# Retail Sales Data Case Study

A Research Project by Ankit

# Contents

# Objectives

- Analysis performance of the sales at the time of markdowns, holidays and non-holidays.
- Publish the insights based on Data Analysis.

# Case Study

- This Case Study Consists of 3 datasets.
- The first dataset consists of Markdowns of each store on Holiday and Not Holiday.
- The second dataset consists of Retail Sales of respective store and departments on Holiday and Not Holiday.
- The third dataset consists of size of store in different types.

# Data Analysis

- In Data Analysis of three tables of Retail Data Analytics dataset, the attributes which are affecting business are in features table is consisting Total Markdowns, Holidays for different stores. Sales table is consisting Weekly Sales in different department of each store and Stores table is consisting Store Sizes of different store.

# Important Factors to Optimize Business

- Total Markdowns
- Holidays
- Sales
- Size of Stores
- CPI
- Fuel Price
- Temperature
- Unemployment

# Table Analysis

- Features Table includes number of stores which is 45. Date is given in the dataset on the basis of week. Total no. of distinct dates are 182.
- Sales table includes different total no. of departments for each store.
- Stores table includes types which categorize size of the store.

# Yearly Sales

- Sales are decreasing with respect to Year from 2010 to 2012.
- In 2010, Sales are 16270.28 and in 2011, Sales are 15954.07 and in 2012, Sales are 15694.95

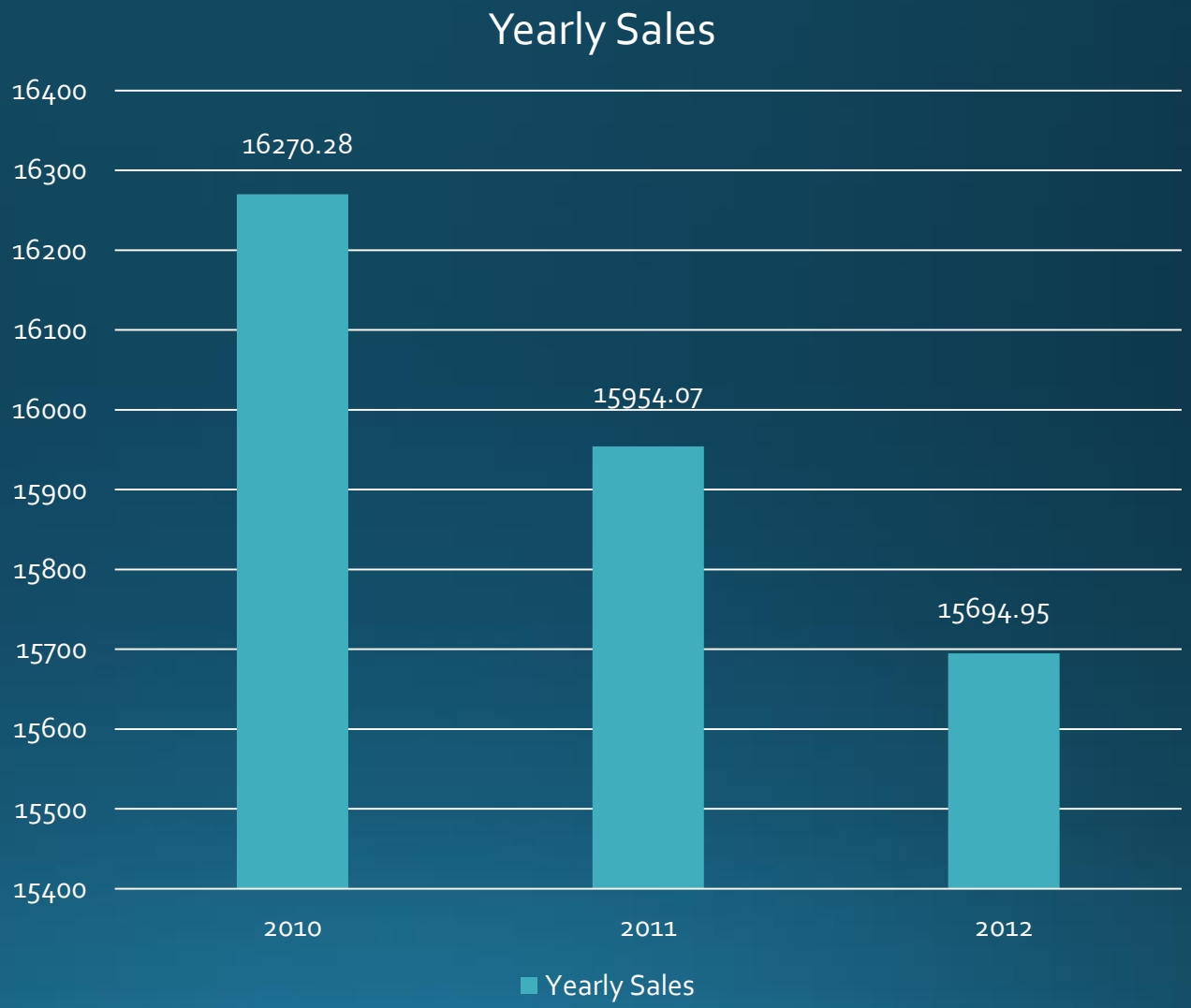
unpivot to pivot | Final SQL Research Project* | school_db* | loan_db_new_extra

Limit to 50000 rows

```
64    -- sales Analysis
65    -- Yearwise sales
66 •  select  year(newdate) "Year",
67    round(Avg(Weekly_Sales),2)
68    "Year Wise Weekly Sales"
69    from sales
70    group by year(newdate);
71 •  create index idx_sales_Weekly_Sales
72    on sales(Weekly Sales);
```

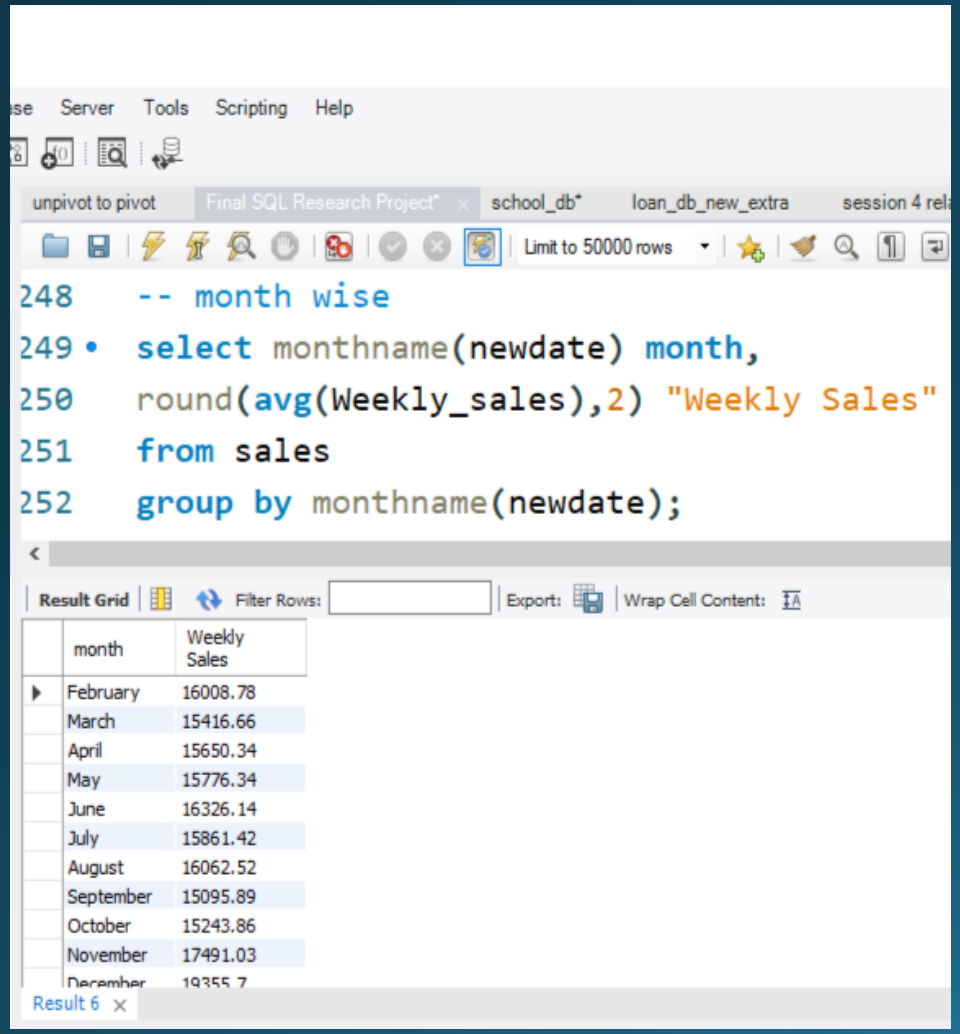
Result Grid | Filter Rows: | Export: | Wrap Cell Content:

