

# Pizza Place Sales



A year's worth of sales from a fictitious pizza place, including the date and time of each order and the pizzas served, with additional details on the type, size, quantity, price, and ingredients.

## Recommended Analysis

- How many customers do we have each day? Are there any peak hours?
- How many pizzas are typically in an order? Do we have any bestsellers?
- How much money did we make this year? Can we identify any seasonality in the sales?
- Are there any pizzas we should take off the menu, or any promotions we could leverage?

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

```
import matplotlib.pyplot as plt
import seaborn as sns
import datetime as dt
```

```
In [2]: pizzas = pd.read_csv("pizza_sales/pizzas.csv")
pizza_types = pd.read_csv("pizza_sales/pizza_types.csv", encoding = 'unicode_escape')
orders = pd.read_csv("pizza_sales/orders.csv")
order_details = pd.read_csv("pizza_sales/order_details.csv")
```

```
In [3]: pizzas
```

```
Out[3]:
```

	pizza_id	pizza_type_id	size	price
0	bbq_ckn_s	bbq_ckn	S	12.75
1	bbq_ckn_m	bbq_ckn	M	16.75
2	bbq_ckn_l	bbq_ckn	L	20.75
3	cali_ckn_s	cali_ckn	S	12.75
4	cali_ckn_m	cali_ckn	M	16.75
...	...	...	...	...
91	spinach_fet_m	spinach_fet	M	16.00
92	spinach_fet_l	spinach_fet	L	20.25
93	veggie_veg_s	veggie_veg	S	12.00
94	veggie_veg_m	veggie_veg	M	16.00
95	veggie_veg_l	veggie_veg	L	20.25

96 rows × 4 columns

```
In [4]: pizza_types
```

Out[4]:

pizza_type_id		name	category	ingredients
0	bbq_ckn	The Barbecue Chicken Pizza	Chicken	Barbecued Chicken, Red Peppers, Green Peppers,...
1	cali_ckn	The California Chicken Pizza	Chicken	Chicken, Artichoke, Spinach, Garlic, Jalapeno ...
2	ckn_alfredo	The Chicken Alfredo Pizza	Chicken	Chicken, Red Onions, Red Peppers, Mushrooms, A...
3	ckn_pesto	The Chicken Pesto Pizza	Chicken	Chicken, Tomatoes, Red Peppers, Spinach, Garli...
4	southw_ckn	The Southwest Chicken Pizza	Chicken	Chicken, Tomatoes, Red Peppers, Red Onions, Ja...
5	thai_ckn	The Thai Chicken Pizza	Chicken	Chicken, Pineapple, Tomatoes, Red Peppers, Tha...
6	big_meat	The Big Meat Pizza	Classic	Bacon, Pepperoni, Italian Sausage, Chorizo Sau...
7	classic_dlx	The Classic Deluxe Pizza	Classic	Pepperoni, Mushrooms, Red Onions, Red Peppers,...
8	hawaiian	The Hawaiian Pizza	Classic	Sliced Ham, Pineapple, Mozzarella Cheese
9	ital_cpcllo	The Italian Capocollo Pizza	Classic	Capocollo, Red Peppers, Tomatoes, Goat Cheese,...
10	napolitana	The Napolitana Pizza	Classic	Tomatoes, Anchovies, Green Olives, Red Onions,...
11	pep_msh_pep	The Pepperoni, Mushroom, and Peppers Pizza	Classic	Pepperoni, Mushrooms, Green Peppers
12	pepperoni	The Pepperoni Pizza	Classic	Mozzarella Cheese, Pepperoni
13	the_greek	The Greek Pizza	Classic	Kalamata Olives, Feta Cheese, Tomatoes, Garlic...
14	brie_carre	The Brie Carre Pizza	Supreme	Brie Carre Cheese, Prosciutto, Caramelized Oni...
15	calabrese	The Calabrese Pizza	Supreme	Nduja Salami, Pancetta, Tomatoes, Red Onions,...
16	ital_supr	The Italian Supreme Pizza	Supreme	Calabrese Salami, Capocollo, Tomatoes, Red Oni...
17	peppr_salami	The Pepper Salami Pizza	Supreme	Genoa Salami, Capocollo, Pepperoni, Tomatoes, ...
18	prsc_argla	The Prosciutto and Arugula Pizza	Supreme	Prosciutto di San Daniele, Arugula, Mozzarella...
19	sicilian	The Sicilian Pizza	Supreme	Coarse Sicilian Salami, Tomatoes, Green Olives...
20	soppressata	The Soppressata Pizza	Supreme	Soppressata Salami, Fontina Cheese, Mozzarella...
21	spicy_ital	The Spicy Italian Pizza	Supreme	Capocollo, Tomatoes, Goat Cheese, Artichokes, ...
22	spinach_supr	The Spinach Supreme Pizza	Supreme	Spinach, Red Onions, Pepperoni, Tomatoes, Arti...
23	five_cheese	The Five Cheese Pizza	Veggie	Mozzarella Cheese, Provolone Cheese, Smoked Go...

