longer() and pivot_wider()
> # Dataset: Food_Delivery_Route_Efficiency_Dataset.csv
> # ================================================================
>
> #install.packages("tidyr")
> library(dplyr)
> library(tidyr)
>
> # ================================================================
> # 1. IMPORT DATA
> # ================================================================
>
> df <- read.csv(
+   "C:\\Users\\itlab\\OneDrive\\Desktop\\S081_R_Studio\\Food_Delivery_Route_Efficiency_Dataset.csv",
+   na.strings = c("", "NA")
+ ) %>%
+   mutate(RecordID = row_number())  # unique row ID
>
> print("--- 1. Original Data ---")
[1] "--- 1. Original Data ---"
> print(head(df))
  order_id distance_km delivery_time_min traffic_level route_length_km
1        1        7.97              63.8          High           9.75
2        2        0.90               7.6          High           1.28
3        3       11.12              78.0        Medium          16.65
4        4        4.90              24.8           Low           5.25
5        5       10.04              56.0          High          11.34
6        6       10.96              76.8          High          13.62
  delivery_mode weather       order_time restaurant_zone customer_zone RecordID
1       Bicycle   Clear 2025-01-01 15:29           South         North        1
2           Car  Cloudy 2025-01-03 00:47            West         North        2
3          Bike   Rainy 2025-01-04 17:32           South       Central        3
4       Scooter   Rainy 2025-01-01 14:12         Central       Central        4
5           Car   Rainy 2025-01-02 16:50            West         North        5
6           Car   Windy 2025-01-02 09:56            West         North        6
>
> # ================================================================
> # 2. SELECT NUMERIC COLUMNS FOR RESHAPING