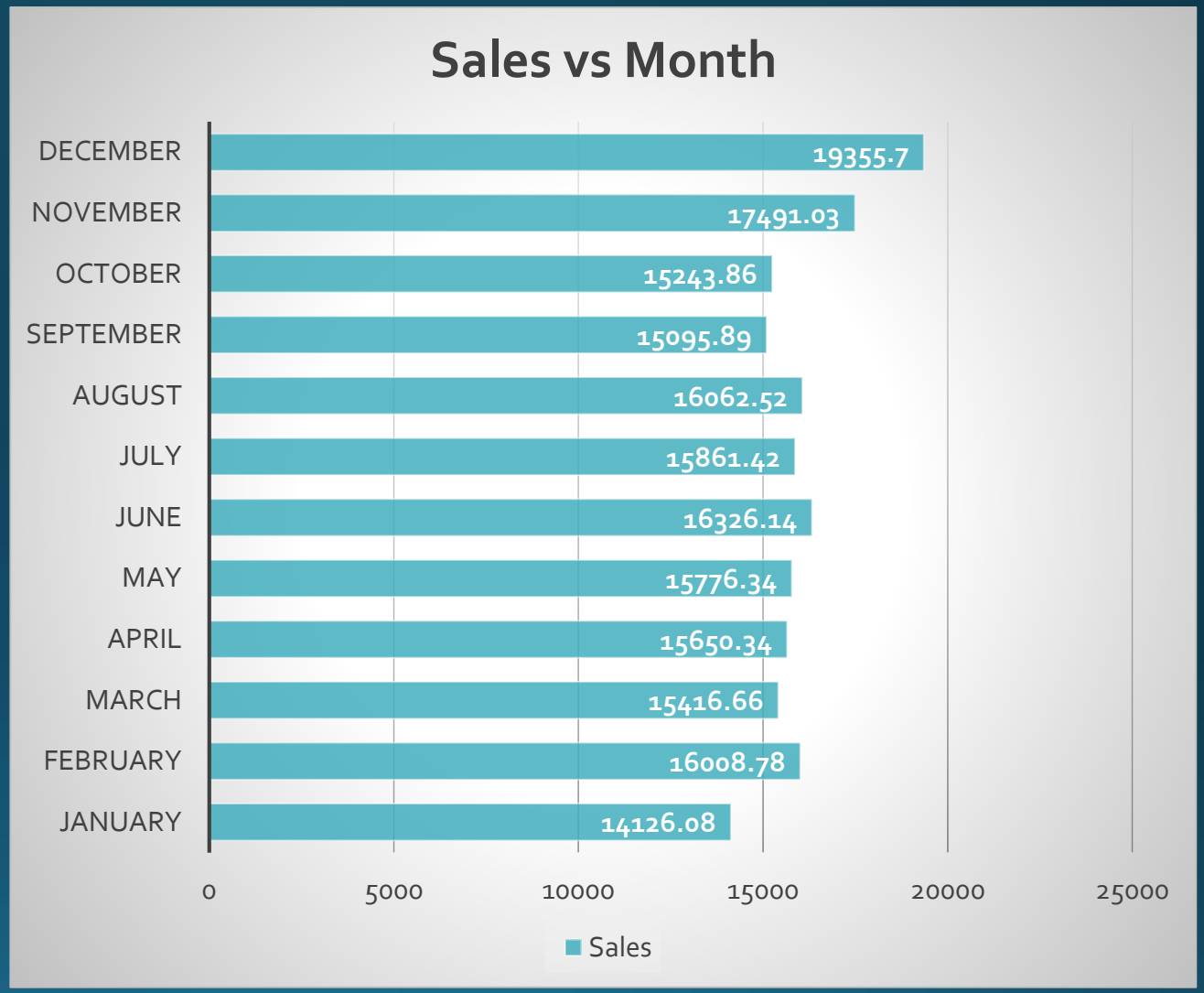
| Year | Year Wise Weekly Sales |
|---|---|
| 2010 | 16270.28 |
| 2011 | 15954.07 |
| 2012 | 15694.95 |



# Monthly Sales

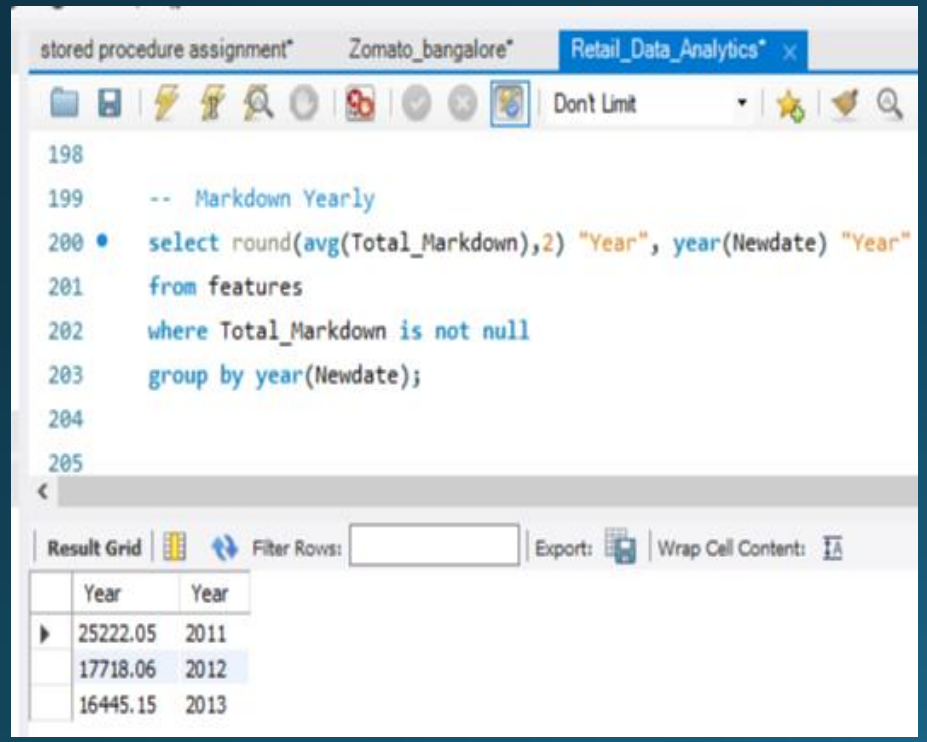
- In December, Sales appear higher than any other month.
- Sales are lowest in the month of

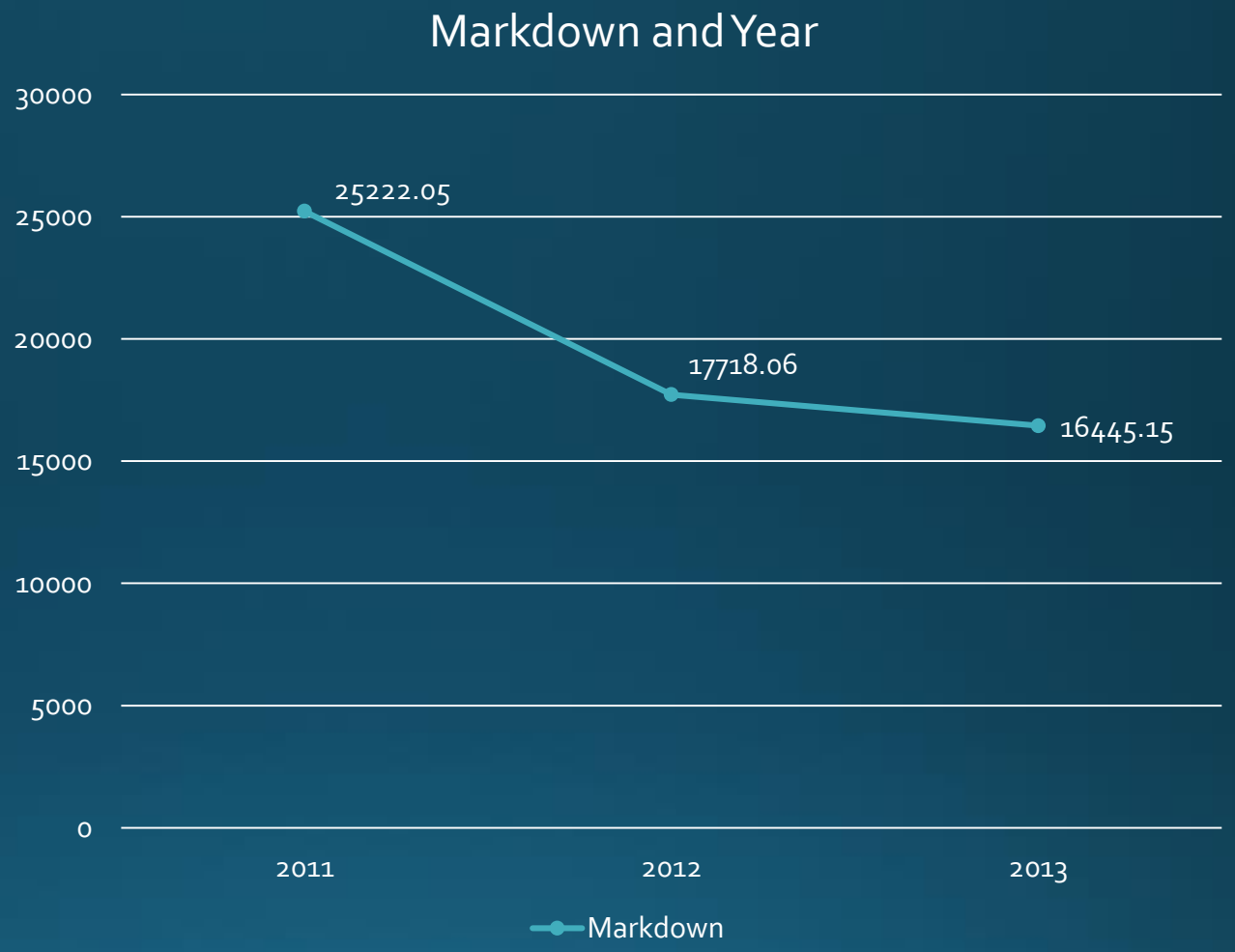


# Markdown in Different Year

- Highest Markdown in 2011 which is 25222.05
- Lowest Markdown in 2013 which is 16445.15



