Import libraries

In [47]:
```
import os
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
```

Reading the dataset

In [48]:
```
train = pd.read_csv/da("Documents/dataset ibm/train.csv")
test = pd.read_csv("Documents/dataset ibm/test.csv")
```

Exploratory data analysis

In [49]:
```
train.head()
```

Out[49]:

	id	week	center_id	meal_id	checkout_price	base_price	emailer_for_promotion	homepage_featured	num_orders
0	1379560	1	55	1885	136.83	152.29	0	0	177
1	1466964	1	55	1993	136.83	135.83	0	0	270
2	1346989	1	55	2539	134.86	135.86	0	0	189
3	1338232	1	55	2139	339.50	437.53	0	0	54
4	1448490	1	55	2631	243.50	242.50	0	0	40

In [50]:
```
test.head()
```

Out[50]:

	id	week	center_id	meal_id	checkout_price	base_price	emailer_for_promotion	homepage_featured
0	1028232	146	55	1885	158.11	159.11	0	0
1	1127204	146	55	1993	160.11	159.11	0	0
2	1212707	146	55	2539	157.14	159.14	0	0
3	1082698	146	55	2631	162.02	162.02	0	0
4	1400926	146	55	1248	163.93	163.93	0	0

In [51]:
```
train.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 456548 entries, 0 to 456547
Data columns (total 9 columns):
 #   Column                Non-Null Count   Dtype
---  ------                --------------   -----
 0   id                    456548 non-null  int64
 1   week                  456548 non-null  int64
 2   center_id             456548 non-null  int64
 3   meal_id               456548 non-null  int64
 4   checkout_price        456548 non-null  float64
 5   base_price            456548 non-null  float64
 6   emailer_for_promotion  456548 non-null  int64
 7   homepage_featured     456548 non-null  int64
 8   num_orders            456548 non-null  int64
dtypes: float64(2), int64(7)
memory usage: 31.3 MB
```

In [52]:
```
train['num_orders'].describe()
```

Out[52]:
```
count    456548.000000
mean        261.872760
std         395.922798
min          13.000000
25%          54.000000
50%         136.000000
75%         324.000000
max       24299.000000
Name: num_orders, dtype: float64
```

Checking for null values

In [53]:
```
train.isnull().sum()
```

Out[53]:
```
id                     0
week                   0
center_id              0
meal_id                0
checkout_price         0
base_price             0
emailer_for_promotion  0
homepage_featured      0
num_orders             0
dtype: int64
```

Reading and merging.csv files

In [63]:
```
meal_info = pd.read_csv("Documents/dataset ibm/meal_info.csv")
center_info = pd.read_csv("Documents/dataset ibm/fulfilment_center_info.csv")

trainfinal = pd.merge(train, meal_info, on="meal_id", how="outer")
trainfinal = pd.merge(trainfinal,center_info, on="center_id", how="outer")
trainfinal.head()
```

Out[63]:

	id	week	center_id	meal_id	checkout_price	base_price	emailer_for_promotion	homepage_featured	num_orders	category	cuisine	city_code	region_code	center_type	op_area
0	1379560	1	55	1885	136.83	152.29	0	0	177	Beverages	Thai	647	56	TYPE_C	2.0
1	1018704	2	55	1885	135.83	152.29	0	0	323	Beverages	Thai	647	56	TYPE_C	2.0
2	1196273	3	55	1885	132.92	133.92	0	0	96	Beverages	Thai	647	56	TYPE_C	2.0
3	1116527	4	55	1885	135.86	134.86	0	0	163	Beverages	Thai	647	56	TYPE_C	2.0
4	1343872	5	55	1885	146.50	147.50	0	0	215	Beverages	Thai	647	56	TYPE_C	2.0

In [64]:
```
trainfinal = trainfinal.drop(['center_id', 'meal_id'], axis=1)
trainfinal.head()
```

Out[64]:

	id	week	checkout_price	base_price	emailer_for_promotion	homepage_featured	num_orders	category	cuisine	city_code	region_code	center_type	op_area
0	1379560	1	136.83	152.29	0	0	177	Beverages	Thai	647	56	TYPE_C	2.0
1	1018704	2	135.83	152.29	0	0	323	Beverages	Thai	647	56	TYPE_C	2.0
2	1196273	3	132.92	133.92	0	0	96	Beverages	Thai	647	56	TYPE_C	2.0
3	1116527	4	135.86	134.86	0	0	163	Beverages	Thai	647	56	TYPE_C	2.0
4	1343872	5	146.50	147.50	0	0	215	Beverages	Thai	647	56	TYPE_C	2.0

Dropping columns

In [65]:
```
cols = trainfinal.columns.tolist()
print(cols)
```

```
['id', 'week', 'checkout_price', 'base_price', 'emailer_for_promotion', 'homepage_featured', 'num_orders', 'category', 'cuisine', 'city_code', 'region_code', 'center_type', 'op_area']
```

