Pizza Sales Analysis

Importing necessary packages

In [1]:
```
import numpy as np
import pandas as pd

import plotly.express as px
from plotly.offline import iplot

import plotly.io as pio
pio.renderers.default = 'notebook'

import warnings
warnings.filterwarnings('ignore')

import datetime
import calendar
```

Importing the dataset

In [2]:
```
data = pd.read_excel("pizza_sales.xlsx", sheet_name='pizza_sales')
data.head()
```

Out[2]:

	pizza_id	order_id	pizza_name_id	quantity	order_date	order_time	unit_price	total_price
0	1	1	hawaiian_m	1	2015-01-01 00:00:00	11:38:36	13.25	13.25
1	2	2	classic_dlx_m	1	2015-01-01 00:00:00	11:57:40	16.00	16.00
2	3	2	five_cheese_l	1	2015-01-01 00:00:00	11:57:40	18.50	18.50
3	4	2	ital_supr_l	1	2015-01-01 00:00:00	11:57:40	20.75	20.75
4	5	2	mexicana_m	1	2015-01-01 00:00:00	11:57:40	16.00	16.00

In [3]:
```
# Shape:
data.shape
```

Out[3]:
```
(48620, 12)
```

There are **48,620** rows and **12** columns present in the dataset

In [4]:
```
# Columns:
data.columns
```

Out[4]:
```
Index(['pizza_id', 'order_id', 'pizza_name_id', 'quantity', 'order_date',
       'order_time', 'unit_price', 'total_price', 'pizza_size',
       'pizza_category', 'pizza_ingredients', 'pizza_name'],
      dtype='object')
```

In [5]:
```
# Statistics of the data:
data.describe()
```

Out[5]:

	pizza_id	order_id	quantity	unit_price	total_price
count	48620.000000	48620.000000	48620.000000	48620.000000	48620.000000
mean	24310.500000	10701.479761	1.019622	16.494132	16.821474
std	14035.529381	6180.119770	0.143077	3.621789	4.437398
min	1.000000	1.000000	1.000000	9.750000	9.750000
25%	12155.750000	5337.000000	1.000000	12.750000	12.750000
50%	24310.500000	10682.500000	1.000000	16.500000	16.500000
75%	36465.250000	16100.000000	1.000000	20.250000	20.500000
max	48620.000000	21350.000000	4.000000	35.950000	83.000000

Checking for null values:

In [6]:
```
data.isna().sum()
```

Out[6]:
```
pizza_id            0
order_id            0
pizza_name_id       0
quantity            0
order_date          0
order_time          0
unit_price          0
total_price         0
pizza_size          0
pizza_category      0
pizza_ingredients   0
pizza_name          0
dtype: int64
```

There is no null values

Datatype of each column

In [7]:
```
data.dtypes
```

Out[7]:
```
pizza_id               int64
order_id               int64
pizza_name_id         object
quantity               int64
order_date            object
order_time            object
unit_price           float64
total_price          float64
pizza_size            object
pizza_category        object
pizza_ingredients     object
pizza_name            object
dtype: object
```

Column Description

1) pizza_id

In [8]:
```
data['pizza_id'].nunique()
```

Out[8]:
```
48620
```

- The number of unique items in **pizza_id** column and the number of rows in the **dataset** are same.
- **pizza_id** is like a serial number.

2) order_id

In [9]:
```
data['order_id'].nunique()
```

Out[9]:
```
21350
```

- The number of unique items in **order_id** is lessthan total number of rows in the dataset.
- At a single order the customer can order morethan one pizza(quantity) and morethan one type of pizza (pizza_name_id).

3) pizza_name_id

In [10]:
```
data['pizza_name_id'].nunique()
```

Out[10]:
```
91
```

- It gives the id of the pizza name

4) quantity

In [11]:
```
data['quantity'].nunique()
```

Out[11]:
```
4
```

In [12]:
```
data['quantity'].unique()
```

Out[12]:
```
array([1, 2, 3, 4], dtype=int64)
```

- It gives the quantity of a type of pizza(pizza_name_id) ordered in a particular order_id.
- Maximum of **4** pizzas were ordered in a particular type of pizza(pizza_name_id).
- And minimum of **1** pizza is ordered in a particular type of pizza(pizza_name_id).