# Holidays impact on Monthly sales and Average Markdown

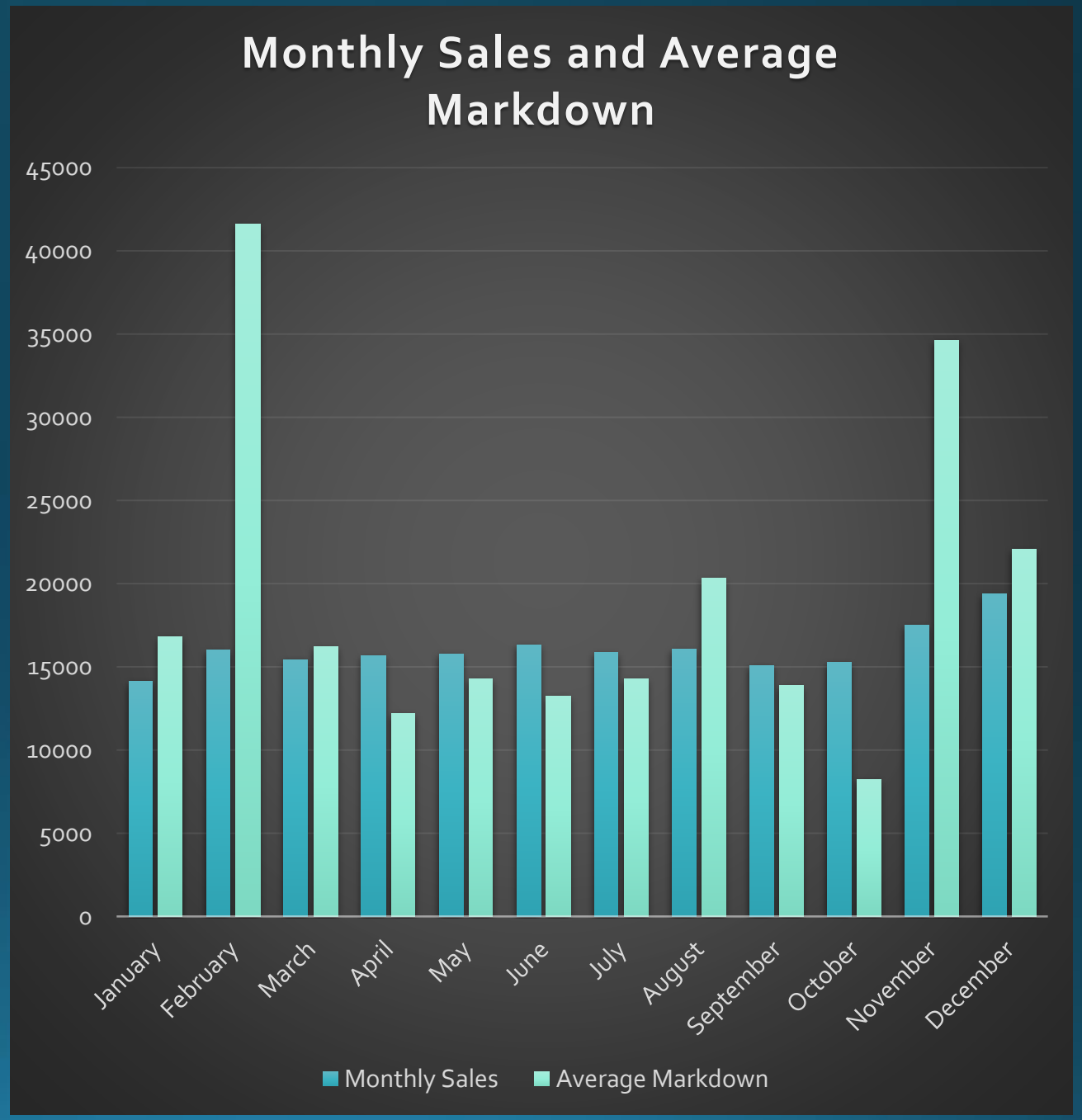
ot to pivot | Final SQL Research Project | school_db* | loan_db_new_extra | session 4 relationships*

Limit to 50000 rows

```
-- Analysis performance of the  sales at the
-- time of markdowns
select  monthname(s.newdate) "Month", round
(Avg(Weekly_Sles),2) "Month Wise Sales",
round(avg(total_markdown),2) "Average Markdown"
from sales s inner join  features f on s.store
= f.store and s.newdate = f.newdate
group by monthname(s.newdate)
order by 3 desc;
```

lt Grid | Filter Rows: | Export: | Wrap Cell Content:

| Month | Month Wise Sales | Average Markdown |
|---|---|---|
| ebruary | 16008.78 | 41592.09 |
| ovember | 17491.03 | 34601.95 |
| ecember | 19355.7 | 22050.89 |
| ugust | 16062.52 | 20327.95 |



# Analysis of Markdown and Number of Holidays and Non Holidays

unpivot to pivot | Final SQL Research Project* | school_db* | loan_db_new_extra | session 4 relationships*

Limit to 50000 rows

```
95   -- Markdowns holiday wise
96 • select  if (isholiday = "T", "Holiday", "
97   Not_Holiday") "Holiday_or_Not_Holiday",
98    round(avg(Total_Markdown),2) Total_Markdown,
99   count(distinct(newdate))
100  Number_of_Holidays_or_Not_Holidays
101  from features
102  group by isholiday;
103
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

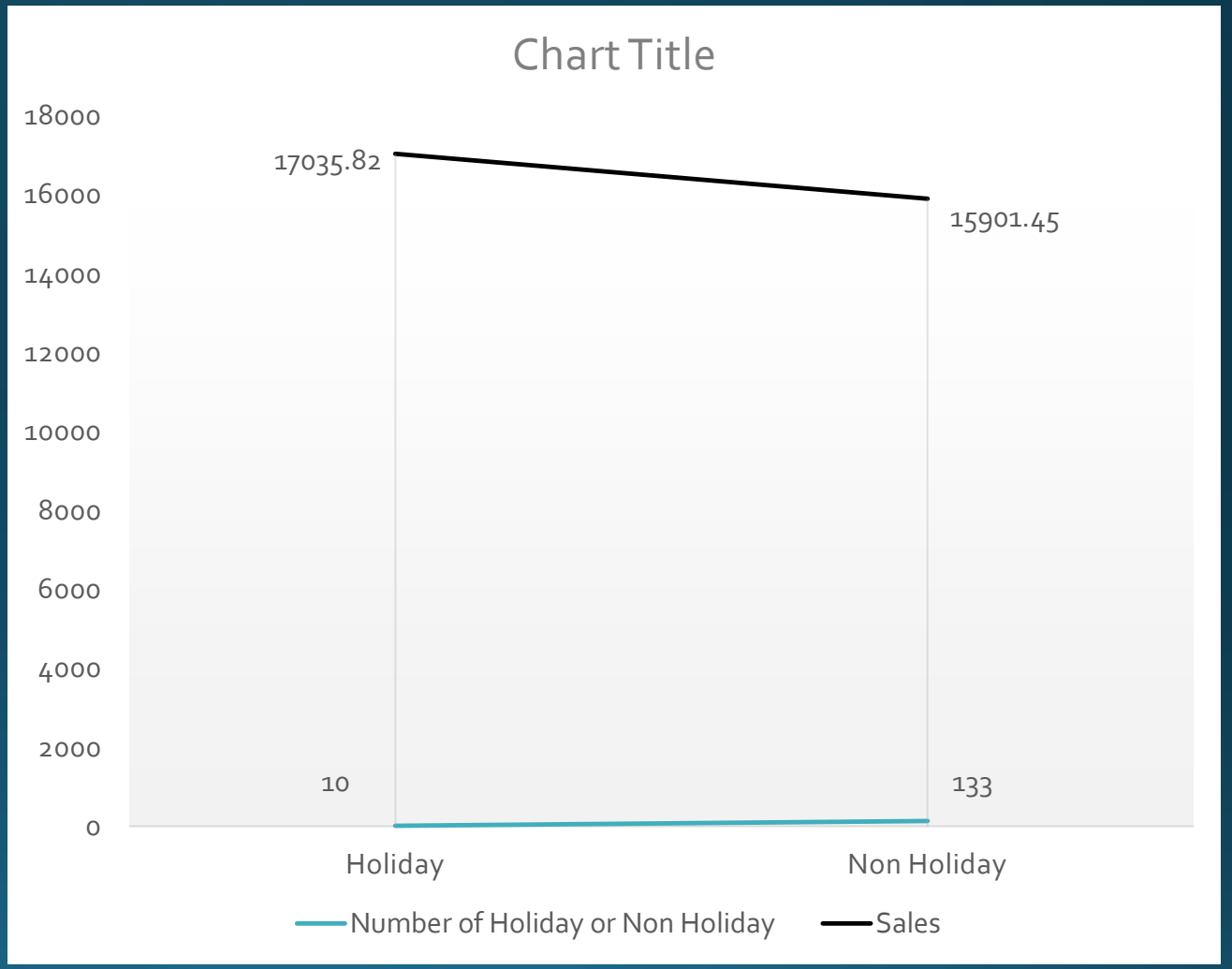
| Holiday_or_Not_Holiday | Total_Markdown | Number_of_Holidays_or_Not_Holidays |
|---|---|---|
| Not_Holiday | 15423.07 | 169 |
| Holiday | 48050.8 | 13 |

# Holiday wise Sales Analysis

```
86   -- Sales holiday wise
87 • select  if (isholiday = "T", "Holiday",
88   "Not_Holiday") "Holiday_or_Not_Holiday",
89    round(avg(Weekly_sales),2) Weekly_sales,
90   count(distinct(newdate))
91   Number_of_Holidays_or_Not_Holidays
92   from sales
93   group by isholiday;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

| Holiday_or_Not_Holiday | Weekly_sales | Number_of_Holidays_or_Not_Holidays |
|---|---|---|
| Not_Holiday | 15901.45 | 133 |
| Holiday | 17035.82 | 10 |