> # (Columns that exist in your dataset)
> # ================================================================
>
> df_small <- df %>%
```

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Roll no. :- S081

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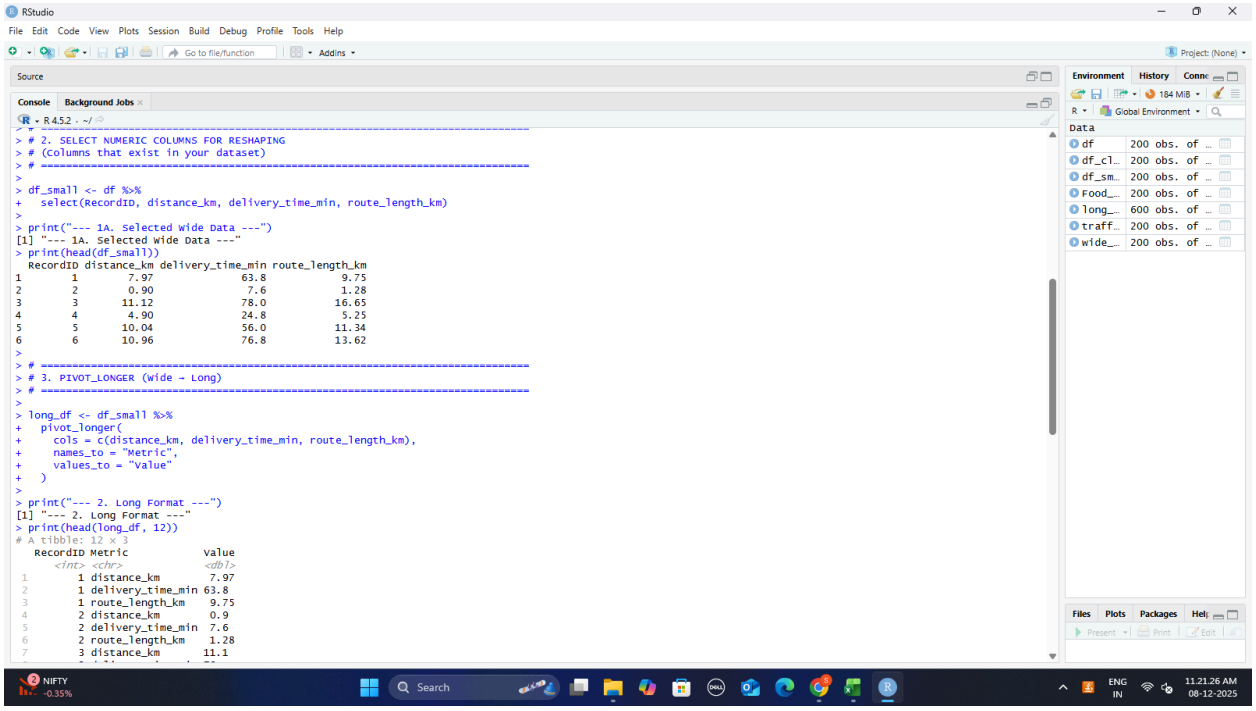
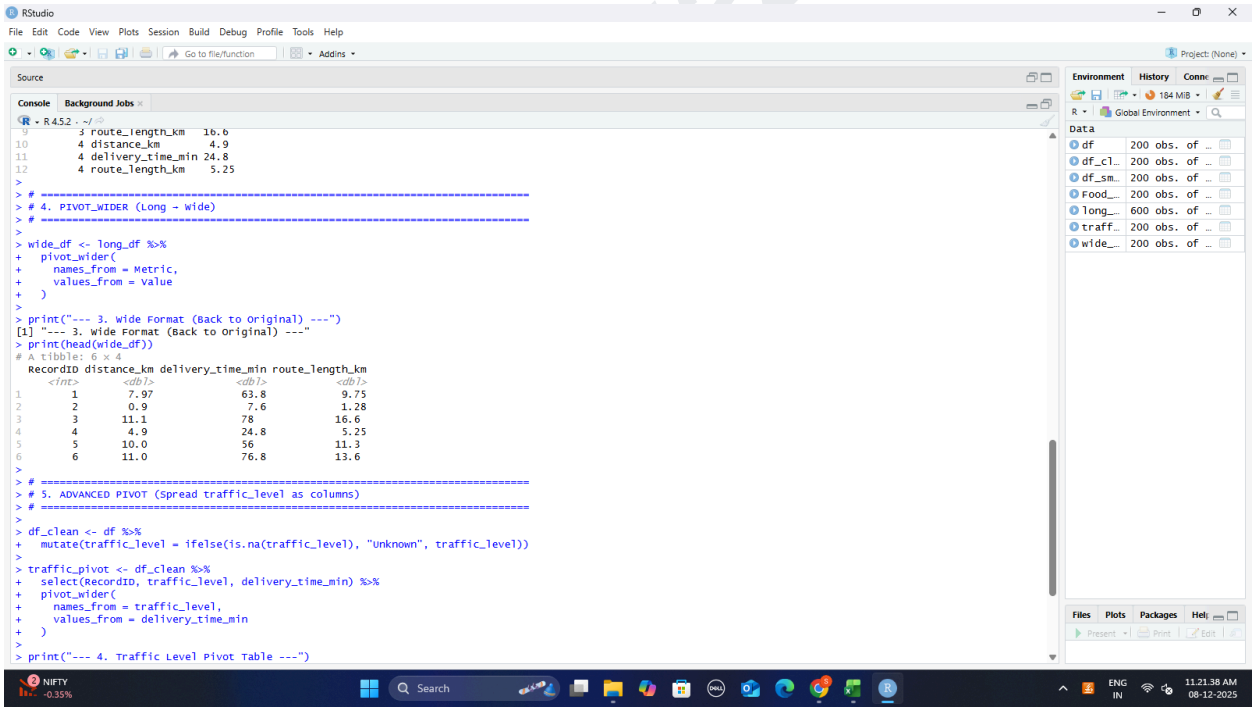


```
> # 2. SELECT NUMERIC COLUMNS FOR RESHAPING
> # (Columns that exist in your dataset)
> # ============================================================================
>
> df_small <- df %>%
+   select(RecordID, distance_km, delivery_time_min, route_length_km)
>
> print("--- 1A. Selected Wide Data ---")
[1] "--- 1A. Selected Wide Data ---"
> print(head(df_small))
  RecordID distance_km delivery_time_min route_length_km
1        1        7.97              63.8            9.75
2        2        0.90               7.6            1.28
3        3       11.12              78.0           16.65
4        4        4.90              24.8            5.25
5        5       10.04              56.0           11.34
6        6       10.96              76.8           13.62
>
> # ============================================================================
> # 3. PIVOT_LONGER (Wide → Long)
> # ============================================================================
>
> long_df <- df_small %>%
+   pivot_longer(
+     cols = c(distance_km, delivery_time_min, route_length_km),
+     names_to = "Metric",
+     values_to = "Value"
+   )
>
> print("--- 2. Long Format ---")
[1] "--- 2. Long Format ---"
> print(head(long_df, 12))
# A tibble: 12 × 3
   RecordID Metric           Value
      <int> <chr>            <dbl>
 1        1 distance_km       7.97
 2        1 delivery_time_min 63.8
 3        1 route_length_km    9.75
 4        2 distance_km       0.9