5) order_date

In [13]:
```
data['order_date'].dtype
```

Out[13]:
```
dtype('O')
```

In [14]:
```
# Changing the datatype of order_date column into datetime datatype:
data['order_date'] = pd.to_datetime(data['order_date'])
```

In [15]:
```
data['order_date'].dtype
```

Out[15]:
```
dtype('<M8[ns]')
```

- It gives the order date

6) order_time

In [16]:
```
data['order_time'].dtype
```

Out[16]:
```
dtype('O')
```

- It gives the order time

7) unit_price

- It gives the price of a single pizza in quantity column

8) total_price

- It gives the total prize of all pizzas in quantity column

9) pizza_size

In [17]:
```
data['pizza_size'].unique()
```

Out[17]:
```
array(['M', 'L', 'S', 'XL', 'XXL'], dtype=object)
```

- It gives the size of the pizza

1. M --> Medium
2. L --> Large
3. S --> Regular
4. XL -> Extra Large
5. XXL > Extra Extra Large

In [18]:
```
# Replace them with their expansion:

data['pizza_size'].replace({'M':'Medium', 'L':'Large', 'S':'Regular', 'XL':
data['pizza_size'].unique()
```

Out[18]:
```
array(['Medium', 'Large', 'Regular', 'X-Large', 'XX-Large'], dtype=object)
```

10) pizza_category

In [19]:
```
data['pizza_category'].unique()
```

Out[19]:
```
array(['Classic', 'Veggie', 'Supreme', 'Chicken'], dtype=object)
```

- It gives the category of the pizza

11) pizza_ingredients

- It gives the ingredients used in the pizza

12) pizza_name

- It gives the name of the pizza

Analysing the Data

In [20]:
```
data.head()
```

Out[20]:

	pizza_id	order_id	pizza_name_id	quantity	order_date	order_time	unit_price	total_price
0	1	1	hawaiian_m	1	2015-01-01	11:38:36	13.25	13.25
1	2	2	classic_dlx_m	1	2015-01-01	11:57:40	16.00	16.00
2	3	2	five_cheese_l	1	2015-01-01	11:57:40	18.50	18.50
3	4	2	ital_supr_l	1	2015-01-01	11:57:40	20.75	20.75
4	5	2	mexicana_m	1	2015-01-01	11:57:40	16.00	16.00

KPI's

1.) Total Revenue

In [21]:
```
tot_rev = data['total_price'].sum()

print("Total Revenue: ${}".format(tot_rev))
```

```
Total Revenue: $817860.05
```

2.) Total Orders

In [22]:
```
tot_orders = data['order_id'].nunique()

print("Total Orders: {} orders".format(tot_orders))
```

```
Total Orders: 21350 orders
```

3.) Total Pizza Sold

In [23]:
```
tot_pizza_sold = data['quantity'].sum()

print("Total Pizza Sold: {} pizzas".format(tot_pizza_sold))
```

```
Total Pizza Sold: 49574 pizzas
```

4.) Average Order Value

- Average amount spent per order

In [24]:
```
avg_order_val = (tot_rev / tot_orders)

print("Average Order Value: ${}".format(round(avg_order_val, 2)))
```

```
Average Order Value: $38.31
```

5.) Average Pizzas per Order

In [25]:
```
avg_pizza_per_order = (tot_pizza_sold / tot_orders)

print("Average Pizzas per Order: {} pizzas/order".format(round(avg_pizza_pe
```

```
Average Pizzas per Order: 2.32 pizzas/order
```

Charts

1.) Daily Trend for Total Orders

In [26]:
```
days = []

for i in data['order_date']:
    day_of_week = i.dayofweek
    j = calendar.day_name[day_of_week]
    day = j[:3].upper()
    days.append(day)

data['Day'] = days
```

In [27]:
```
df1 = data.groupby(by='Day').nunique().reset_index()[['Day','order_id']].so
df1.rename(columns={'order_id':'tot_order'}, inplace=True)
df1
```

Out[27]:

	Day	tot_order
0	FRI	3359
4	THU	3173
2	SAT	3126
6	WED	3064
5	TUE	2978
1	MON	2940
3	SUN	2710

In [28]:
```
fig1 = px.bar(df1, x='Day', y='tot_order', title='<b>Daily Trend for Total
              width=600, height=450, text_auto=True)

fig1.update_traces(marker_color='violet', textposition='inside')
iplot(fig1)
```

