In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import itertools
import time
from function import *
from datetime import datetime
import pickle
import warnings
warnings.filterwarnings('ignore')
```

In [2]:
```
aisles = pd.read_csv("C:/Dataset/aisles.csv")
departments = pd.read_csv("C:\Dataset\departments.csv")
order_products_prior = pd.read_csv("C:\Dataset\order_products__prior.csv")
order_products_train = pd.read_csv("C:\Dataset\order_products__train.csv")
orders = pd.read_csv("C:\Dataset\orders.csv")
products = pd.read_csv("C:\Dataset\products.csv")
```

In [3]:
```
aisles.isna().sum()
```

Out[3]:
```
aisle_id    0
aisle       0
dtype: int64
```

In [4]:
```
departments.isna().sum()
```

Out[4]:
```
department_id    0
department       0
dtype: int64
```

In [5]:
```
products.isna().sum()
```

Out[5]:
```
product_id       0
product_name     0
aisle_id         0
department_id    0
dtype: int64
```

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

Out[6]:
```
order_id                  0
user_id                   0
eval_set                  0
order_number              0
order_dow                 0
order_hour_of_day         0
days_since_prior_order    3106
dtype: int64
```

In [7]:
```
orders.days_since_prior_order.value_counts()
```

Out[7]:
```
30.0    5537
7.0     4628
6.0     3370
4.0     3260
3.0     3168
5.0     3100
2.0     2860
8.0     2642
1.0     2045
9.0     1732
14.0    1484
10.0    1385
13.0    1159
11.0    1155
12.0    1141
15.0     952
0.0      909
16.0     721
21.0     702
17.0     596
20.0     558
18.0     548
19.0     525
22.0     506
28.0     372
23.0     364
25.0     342
27.0     302
26.0     285
24.0     274
29.0     271
Name: days_since_prior_order, dtype: int64
```

In [8]:
```
orders.head()
```

Out[8]:

	order_id	user_id	eval_set	order_number	order_dow	order_hour_of_day	days_since_prior_order
0	2539329	1	prior	1	2	8	NaN
1	2398795	1	prior	2	3	7	15.0
2	473747	1	prior	3	3	12	21.0
3	2254736	1	prior	4	4	7	29.0
4	431534	1	prior	5	4	15	28.0

In [9]:
```
order_products_train.isna().sum()
```

Out[9]:
```
order_id              0
product_id            0