	pizza_type_id		name	category	ingredients
24	four_cheese		The Four Cheese Pizza	Veggie	Ricotta Cheese, Gorgonzola Piccante Cheese, Mo...
25	green_garden		The Green Garden Pizza	Veggie	Spinach, Mushrooms, Tomatoes, Green Olives, Fe...
26	ital_veggie		The Italian Vegetables Pizza	Veggie	Eggplant, Artichokes, Tomatoes, Zucchini, Red ...
27	mediterraneo		The Mediterranean Pizza	Veggie	Spinach, Artichokes, Kalamata Olives, Sun-drie...
28	mexicana		The Mexicana Pizza	Veggie	Tomatoes, Red Peppers, Jalapeno Peppers, Red O...
29	spin_pesto		The Spinach Pesto Pizza	Veggie	Spinach, Artichokes, Tomatoes, Sun-dried Tomat...
30	spinach_fet		The Spinach and Feta Pizza	Veggie	Spinach, Mushrooms, Red Onions, Feta Cheese, G...
31	veggie_veg		The Vegetables + Vegetables Pizza	Veggie	Mushrooms, Tomatoes, Red Peppers, Green Pepper...

In [5]:

```
orders
```

Out[5]:

	order_id	date	time
0	1	2015-01-01	11:38:36
1	2	2015-01-01	11:57:40
2	3	2015-01-01	12:12:28
3	4	2015-01-01	12:16:31
4	5	2015-01-01	12:21:30
...	...	...	...
21345	21346	2015-12-31	20:51:07
21346	21347	2015-12-31	21:14:37
21347	21348	2015-12-31	21:23:10
21348	21349	2015-12-31	22:09:54
21349	21350	2015-12-31	23:02:05

21350 rows × 3 columns

```
In [6]: order_details
```

```
Out[6]:
```

	<b>order_details_id</b>	<b>order_id</b>	<b>pizza_id</b>	<b>quantity</b>
<b>0</b>	1	1	hawaiian_m	1
<b>1</b>	2	2	classic_dlx_m	1
<b>2</b>	3	2	five_cheese_l	1
<b>3</b>	4	2	ital_supr_l	1
<b>4</b>	5	2	mexicana_m	1
...	...	...	...	...
<b>48615</b>	48616	21348	ckn_alfredo_m	1
<b>48616</b>	48617	21348	four_cheese_l	1
<b>48617</b>	48618	21348	napolitana_s	1
<b>48618</b>	48619	21349	mexicana_l	1
<b>48619</b>	48620	21350	bbq_ckn_s	1

48620 rows × 4 columns

```
In [7]: orders_full = orders.join(order_details.set_index("order_id"), on="order_id")
orders_full
```

Out[7]:

	order_id	date	time	order_details_id	pizza_id	quantity
0	1	2015-01-01	11:38:36	1	hawaiian_m	1
1	2	2015-01-01	11:57:40	2	classic_dlx_m	1
1	2	2015-01-01	11:57:40	3	five_cheese_l	1
1	2	2015-01-01	11:57:40	4	ital_supr_l	1
1	2	2015-01-01	11:57:40	5	mexicana_m	1
...	...	...	...	...	...	...
21347	21348	2015-12-31	21:23:10	48616	ckn_alfredo_m	1
21347	21348	2015-12-31	21:23:10	48617	four_cheese_l	1
21347	21348	2015-12-31	21:23:10	48618	napolitana_s	1
21348	21349	2015-12-31	22:09:54	48619	mexicana_l	1
21349	21350	2015-12-31	23:02:05	48620	bbq_ckn_s	1