 5        2 delivery_time_min  7.6
 6        2 route_length_km    1.28
 7        3 distance_km       11.1
```



```
10        4 distance_km        4.9
11        4 delivery_time_min 24.8
12        4 route_length_km    5.25
>
> # ============================================================================
> # 4. PIVOT_WIDER (Long → Wide)
> # ============================================================================
>
> wide_df <- long_df %>%
+   pivot_wider(
+     names_from = Metric,
+     values_from = Value
+   )
>
> print("--- 3. Wide Format (Back to Original) ---")
[1] "--- 3. Wide Format (Back to Original) ---"
> print(head(wide_df))
# A tibble: 6 × 4
  RecordID distance_km delivery_time_min route_length_km
     <int>       <dbl>             <dbl>           <dbl>
1        1        7.97              63.8            9.75
2        2        0.9                7.6            1.28
3        3       11.1               78             16.6
4        4        4.9               24.8            5.25
5        5       10.0               56             11.3
6        6       11.0               76.8           13.6
>
> # ============================================================================
> # 5. ADVANCED PIVOT (Spread traffic_level as columns)
> # ============================================================================
>
> df_clean <- df %>%
+   mutate(traffic_level = ifelse(is.na(traffic_level), "Unknown", traffic_level))
>
> traffic_pivot <- df_clean %>%
+   select(RecordID, traffic_level, delivery_time_min) %>%
+   pivot_wider(
+     names_from = traffic_level,
+     values_from = delivery_time_min
+   )
>
> print("--- 4. Traffic Level Pivot Table ---")
```

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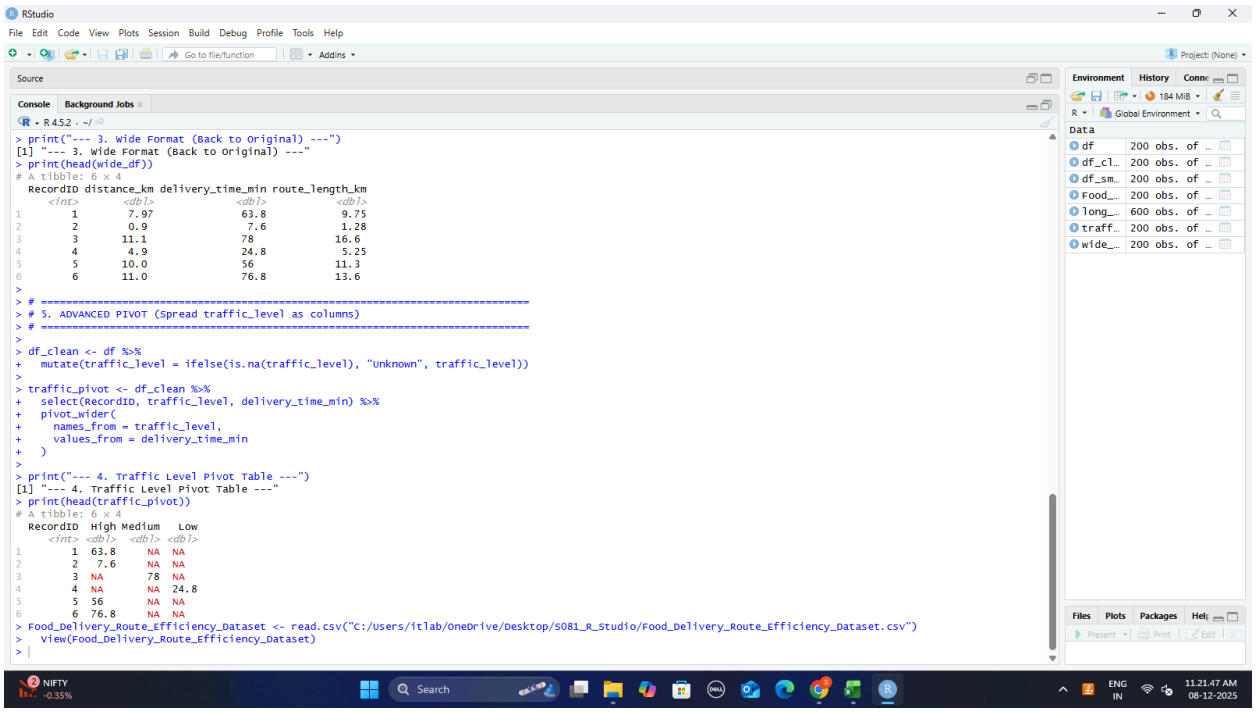

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