add_to_cart_order     0
reordered             0
dtype: int64
```

In [10]:
```
order_products_prior.isna().sum()
```

Out[10]:
```
order_id              0
product_id            0
add_to_cart_order     0
reordered             0
dtype: int64
```

In [11]:
```
products.head()
```

Out[11]:

	product_id	product_name	aisle_id	department_id
0	1	Chocolate Sandwich Cookies	61	19
1	2	All-Seasons Salt	104	13
2	3	Robust Golden Unsweetened Oolong Tea	94	7
3	4	Smart Ones Classic Favorites Mini Rigatoni Wit...	38	1
4	5	Green Chile Anytime Sauce	5	13

In [12]:
```
print(len(products))
print(products.aisle_id.nunique())
print(products.department_id.nunique())
```

```
49688
134
21
```

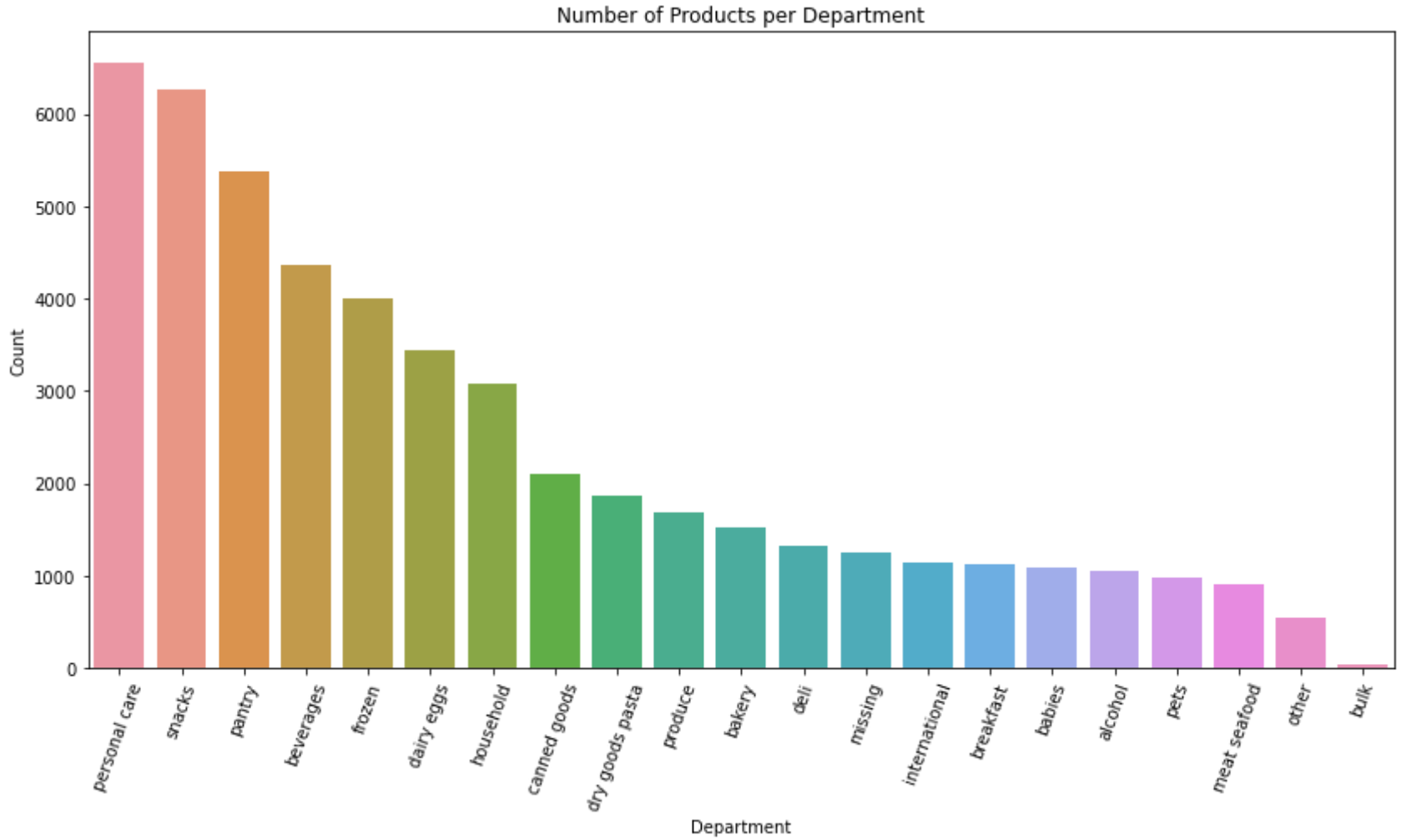
In [13]:
```
products_aisles = pd.merge(products, aisles, on = 'aisle_id', how = 'left')
products_desc = pd.merge(products_aisles, departments, on = 'department_id', how = 'left')
products_desc.head()
```

Out[13]:

	product_id	product_name	aisle_id	department_id	aisle	department
0	1	Chocolate Sandwich Cookies	61	19	cookies cakes	snacks
1	2	All-Seasons Salt	104	13	spices seasonings	pantry
2	3	Robust Golden Unsweetened Oolong Tea	94	7	tea	beverages
3	4	Smart Ones Classic Favorites Mini Rigatoni Wit...	38	1	frozen meals	frozen
4	5	Green Chile Anytime Sauce	5	13	marinades meat preparation	pantry

In [14]:
```
plt.figure(figsize = (14,7))
sns.countplot(x='department', data= products_desc, order = products_desc.department.value_counts().index)
plt.title('Number of Products per Department')
plt.xticks(rotation=70)
plt.ylabel('Count')
plt.xlabel('Department')
```

Out[14]: Text(0.5, 0, 'Department')



In [15]:
```
products_desc[products_desc['aisle']=='missing']
```

Out[15]:

	product_id	product_name	aisle_id	department_id	aisle	department
37	38	Ultra Antibacterial Dish Liquid	100	21	missing	missing
71	72	Organic Honeycrisp Apples	100	21	missing	missing
109	110	Uncured Turkey Bologna	100	21	missing	missing
296	297	Write Bros Ball Point Pens, Cap-Pen, Medium (1...	100	21	missing	missing
416	417	Classics Baby Binks Easter Chocolate Bunny	100	21	missing	missing
...	...	...	...	...	...	...