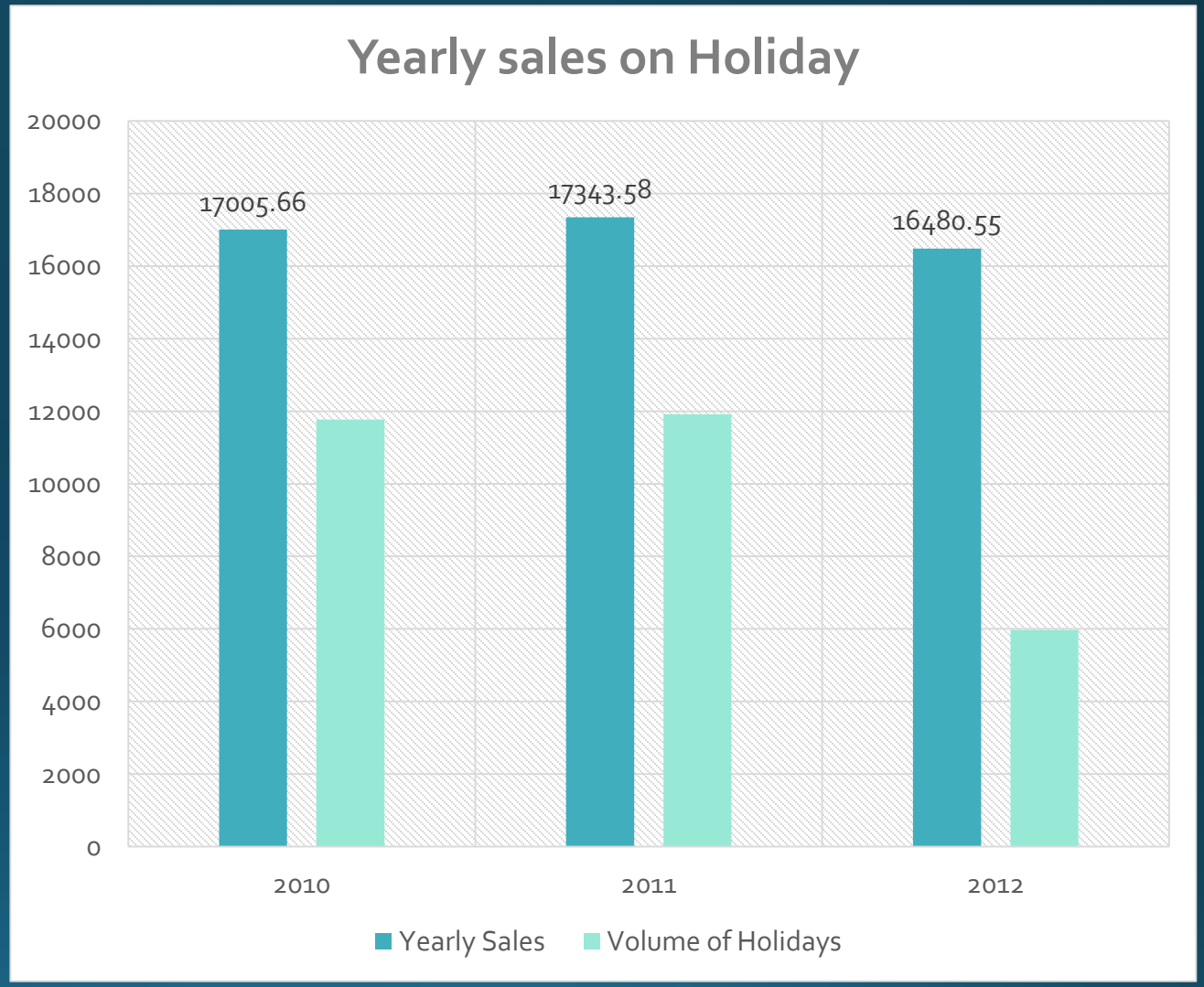


# Yearly Sales on Holiday

```
275   -- Why yearwise weekly sales and Volume of Holidays
276 • select  year(newdate) "Year", round(Avg(Weekly_Sales),2)
277    "Yearly Sales",count(newdate) "Volume of Holidays"
278   from sales
279   where isholiday ="T"
280   group by year(newdate);
281
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

| Year | Yearly Sales | Volume of Holidays |
|---|---|---|
| 2010 | 17005.66 | 11774 |
| 2011 | 17343.58 | 11920 |
| 2012 | 16480.55 | 5967 |



# Sales with respect to Store

- Highest Sales is in store 20
- Lowest Sales is in store 5

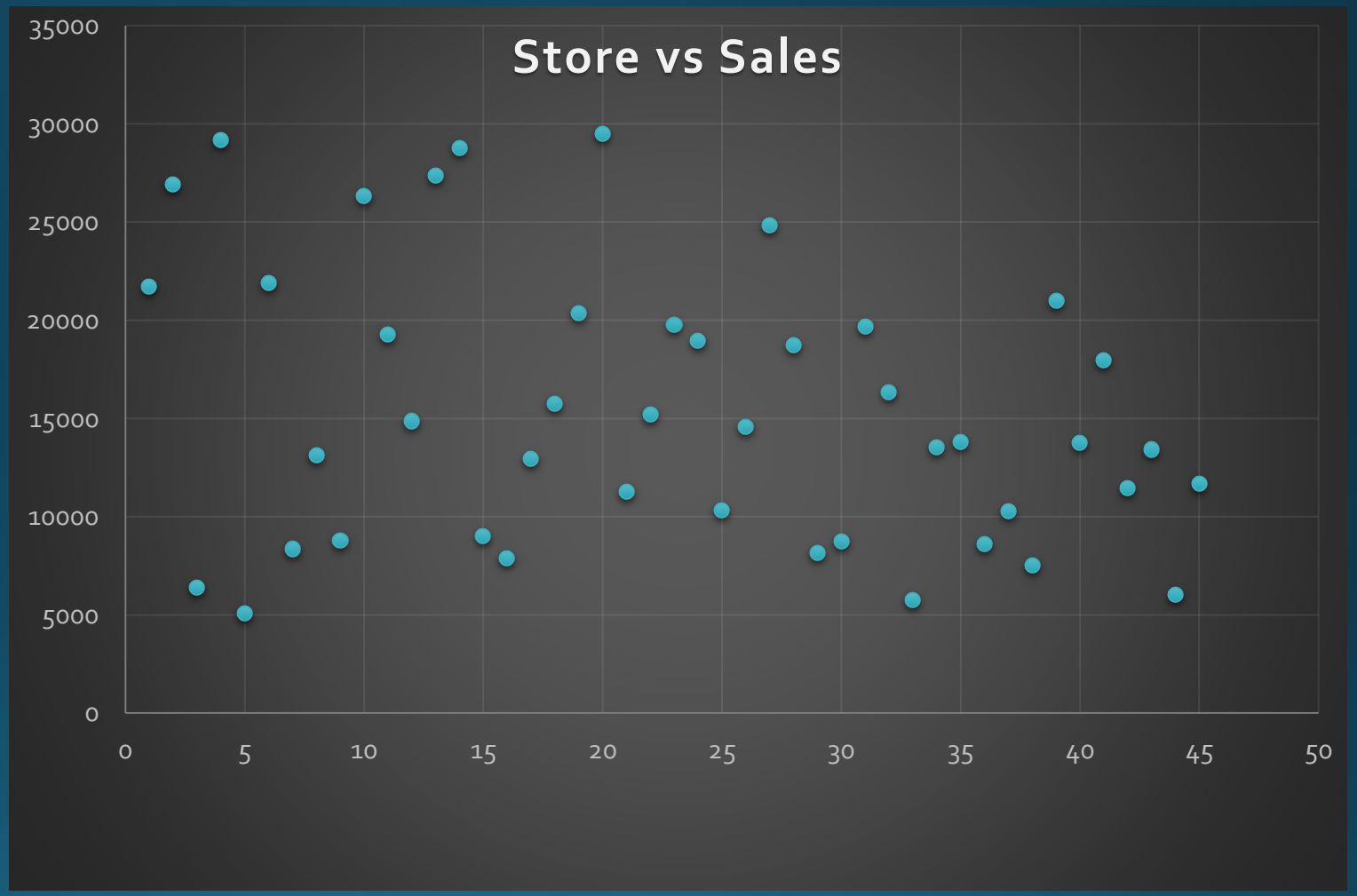
unpivot to pivot | Final SQL Research Project*

Limit to 50000 rows

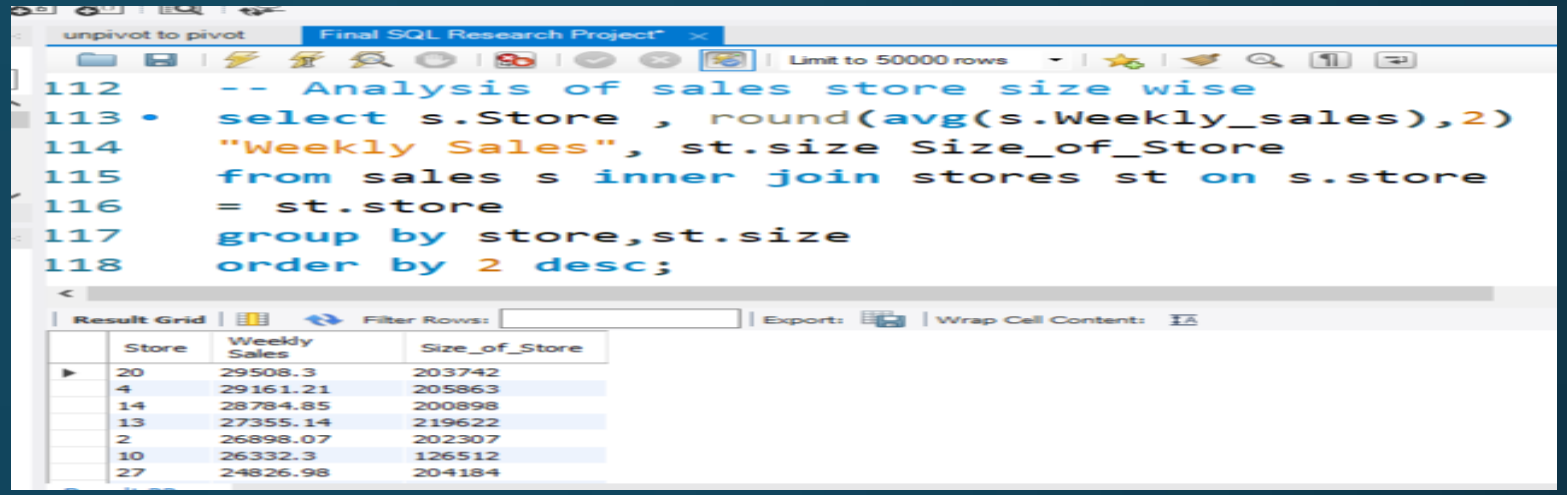
```
175    -- Analysis of sales store wise
176 •  select Store , round(avg(Weekly_sales),2)
177    "Weekly Sales"
178    from sales
```

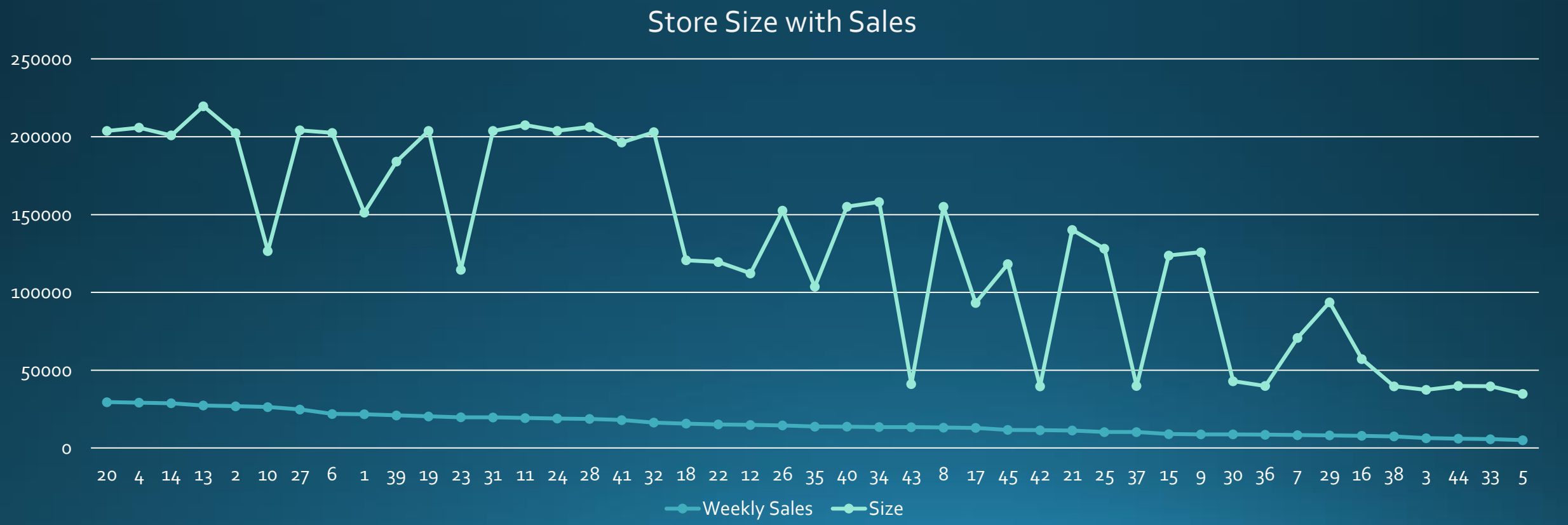
Result Grid | Filter Rows: | Export: | Wrap Cell Content:

| Store | Weekly Sales |
|---|---|
| 1 | 21710.54 |
| 2 | 26898.07 |
| 3 | 6373.03 |
| 4 | 29161.21 |
| 5 | 5053.42 |
| 6 | 21913.24 |
| 7 | 8358.77 |
| 8 | 13133.01 |
| 9 | 8772.89 |
| 10 | 26332.3 |
| 11 | 19276.76 |
| 12 | 14867.31 |
| 13 | 27355.14 |



# Proportionality of Sales and Store Size



# Store wise Markdowns

- Highest total markdowns is in store 39.
- Lowest total markdowns is in store 44.