In [66]:
```
cols = cols[:2] + cols[9:] + cols[7:9] + cols[2:7]
print(cols)
```

```
['id', 'week', 'city_code', 'region_code', 'center_type', 'op_area', 'category', 'cuisine', 'checkout_price', 'base_price', 'emailer_for_promotion', 'homepage_featured', 'num_orders']
```

In [67]:
```
trainfinal = trainfinal[cols]
trainfinal.dtypes
```

Out[67]:
```
id                       int64
week                     int64
city_code                int64
region_code              int64
center_type             object
op_area                float64
category                object
cuisine                 object
checkout_price         float64
base_price             float64
emailer_for_promotion    int64
homepage_featured        int64
num_orders               int64
dtype: object
```

In [68]:
```
from sklearn.preprocessing import LabelEncoder
```

Label encoding

In [69]:
```
trainfinal.head()
```

Out[69]:

	id	week	city_code	region_code	center_type	op_area	category	cuisine	checkout_price	base_price	emailer_for_promotion	homepage_featured	num_orders
0	1379560	1	647	56	TYPE_C	2.0	Beverages	Thai	136.83	152.29	0	0	177
1	1018704	2	647	56	TYPE_C	2.0	Beverages	Thai	135.83	152.29	0	0	323
2	1196273	3	647	56	TYPE_C	2.0	Beverages	Thai	132.92	133.92	0	0	96
3	1116527	4	647	56	TYPE_C	2.0	Beverages	Thai	135.86	134.86	0	0	163
4	1343872	5	647	56	TYPE_C	2.0	Beverages	Thai	146.50	147.50	0	0	215

In [70]:
```
trainfinal.shape
```

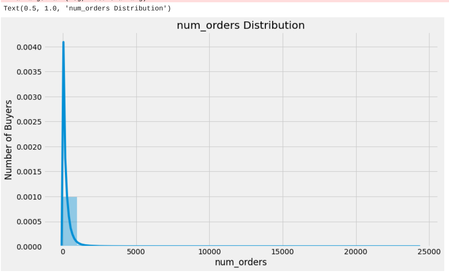
Out[70]:
```
(456548, 13)
```

Data visualization

In [71]:
```
plt.style.use('fivethirtyeight')
plt.figure(figsize=(12,7))
sns.distplot(trainfinal.num_orders, bins = 25)
plt.xlabel("num_orders")
plt.ylabel("Number of Buyers")
plt.title("num_orders Distribution")
```

```
C:\Users\sss\anaconda3\lib\site-packages\seaborn\distributions.py:2557: FutureWarning: `distplot` is a deprecated function and will be removed in a future version. Please adapt your code to use either `displot` (a figure-level function with similar flexibility) or `histplot` (an axes-level function for histograms).
  warnings.warn(msg, FutureWarning)
```

Out[71]:
```
Text(0.5, 1.0, 'num_orders Distribution')
```

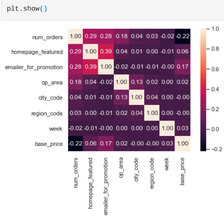


In [72]:
```
trainfinal2 = trainfinal.drop(['id'], axis=1)
correlation = trainfinal2.corr(method='pearson')
columns = correlation.nlargest(8, 'num_orders').index
columns
```

Out[72]:
```
Index(['num_orders', 'homepage_featured', 'emailer_for_promotion', 'op_area',
       'city_code', 'region_code', 'week', 'base_price'],
      dtype='object')
```

In [73]:
```
correlation_map = np.corrcoef(trainfinal2[columns].values.T)
sns.set(font_scale=1.0)
heatmap = sns.heatmap(correlation_map, cbar=True, annot=True, square=True, fmt='.2f', yticklabels=columns.values, xticklabels=columns.values)

plt.show()
```



Spliting the dataset into dependent and independent variable

In [74]:
```
features = columns.drop(['num_orders'])
trainfinal3 = trainfinal[features]
X = trainfinal3.values
Y = trainfinal['num_orders'].values
trainfinal3.head()
```

Out[74]:

	homepage_featured	emailer_for_promotion	op_area	city_code	region_code	week	base_price
0	0	0	2.0	647	56	1	152.29
1	0	0	2.0	647	56	2	152.29
2	0	0	2.0	647	56	3	133.92
3	0	0	2.0	647	56	4	134.86
4	0	0	2.0	647	56	5	147.50

Split the dataset into train set and test set

In [75]:
```
from sklearn.model_selection import train_test_split
X_train, X_val, Y_train, Y_val = train_test_split(X, Y, test_size=0.25)
```

In [ ]:
```

```