48620 rows × 6 columns

In [8]:

```
# df.join(other.set_index('key'), on='key')
pizzas_full = pizzas.join(pizza_types.set_index("pizza_type_id"), on="pizza_type_id")
pizzas_full
```

Out[8]:

	pizza_id	pizza_type_id	size	price	name	category	ingredients
0	bbq_ckn_s	bbq_ckn	S	12.75	The Barbecue Chicken Pizza	Chicken	Barbecued Chicken, Red Peppers, Green Peppers,...
1	bbq_ckn_m	bbq_ckn	M	16.75	The Barbecue Chicken Pizza	Chicken	Barbecued Chicken, Red Peppers, Green Peppers,...
2	bbq_ckn_l	bbq_ckn	L	20.75	The Barbecue Chicken Pizza	Chicken	Barbecued Chicken, Red Peppers, Green Peppers,...
3	cali_ckn_s	cali_ckn	S	12.75	The California Chicken Pizza	Chicken	Chicken, Artichoke, Spinach, Garlic, Jalapeno ...
4	cali_ckn_m	cali_ckn	M	16.75	The California Chicken Pizza	Chicken	Chicken, Artichoke, Spinach, Garlic, Jalapeno ...
...	...	...	...	...	...	...	...
91	spinach_fet_m	spinach_fet	M	16.00	The Spinach and Feta Pizza	Veggie	Spinach, Mushrooms, Red Onions, Feta Cheese, G...
92	spinach_fet_l	spinach_fet	L	20.25	The Spinach and Feta Pizza	Veggie	Spinach, Mushrooms, Red Onions, Feta Cheese, G...
93	veggie_veg_s	veggie_veg	S	12.00	The Vegetables + Vegetables Pizza	Veggie	Mushrooms, Tomatoes, Red Peppers, Green Pepper...
94	veggie_veg_m	veggie_veg	M	16.00	The Vegetables + Vegetables Pizza	Veggie	Mushrooms, Tomatoes, Red Peppers, Green Pepper...
95	veggie_veg_l	veggie_veg	L	20.25	The Vegetables + Vegetables Pizza	Veggie	Mushrooms, Tomatoes, Red Peppers, Green Pepper...

96 rows × 7 columns

```
In [9]: df = orders_full.merge(pizzas_full, on="pizza_id").sort_values(by="order_id")
```

```
In [10]: df["qxp"] = df["quantity"]*df["price"]
```

```
In [11]: print(f"Registros: {df.shape[0]} | Columnas: {df.shape[1]}")
```

Registros: 48620 | Columnas: 13

```
In [12]: df.columns
```

```
Out[12]: Index(['order_id', 'date', 'time', 'order_details_id', 'pizza_id', 'quantity',  
            'pizza_type_id', 'size', 'price', 'name', 'category', 'ingredients',  
            'qxp'],  
            dtype='object')
```

```
In [13]: df.info()
```

```

<class 'pandas.core.frame.DataFrame'>
Int64Index: 48620 entries, 0 to 7364
Data columns (total 13 columns):
#   Column              Non-Null Count  Dtype  
---  -
0   order_id            48620 non-null  int64   
1   date                48620 non-null  object  
2   time                48620 non-null  object  
3   order_details_id    48620 non-null  int64   
4   pizza_id            48620 non-null  object  
5   quantity            48620 non-null  int64   
6   pizza_type_id       48620 non-null  object  
7   size                48620 non-null  object  
8   price              48620 non-null  float64  
9   name                48620 non-null  object  
10  category            48620 non-null  object  
11  ingredients          48620 non-null  object  
12  qxp                 48620 non-null  float64  
dtypes: float64(2), int64(3), object(8)
memory usage: 5.2+ MB

```

```

In [14]: df['date_time'] = df['date'].str.cat(df['time'],sep=" ")
df["date_time"] = pd.to_datetime(df["date_time"])
del df['date']
del df['time']