```
175    -- Analysis of markdown store wise
176 •  select Store , round(avg(total_markdown),2)
177    "markdowns"
178    from features
179    group by store;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

| Store | markdowns |
|---|---|
| 1 | 20985.07 |
| 2 | 27169.87 |
| 3 | 7066.65 |
| 4 | 28411.99 |
| 5 | 7957.17 |
| 6 | 24731.7 |
| 7 | 11966.28 |
| 8 | 17608.02 |
| 9 | 9141.38 |
| 10 | 26535.87 |
| 11 | 23468 |
| 12 | 25415.89 |

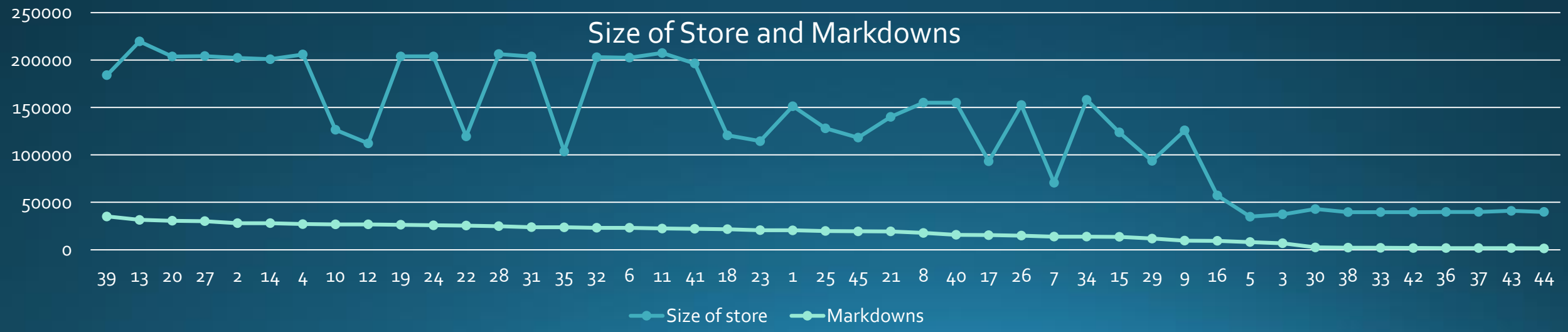
# Size of Stores affect Markdowns

```
471    -- Markdowns and size
472    select  st.store,round(avg(st.size),2) Average_Size,
473     round(avg(f.Total_Markdown) , 2) Markdown
474    from features f inner join stores st on st.store =
475     f.store inner join sales s on s.store = f.store and
476    s.newdate = f.newdate
477    where Total_Markdown is not null
478    group by st.store
479    order by 3 desc;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content

| store | Average_Size | Markdown |
|---|---|---|
| 39 | 184109.00 | 35152.13 |
| 13 | 219622.00 | 31509.04 |
| 20 | 203742.00 | 30612.56 |
| 27 | 204184.00 | 30138.92 |
| 2 | 202307.00 | 28060.36 |
| 14 | 200898.00 | 28050.58 |
| 4 | 205863.00 | 27100.95 |
| 10 | 126512.00 | 26789.84 |
| 12 | 112238.00 | 26772.62 |

Result 13



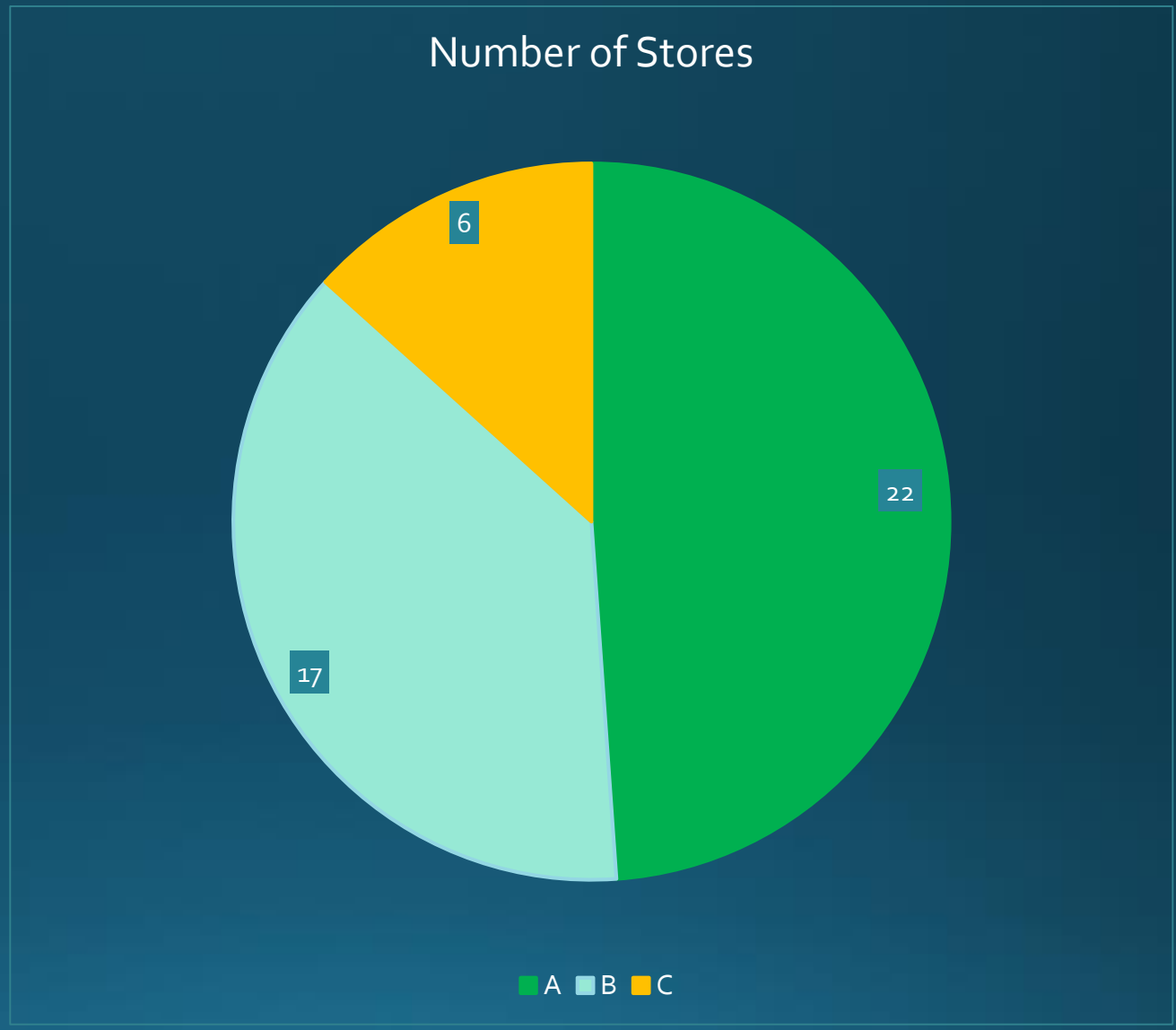
# Number of Stores in each Type of Store

- Type A of Stores consist of highest Number of Stores which is 22
- Type C of Stores consist of Lowest Number of Stores which is 6