2.) Monthly Trend for Total Orders

In [29]:
```
months = []

for i in data['order_date']:
    mnth = i.month
    j = calendar.month_name[mnth]
    month = j[:3].upper()
    months.append(month)

data['Month'] = months
```

In [30]:
```
df2 = data.groupby(by='Month').nunique().reset_index()[['Month','order_id']]
df2.rename(columns={'order_id':'tot_order'}, inplace=True)
df2
```

Out[30]:

	Month	tot_order
4	JAN	1929
7	MAR	1864
5	JUL	1860
9	NOV	1844
1	AUG	1835
0	APR	1829
10	OCT	1782
6	JUN	1771
8	MAY	1765
3	FEB	1648
11	SEP	1638
2	DEC	1585

In [31]:
```
fig2 = px.bar(df2, x='Month', y='tot_order', title='<b>Monthly Trend for To
              width=750, height=450, text_auto=True)

fig2.update_traces(marker_color='purple', textposition='inside')
iplot(fig2)
```

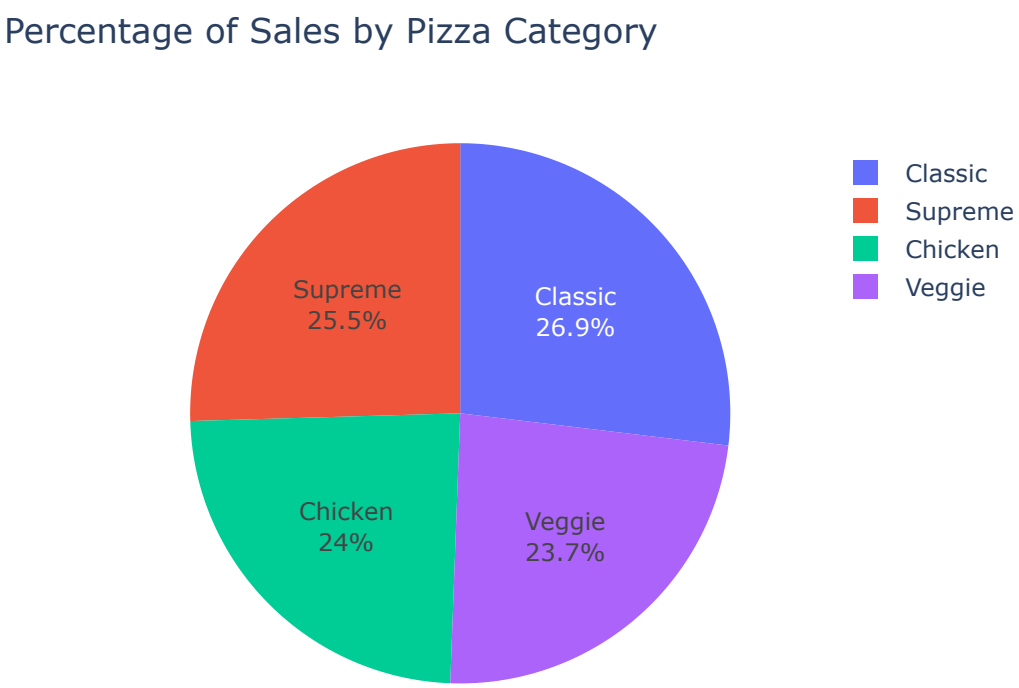
3.) Percentage of Sales by Pizza Category

In [32]:
```
df3 = data[['total_price','pizza_category']].groupby(by='pizza_category').s
df3['percentage_of_sales'] = round((df3['total_price']/df3['total_price'].s
df3
```

Out[32]:

	pizza_category	total_price	percentage_of_sales
0	Chicken	195919.50	23.96
1	Classic	220053.10	26.91
2	Supreme	208197.00	25.46
3	Veggie	193690.45	23.68

In [33]:
```
fig3 = px.pie(df3, values='total_price', names='pizza_category',
              title="Percentage of Sales by Pizza Category",
              width=550, height=450, hole=0)

fig3.update_traces(textposition='inside', textinfo='label+percent')
iplot(fig3)
```