```

```

In [15]: df

```



Out[15]:

	order_id	order_details_id	pizza_id	quantity	pizza_type_id	size	price	name	category	ingredients	qxp	date_time
<b>0</b>	1	1	hawaiian_m	1	hawaiian	M	13.25	The Hawaiian Pizza	Classic	Sliced Ham, Pineapple, Mozzarella Cheese	13.25	2015-01-01 11:38:36
<b>4178</b>	2	6	thai_ckn_l	1	thai_ckn	L	20.75	The Thai Chicken Pizza	Chicken	Chicken, Pineapple, Tomatoes, Red Peppers, Tha...	20.75	2015-01-01 11:57:40
<b>3726</b>	2	5	mexicana_m	1	mexicana	M	16.00	The Mexicana Pizza	Veggie	Tomatoes, Red Peppers, Jalapeno Peppers, Red O...	16.00	2015-01-01 11:57:40
<b>2991</b>	2	4	ital_supr_l	1	ital_supr	L	20.75	The Italian Supreme Pizza	Supreme	Calabrese Salami, Capocollo, Tomatoes, Red Oni...	20.75	2015-01-01 11:57:40
<b>1632</b>	2	3	five_cheese_l	1	five_cheese	L	18.50	The Five Cheese Pizza	Veggie	Mozzarella Cheese, Provolone Cheese, Smoked Go...	18.50	2015-01-01 11:57:40
...	...	...	...	...	...	...	...	...	...	...	...	...
<b>22493</b>	21348	48618	napolitana_s	1	napolitana	S	12.00	The Napolitana Pizza	Classic	Tomatoes, Anchovies, Green Olives, Red Onions,...	12.00	2015-12-31 21:23:10
<b>22025</b>	21348	48617	four_cheese_l	1	four_cheese	L	17.95	The Four Cheese Pizza	Veggie	Ricotta Cheese, Gorgonzola Piccante Cheese, Mo...	17.95	2015-12-31 21:23:10
<b>33849</b>	21348	48616	ckn_alfredo_m	1	ckn_alfredo	M	16.75	The Chicken Alfredo Pizza	Chicken	Chicken, Red Onions, Red Peppers, Mushrooms, A...	16.75	2015-12-31 21:23:10
<b>13174</b>	21349	48619	mexicana_l	1	mexicana	L	20.25	The Mexicana Pizza	Veggie	Tomatoes, Red Peppers, Jalapeno Peppers, Red O...	20.25	2015-12-31 22:09:54
<b>7364</b>	21350	48620	bbq_ckn_s	1	bbq_ckn	S	12.75	The Barbecue Chicken Pizza	Chicken	Barbecued Chicken, Red Peppers, Green Peppers,...	12.75	2015-12-31 23:02:05

48620 rows × 12 columns

```
In [16]: df.to_csv('PIZZA_PLACE.csv')
```

```
In [140... weekdays = df.groupby(df['date_time'].dt.weekday)['order_id'].count()

print('Recuento de órdenes por el día de la semana\n')
print('weekday\t', 'count\t', '%', '\n-\t -\t -')
for i in range(len weekdays):
    print('weekdays.index[i], '\t', weekdays.values[i], '\t', round(weekdays.values[i]/df.shape[0]*100, 2))
```

Recuento de pedidos por el día de la semana

weekday	count	%
-	-	-
0	6369	13.1
1	6753	13.89
2	6797	13.98
3	7323	15.06
4	8106	16.67
5	7355	15.13
6	5917	12.17

```
In [141... hours = df.groupby(df['date_time'].dt.hour)['order_id'].count()

print('Recuento de órdenes por horas\n')
print('hours\t', 'count\t', '%', '\n-\t -\t -')
for i in range(len hours):
    print('hours.index[i], '\t', hours.values[i], '\t', round(hours.values[i]/df.shape[0]*100, 2))
```

Recuento de pedidos por horas

hours	count	%
-	-	-
9	4	0.01
10	17	0.03
11	2672	5.5
12	6543	13.46
13	6203	12.76
14	3521	7.24
15	3170	6.52
16	4185	8.61
17	5143	10.58
18	5359	11.02
19	4350	8.95
20	3487	7.17
21	2528	5.2
22	1370	2.82
23	68	0.14

In [142...

```
months = df.groupby(df['date_time'].dt.month)['order_id'].count()

print('Recuento de órdenes por los meses\n')
print('month\t', 'count\t', '%', '\n-\t -\t -')
for i in range(12):
    print(months.index[i], '\t', months.values[i], '\t', round(months.values[i]/df.shape[0]*100, 2))
```