```
433     -- stores
434 •   select type, count(Store) Number_of_Store from stores group by type;
435
436
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

| type | Number_of_Store |
|---|---|
| A | 22 |
| B | 17 |
| C | 6 |



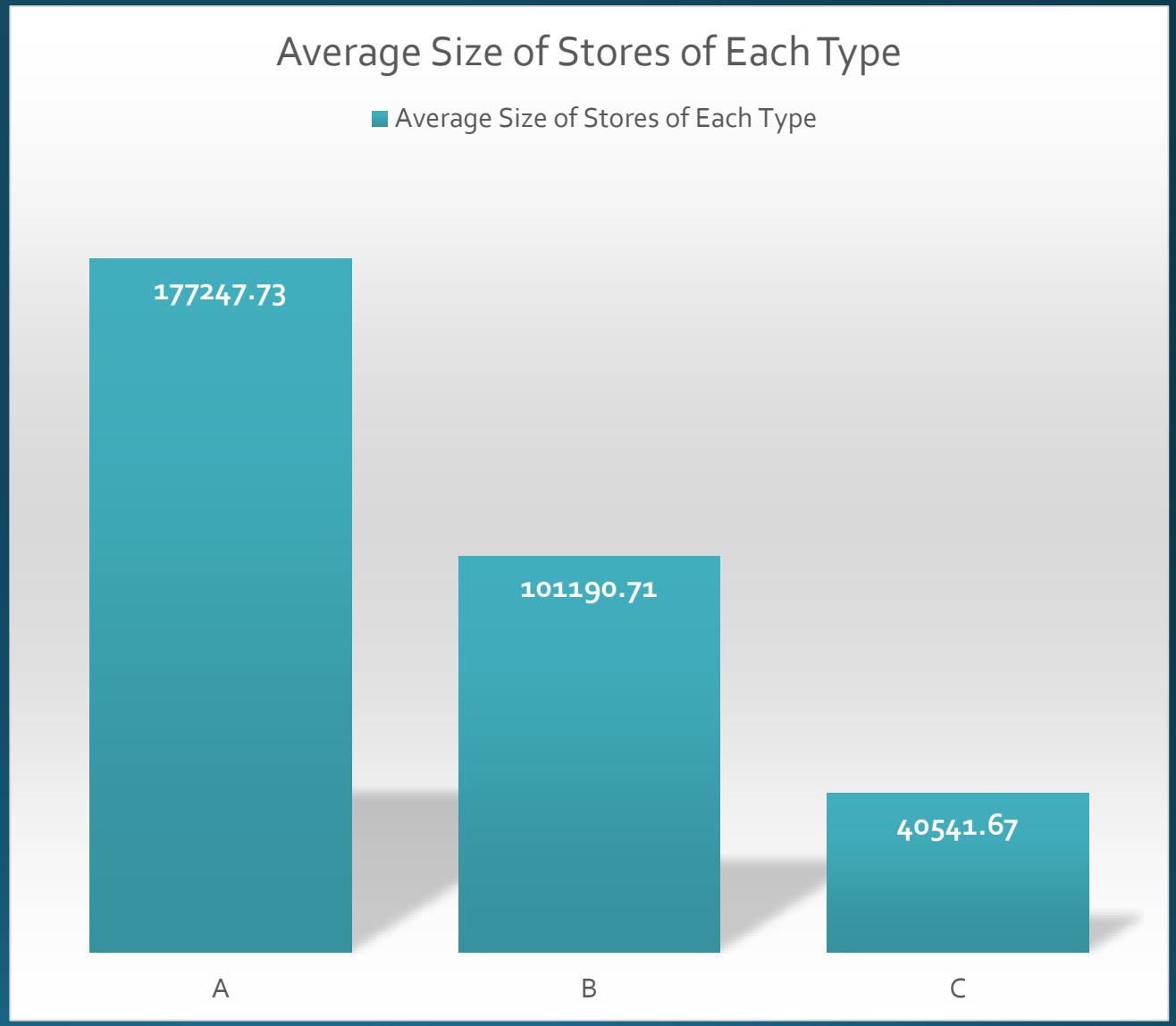
# Size of Stores of each Type

- Type A has largest Average size of stores which is 177247.73
- Type C has lowest Average size of stores which is 40541.67

```
440
441     -- size
442 •   select type, round(avg(size),2) Size from stores group by type;
443
444
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

| type | Size |
|---|---|
| A | 177247.73 |
| B | 101190.71 |
| C | 40541.67 |



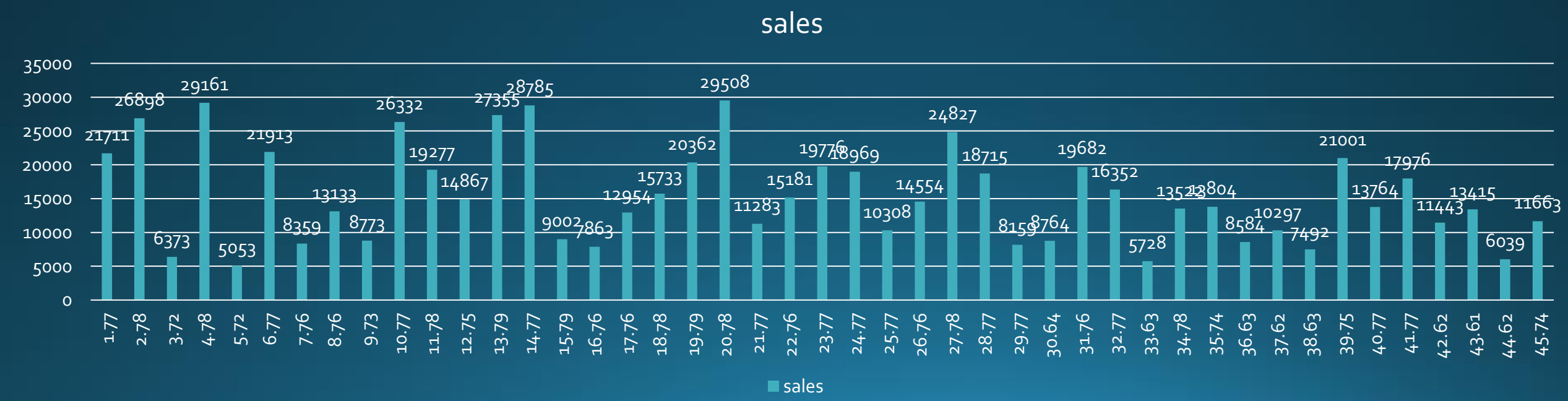
# Sales by Number of Departments

- NOTE:1.77 in below table is "store. Total Number of Departments"

```
455     -- dept sales
456     -- Table no. of departments in store  analysis
457
458 •   create table deptsales as (select  store,  count(distinct(dept))
459     Number_of_Departments, round(avg(weekly_sales)) sales
460     from sales
461     group by store
462     order by sales desc);
463
464 •   select *
465     from deptsales
466     order by store asc;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

| store | Number_of_Departments | sales |
|---|---|---|
| 1 | 77 | 21711 |
| 2 | 78 | 26898 |
| 3 | 72 | 6373 |
| 4 | 78 | 29161 |
| 5 | 72 | 5053 |



# Sales with respect to CPI(Consumer Price Index)

- As per analysis, CPI is increasing and Sales are decreasing on yearly basis.

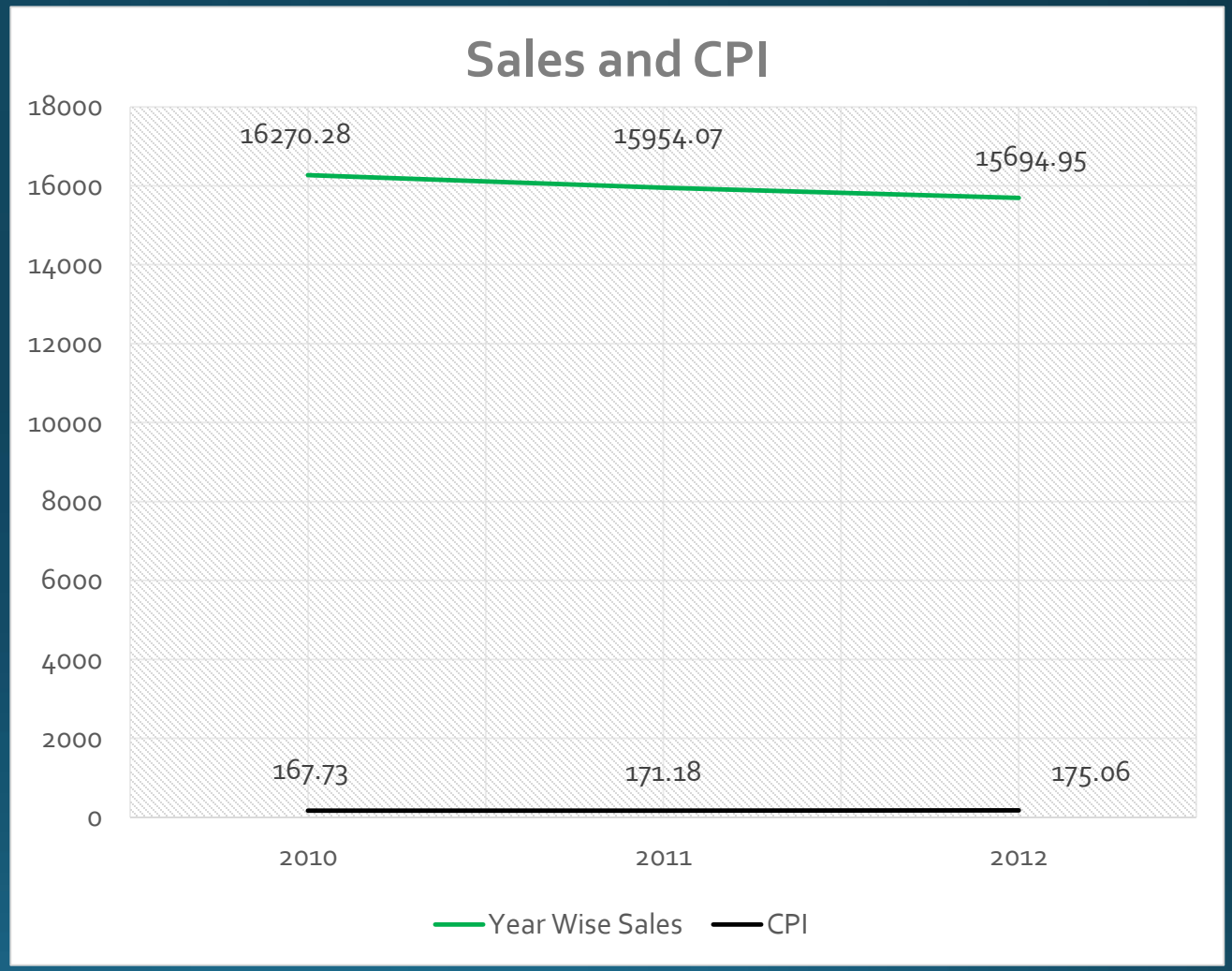
unpivot to pivot | Zomato_bangalore | Retail_Data_Analytics*