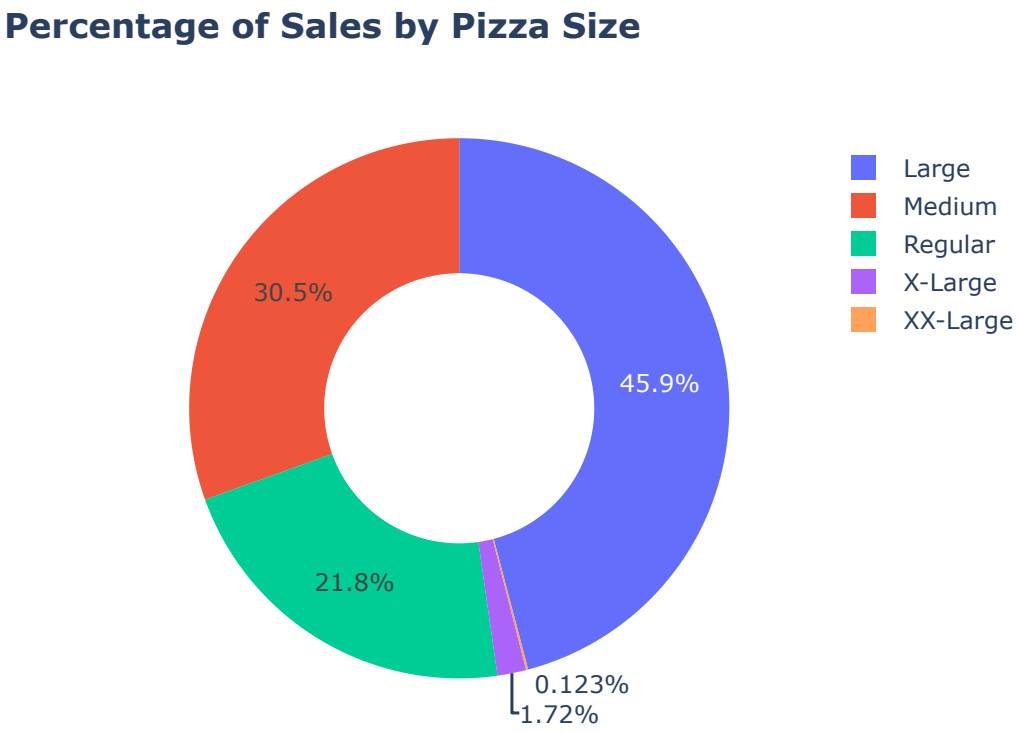
4.) Percentage of Sales by Pizza Size

In [34]:
```
df4 = data[['total_price','pizza_size']].groupby(by='pizza_size').sum().res
df4['percentage_of_sales'] = round((df4['total_price']/df4['total_price'].s
df4
```

Out[34]:

	pizza_size	total_price	percentage_of_sales
0	Large	375318.70	45.89
1	Medium	249382.25	30.49
2	Regular	178076.50	21.77
3	X-Large	14076.00	1.72
4	XX-Large	1006.60	0.12

In [35]:
```
fig4 = px.pie(df4, values='total_price', names='pizza_size',
              title='<b>Percentage of Sales by Pizza Size</b>',
              width=550, height=450, hole=0.5)

iplot(fig4)
```