49552	49553	Organic Plain Skyr	100	21	missing	missing
49574	49575	Chocolate Vanilla Malt Custard	100	21	missing	missing
49640	49641	8\" Pecan Pie	100	21	missing	missing
49663	49664	Lemon Cayenne Drinking Vinegar	100	21	missing	missing
49668	49669	K Cup Dark Blend	100	21	missing	missing

1258 rows × 6 columns

In [16]:
```
products_desc[products_desc['department']=='snacks']
```

Out[16]:

	product_id	product_name	aisle_id	department_id	aisle	department
0	1	Chocolate Sandwich Cookies	61	19	cookies cakes	snacks
15	16	Mint Chocolate Flavored Syrup	103	19	ice cream toppings	snacks
24	25	Salted Caramel Lean Protein & Fiber Bar	3	19	energy granola bars	snacks
31	32	Nacho Cheese White Bean Chips	107	19	chips pretzels	snacks
40	41	Organic Sourdough Einkorn Crackers Rosemary	78	19	crackers	snacks
...	...	...	...	...	...	...
49661	49662	Bacon Cheddar Pretzel Pieces	107	19	chips pretzels	snacks
49664	49665	Super Dark Coconut Ash & Banana Chocolate Bar	45	19	candy chocolate	snacks
49665	49666	Ginger Snaps Snacking Cookies	61	19	cookies cakes	snacks
49670	49671	Milk Chocolate Drops	45	19	candy chocolate	snacks
49678	49679	Famous Chocolate Wafers	61	19	cookies cakes	snacks

6264 rows × 6 columns

In [17]:
```
products_desc[products_desc['aisle_id']==45]
```

Out[17]:

	product_id	product_name	aisle_id	department_id	aisle	department
123	124	Sun Cups Dark Chocolate	45	19	candy chocolate	snacks
135	136	Simple	45	19	candy chocolate	snacks
183	184	Kisses Milk Chocolate Candy	45	19	candy chocolate	snacks
206	207	Minis Candy Bars	45	19	candy chocolate	snacks
226	227	Triple Chocolate Snack Size	45	19	candy chocolate	snacks
...	...	...	...	...	...	...