Limit to 50000 rows

```
354    -- CPI
355 •  select  year(s.newdate) "Year", round(Avg(Weekly_Sales),2)
356    "Year Wise Weekly Sales",round(avg(f.cpi),2) "CPI"
357    from sales s inner join  features f on s.store = f.store
358    and s.newdate = f.newdate
359    group by year(s.newdate);
360
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

| Year | Year Wise Weekly Sales | CPI |
|---|---|---|
| 2010 | 16270.28 | 167.73 |
| 2011 | 15954.07 | 171.18 |
| 2012 | 15694.95 | 175.06 |



# Yearly Sales and Fuel Price Analysis

- As Sales are decreasing on yearly basis fuel prices are increasing.

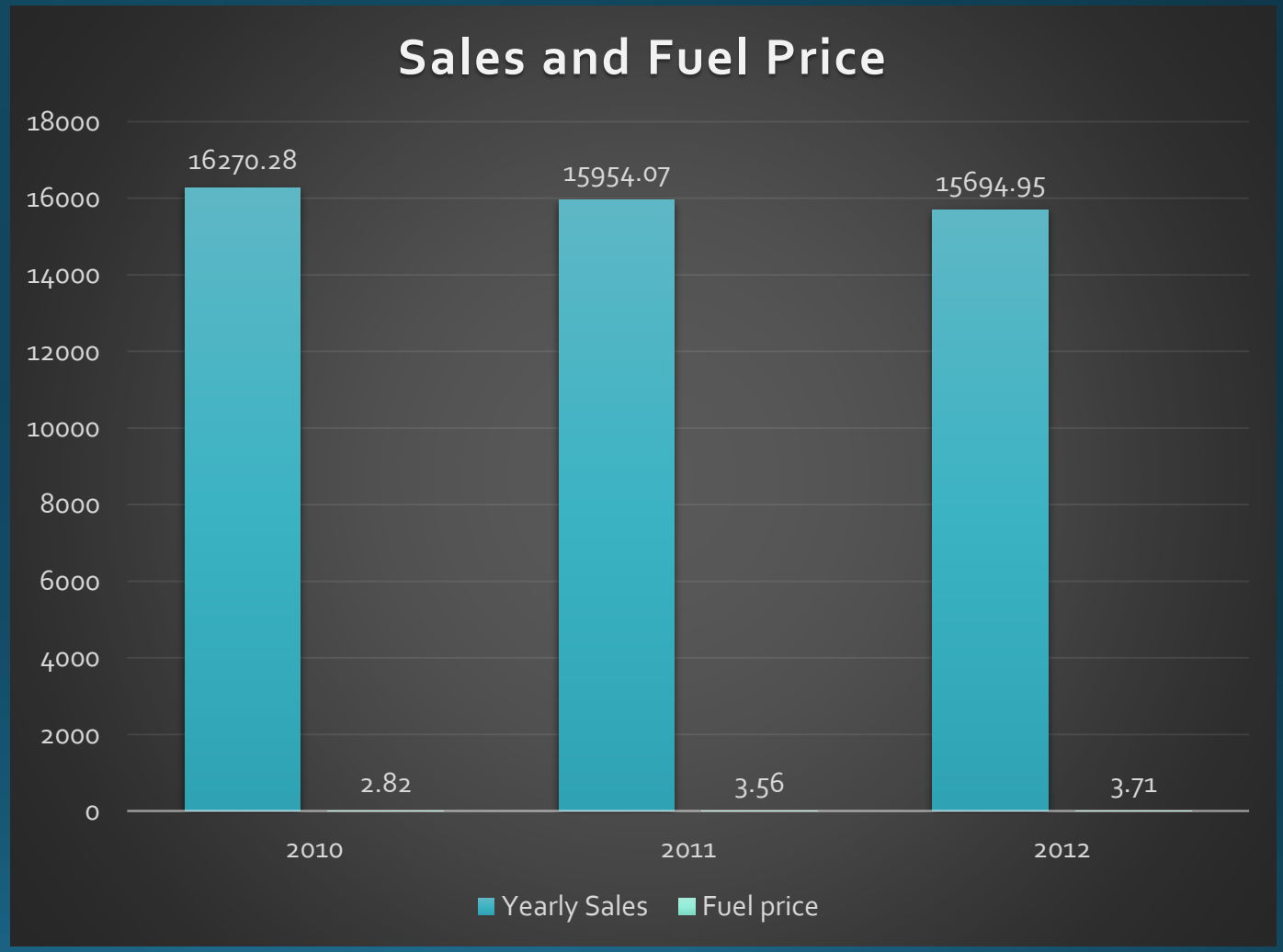
unpivot to pivot | Zomato_bangalore | Retail_Data_Analytics*

Limit to 50000 rows

```
362    -- Fuel price
363 •  select  year(s.newdate) "Year", round(Avg(Weekly_Sales),2)
364    "Year Wise Weekly Sales",
365    round(avg(f.fuel_price),2) Fuel_price
366    from sales s inner join  features f on s.store = f.store and
367    s.newdate = f.newdate
368    group by year(s.newdate);
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

| Year | Year Wise Weekly Sales | Fuel_price |
|---|---|---|
| 2010 | 16270.28 | 2.82 |
| 2011 | 15954.07 | 3.56 |
| 2012 | 15694.95 | 3.71 |



# Temperature and Monthly Sales Analysis

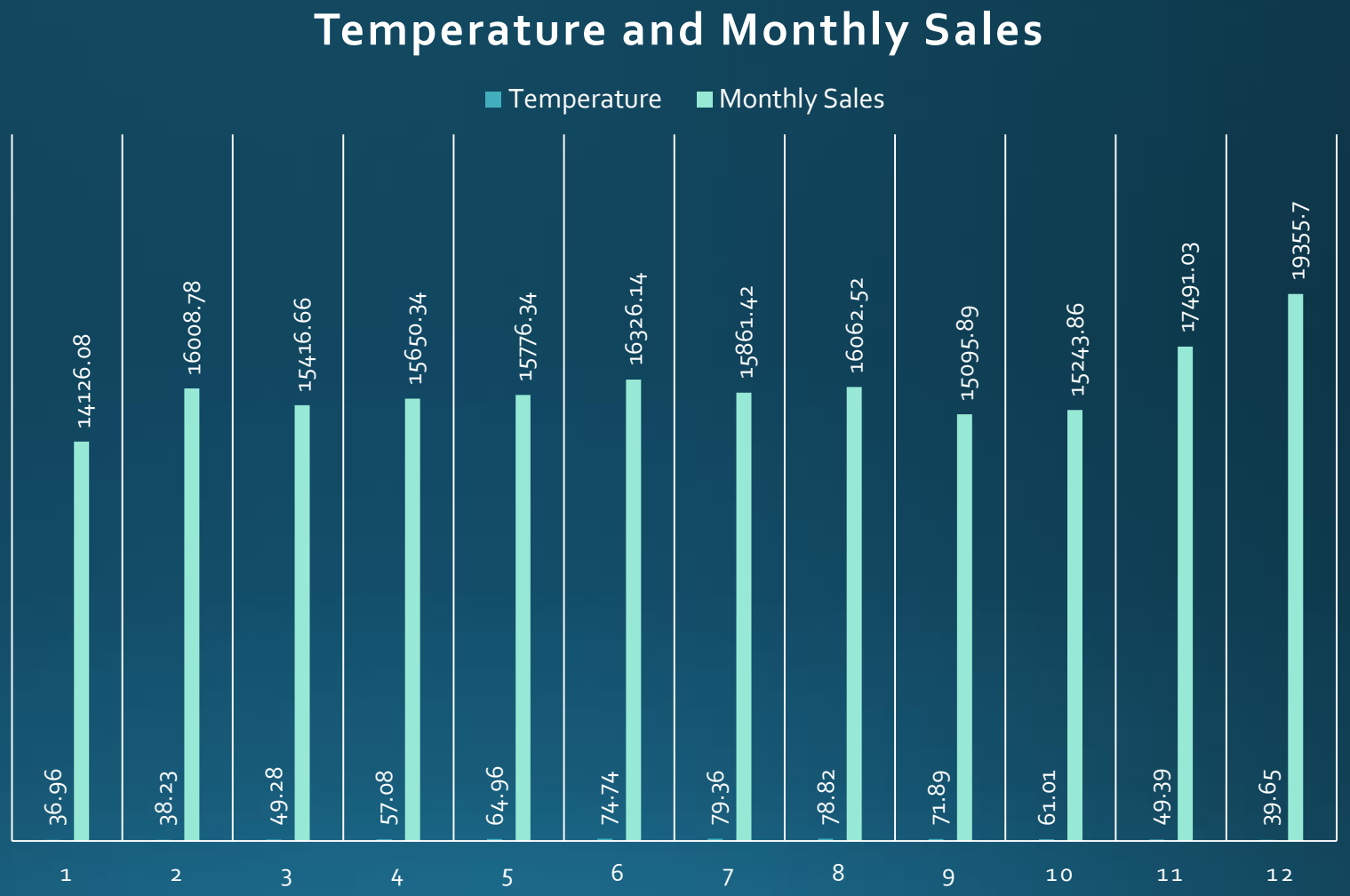
- At temperature above 57 degree F, it is giving Average Monthly Sales value as 15716.64 for 7 months.
- Note: 1 = January to 12 = December

```
405     -- sales
406 •   create table salestemperature as (select  month(s.newdate) ,
407     round(avg(f.temperature),2) Temperature, round(Avg(Weekly_Sales),2)
408     Year_Wise_Weekly_Sales
409     from sales s inner join  features f on s.store = f.store and
410     s.newdate = f.newdate
411     group by month(s.newdate)
412     order by month(s.newdate) asc);
413
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

| month(s.newdate) | Temperature | Year_Wise_Weekly_Sales |
|---|---|---|
| 1 | 36.96 | 14126.08 |
| 2 | 38.23 | 16008.78 |
| 3 | 49.28 | 15416.66 |
| 4 | 57.08 | 15650.34 |
| 5 | 64.96 | 15776.34 |
| 6 | 74.74 | 16326.14 |
| 7 | 79.36 | 15861.42 |
| 8 | 78.82 | 16062.52 |
| 9 | 71.89 | 15095.89 |

salestemperature 2



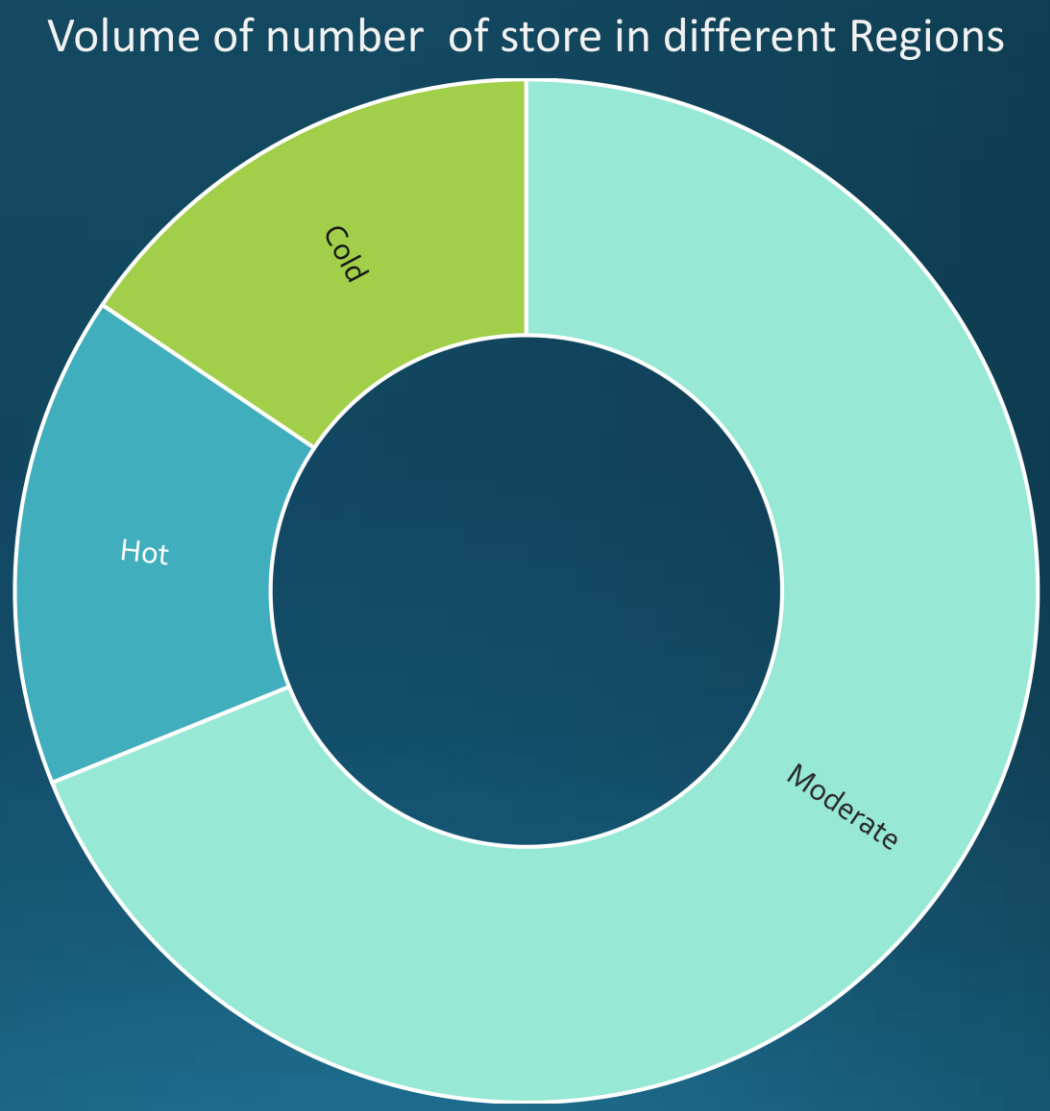
# Volume of number of store in different region

- Hot region consist of 7 Stores.
- Moderate region consist of 31 Stores.
- Cold region consist of 7 Stores.