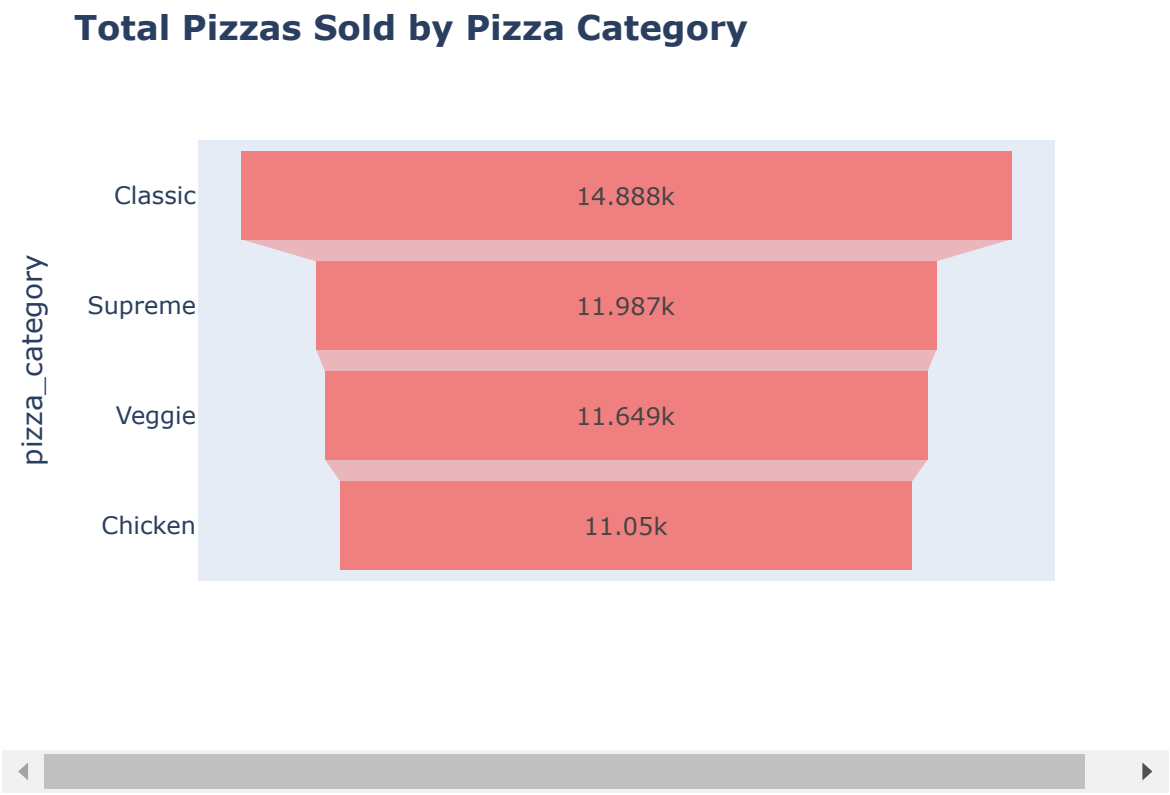
5.) Total Pizzas Sold by Pizza Category

In [36]:
```
df5 = data[['quantity','pizza_category']].groupby(by='pizza_category').sum(
df5 = df5.sort_values(by='quantity', ascending=False)
df5
```

Out[36]:

	pizza_category	quantity
1	Classic	14888
2	Supreme	11987
3	Veggie	11649