Recuento de pedidos por los meses

month	count	%
-	-	-
1	4156	8.55
2	3892	8.0
3	4186	8.61
4	4067	8.36
5	4239	8.72
6	4025	8.28
7	4301	8.85
8	4094	8.42
9	3819	7.85
10	3797	7.81
11	4185	8.61
12	3859	7.94

```
In [136... print('Recuento de órdenes por los meses')
df.groupby([pd.Grouper(key='date_time', freq='M')])['order_id'].count()
```

```
Out[136]: Recuento de pedidos por los meses
date_time
2015-01-31    4156
2015-02-28    3892
2015-03-31    4186
2015-04-30    4067
2015-05-31    4239
2015-06-30    4025
2015-07-31    4301
2015-08-31    4094
2015-09-30    3819
2015-10-31    3797
2015-11-30    4185
2015-12-31    3859
Freq: M, Name: order_id, dtype: int64
```

---

```
In [150... print('Suma de cantidades por órdenes')
df.groupby('order_id')['quantity'].sum().sort_values(ascending=False)
```

```
Out[150]: Suma de cantidades por órdenes
order_id
18845    28
10760    25
18513    15
21158    15
20163    15
..
10393     1
10394     1
10395     1
10401     1
21350     1
Name: quantity, Length: 21350, dtype: int64
```

```
In [149... print('Promedio de cantidades por órdenes')
round(df.groupby('order_id')['quantity'].sum().mean(),2)
```

Promedio de cantidades por órdenes

Out[149]: 2.32

```
In [143... print('Importe total de cada orden')
df.groupby('order_id')['qxp'].sum().sort_values(ascending=False)
```

Importe total de cada orden

Out[143]:

order_id	
18845	444.20
10760	417.15
1096	285.15
6169	284.00
740	280.95
...	
17455	9.75
17456	9.75
20492	9.75
20284	9.75
15300	9.75

Name: qxp, Length: 21350, dtype: float64

```
In [147... print('Promedio de importes $')
round(df.groupby('order_id')['qxp'].sum().mean(),2)
```

Promedio de importes \$

Out[147]: 38.31

```
In [109... df.groupby(['name', 'size'])['quantity'].sum().sort_values(ascending=False)
```

Out[109]:

name	size	
The Big Meat Pizza	S	1914
The Thai Chicken Pizza	L	1410
The Five Cheese Pizza	L	1409
The Four Cheese Pizza	L	1316
The Classic Deluxe Pizza	M	1181
...		
The Mexicana Pizza	S	162
The Calabrese Pizza	S	99
The Chicken Alfredo Pizza	S	96
The Green Garden Pizza	L	95
The Greek Pizza	XXL	28

Name: quantity, Length: 91, dtype: int64

```
In [108... df.groupby(['name'])['quantity'].sum().sort_values(ascending=False)
```

```
Out[108]: name
The Classic Deluxe Pizza      2453
The Barbecue Chicken Pizza    2432
The Hawaiian Pizza            2422
The Pepperoni Pizza           2418
The Thai Chicken Pizza        2371
The California Chicken Pizza  2370
The Sicilian Pizza            1938
The Spicy Italian Pizza       1924
The Southwest Chicken Pizza   1917
The Big Meat Pizza            1914
The Four Cheese Pizza         1902
The Italian Supreme Pizza     1884
The Vegetables + Vegetables Pizza 1526
The Mexicana Pizza            1484
The Napolitana Pizza          1464
The Prosciutto and Arugula Pizza 1457
The Spinach and Feta Pizza     1446
The Pepper Salami Pizza       1446
The Italian Capocollo Pizza   1438
The Greek Pizza               1420
The Five Cheese Pizza         1409
The Pepperoni, Mushroom, and Peppers Pizza 1359
The Green Garden Pizza        997
The Chicken Alfredo Pizza     987
The Italian Vegetables Pizza  981
The Chicken Pesto Pizza       973
The Spinach Pesto Pizza       970
The Soppressata Pizza         961
The Spinach Supreme Pizza     950
The Calabrese Pizza           937
The Mediterranean Pizza      934
The Brie Carre Pizza          490
Name: quantity, dtype: int64
```

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```
In [146... print('Recaudación total: $', df['qxp'].sum())
```

```
Recaudación total: $ 817860.05
```

```
In [80]: print('Pizzas vendidas: ', df['quantity'].sum())
```

```
Pizzas vendidas: 49574
```