```
239
240 • select  Case when  Average_temperature between 70 and 75.44 then "Hot"
241       when  Average_temperature between 50 and 69.99 then "Moderate"
242     else "Cold"
243     end Status_of_Temperature, count(Store) Number_of_stores
244     from Regionwisetemperature
245     group by Status_of_Temperature;
246
247
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

| Status_of_Temperature | Number_of_stores |
|---|---|
| Hot | 7 |
| Moderate | 31 |
| Cold | 7 |



# Sales and Unemployment Analysis

- As Sales are decreasing Unemployment also decreasing.

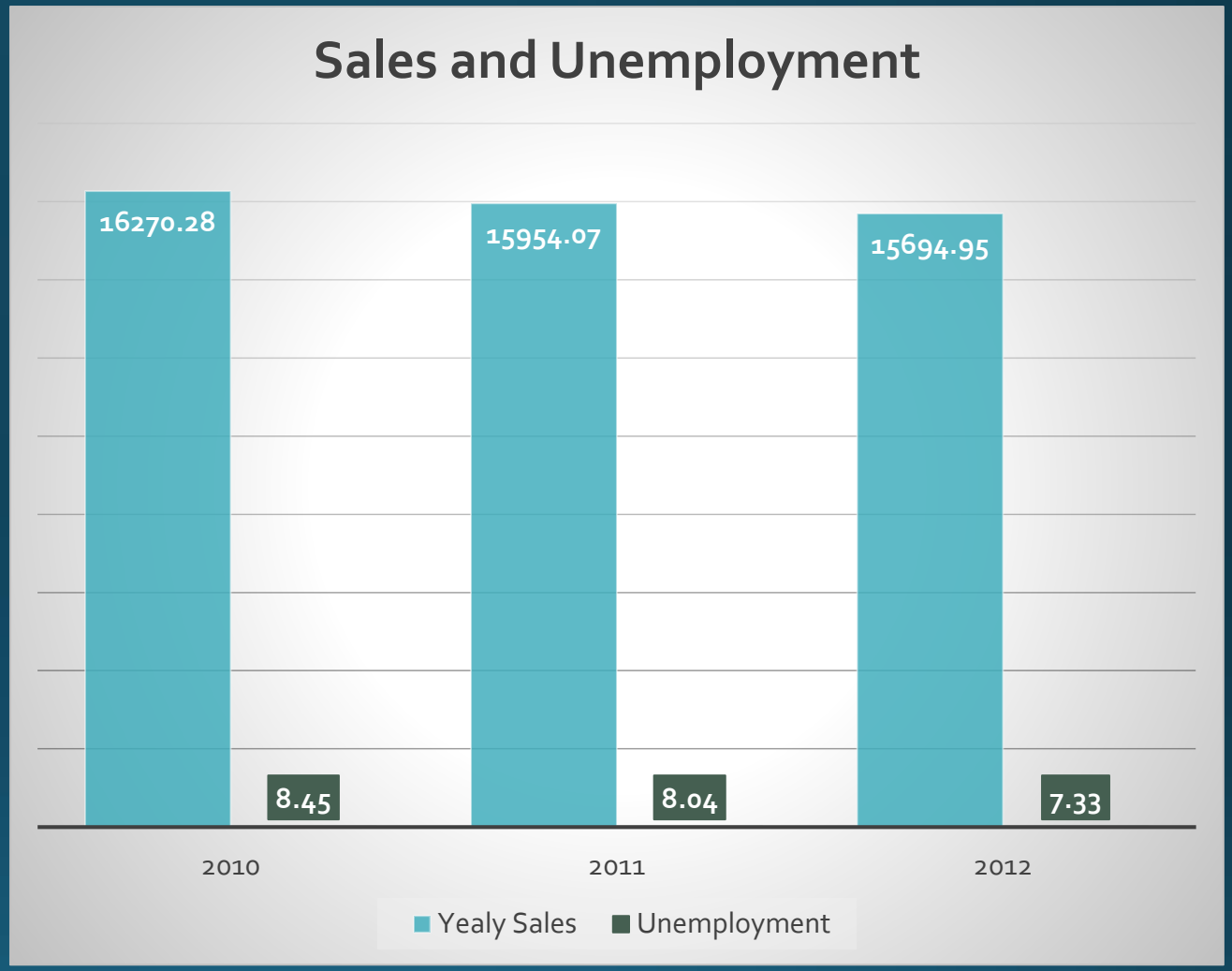
stored procedure assignment* | Zomato_bangalore* | Retail_Data_Analytics*

Don't Limit

```
394    -- Unemployment
395 •  select  year(s.newdate) "Year", round(Avg(Weekly_Sales),2)
396    "Year Wise Weekly Sales",
397    round(avg(f.Unemployment),2) Unemployment
398    from sales s inner join  features f on s.store = f.store
399    and s.newdate = f.newdate
400    group by year(s.newdate);
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

| Year | Year Wise Weekly Sales | Unemployment |
|---|---|---|
| 2010 | 16270.28 | 8.45 |
| 2011 | 15954.07 | 8.04 |
| 2012 | 15694.95 | 7.33 |



# Findings

- As per Company's information, Effectiveness of **Promotional Strategies** can be responsible for decreasing in sales.
- According to Analysis, **Timing and Magnitude of Markdowns**, optimize Markdown Promotional Events in February, November and December as this months consist of holidays. **Offering Discounts and Promotional Events** one month before a big festival allows customers ample time to plan their purchases and take advantage of the promotions and this will be effective in increasing sales.
- Volume of sales and markdown are huge on holidays than non holidays.
- **Larger Store Space** will be profitable in both cases, If considering about **expanding of existing store** in available space or If **relocating to larger store spaces**, especially in areas where there is potential for increased foot traffic, customer demand, high population density and strong consumer purchasing power.
- As **Consumer Price Index (CPI)** affects sales. The increasing CPI may affect **consumer purchasing power**. Review the product mix and pricing strategies to ensure they align with **consumer preferences**. Conduct a competitive analysis to ensure that your pricing remains **competitive** in the market. Establish a **feedback loop with customers** to understand their evolving needs and preferences, allowing for continuous improvement in products and services
- The rise in **Fuel Prices**, the company should focus on implementing **cost-effective measures in operations**, such as optimizing transportation routes, adopting fuel-efficient vehicles, Utilizing technologies like GPS and fleet management systems or exploring alternative transportation methods. This will minimize expense to greater extent.