0	Chicken	11050

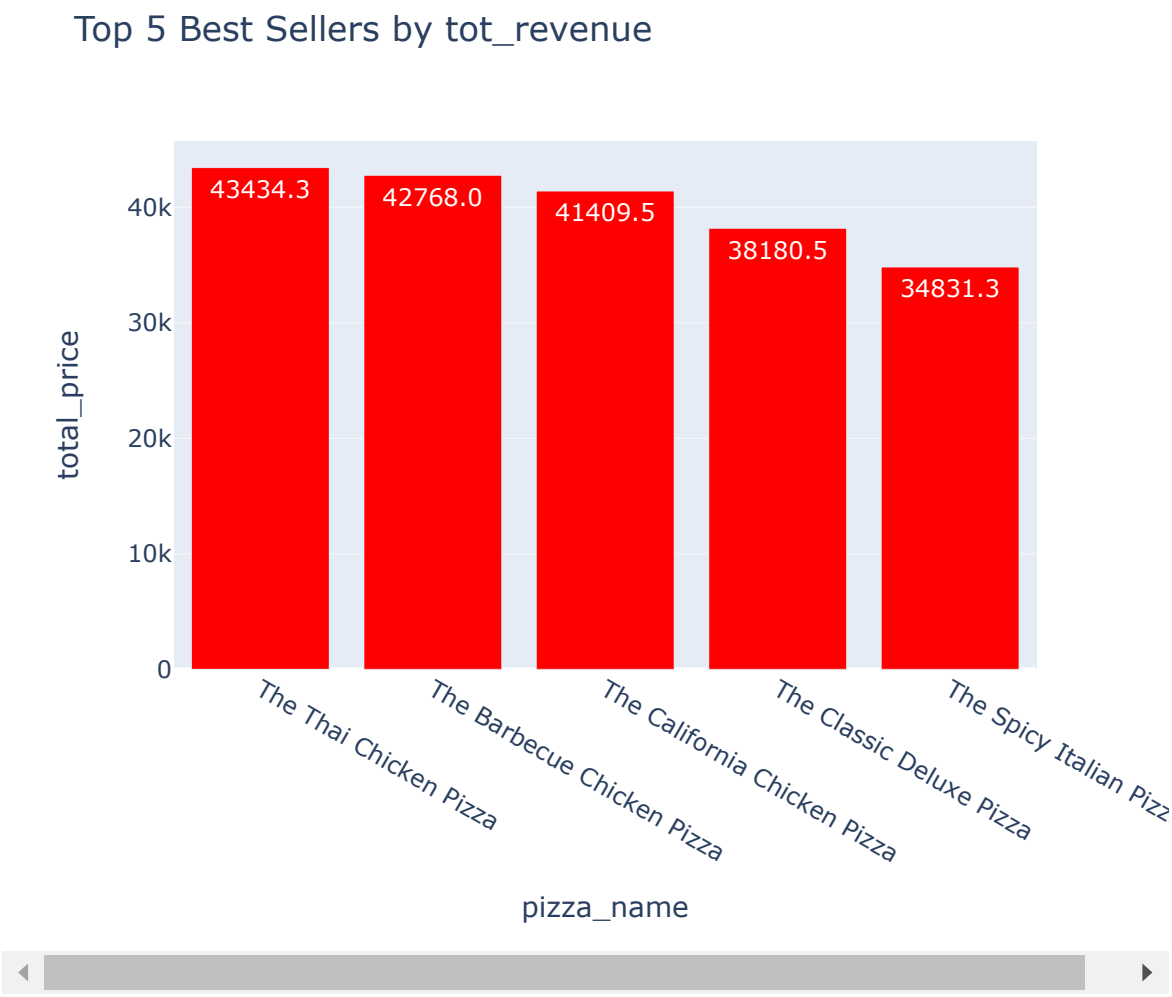
In [37]:
```
fig5 = px.funnel(df5, x='quantity', y='pizza_category',
                 title='<b>Total Pizzas Sold by Pizza Category</b>',
                 width=600, height=400)

fig5.update_traces(marker_color='lightcoral')
iplot(fig5)
```



6.) Top 5 Best Sellers by Total Revenue, Total Quantity and Total Order

In [38]:
```
def best_sellers_by(para,color):

    if para=='tot_revenue':
        col='total_price'
    elif para=='tot_quantity':
        col='quantity'
    elif para=='tot_orders':
        col='order_id'


    if col=='order_id':
        df6 = data[[col,'pizza_name']].groupby(by='pizza_name').nunique().r
    else:
        df6 = data[[col,'pizza_name']].groupby(by='pizza_name').sum().reset


    df6 = df6.sort_values(by=col, ascending=False).head(5)

    fig6 = px.bar(df6, x='pizza_name', y=col,
                  title='Top 5 Best Sellers by '+para,
                  width=600, height=500, text_auto='0.1f')

    fig6.update_traces(textposition='inside', marker_color=color)
    iplot(fig6)
```

In [39]:
```
for i,j in zip(['tot_revenue', 'tot_quantity', 'tot_orders'], ['red','gold'
    best_sellers_by(i,j)
```



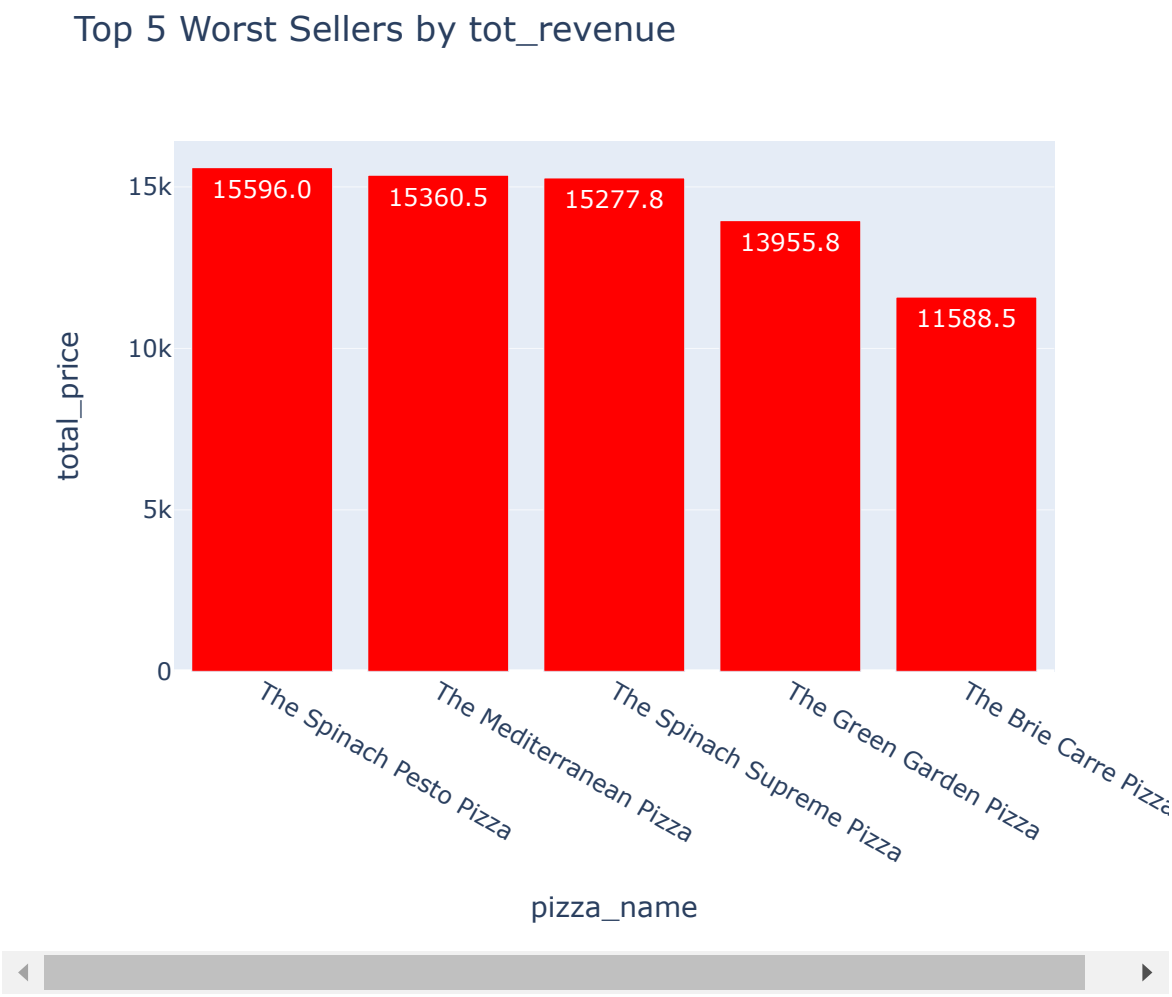

Top 5 Best Sellers by tot_quantity
quantity
2500
2000
1500
1000
500
0
2453.0
2432.0
2422.0
2418.0
2371.0
The Classic Deluxe Pizza
The Barbecue Chicken Pizza
The Hawaiian Pizza
The Pepperoni Pizza
The Thai Chicken Pizz
pizza_name


Top 5 Best Sellers by tot_orders
order_id
2000
1500
1000
500
0
2329.0
2280.0
2278.0
2273.0
2225.0
The Classic Deluxe Pizza
The Hawaiian Pizza
The Pepperoni Pizza
The Barbecue Chicken Pizza
The Thai Chicken Pizz
pizza_name

7.) Top 5 Worst Sellers by Total Revenue, Total Quantity and Total Order

In [40]:
```
def worst_sellers_by(para,color):

    if para=='tot_revenue':
        col='total_price'
    elif para=='tot_quantity':
        col='quantity'
    elif para=='tot_orders':
        col='order_id'


    if col=='order_id':
        df7 = data[[col,'pizza_name']].groupby(by='pizza_name').nunique().r
    else:
        df7 = data[[col,'pizza_name']].groupby(by='pizza_name').sum().reset


    df7 = df7.sort_values(by=col, ascending=False).tail(5)

    fig7 = px.bar(df7, x='pizza_name', y=col,
                  title='Top 5 Worst Sellers by '+para,
                  width=600, height=500, text_auto='0.1f')

    fig7.update_traces(textposition='inside', marker_color=color)
    iplot(fig7)
```

In [41]:
```
for i,j in zip(['tot_revenue', 'tot_quantity', 'tot_orders'], ['red','gold'
    worst_sellers_by(i,j)
```




Top 5 Worst Sellers by tot_quantity
quantity
1000
800
600
400
200
0
961.0
950.0
937.0
934.0
490.0
The Soppressata Pizza
The Spinach Supreme Pizza
The Calabrese Pizza
The Mediterranean Pizza
The Brie Carre Pizza
pizza_name

Exporting the data

In [42]:
```
data.to_csv("Pizza_Sales_Data.csv", index=False)
```

In [ ]:
```

```