49503	49504	Dark Chocolate Peanut Butter Cups Miniatures	45	19	candy chocolate	snacks
49600	49601	Pomegranate Gummy Bears	45	19	candy chocolate	snacks
49619	49620	Milk Chocolate Mini's	45	19	candy chocolate	snacks
49664	49665	Super Dark Coconut Ash & Banana Chocolate Bar	45	19	candy chocolate	snacks
49670	49671	Milk Chocolate Drops	45	19	candy chocolate	snacks

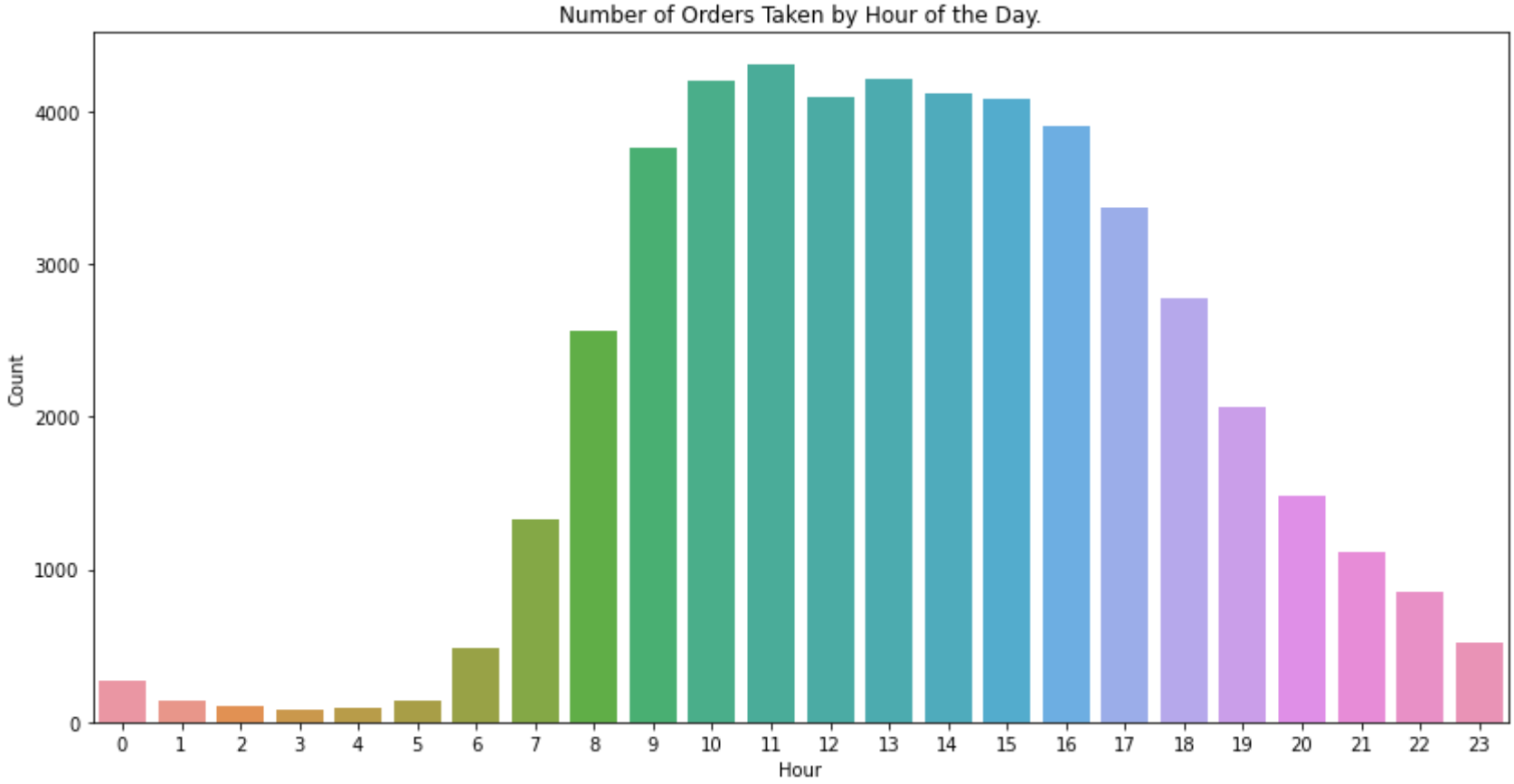
1246 rows × 6 columns

In [18]:
```
import os
pickle.dump(products_desc, open("Pickle/products_desc.p", "wb"))
```

In [19]:
```
import os
filename = "Pickle/products_desc.p"
os.makedirs(os.path.dirname(filename), exist_ok=True)
data = 'C:\Dataset\products.csv'
with open('Pickle/products_desc.pl', 'wb') as f:
    pickle.dump(data, f)
```

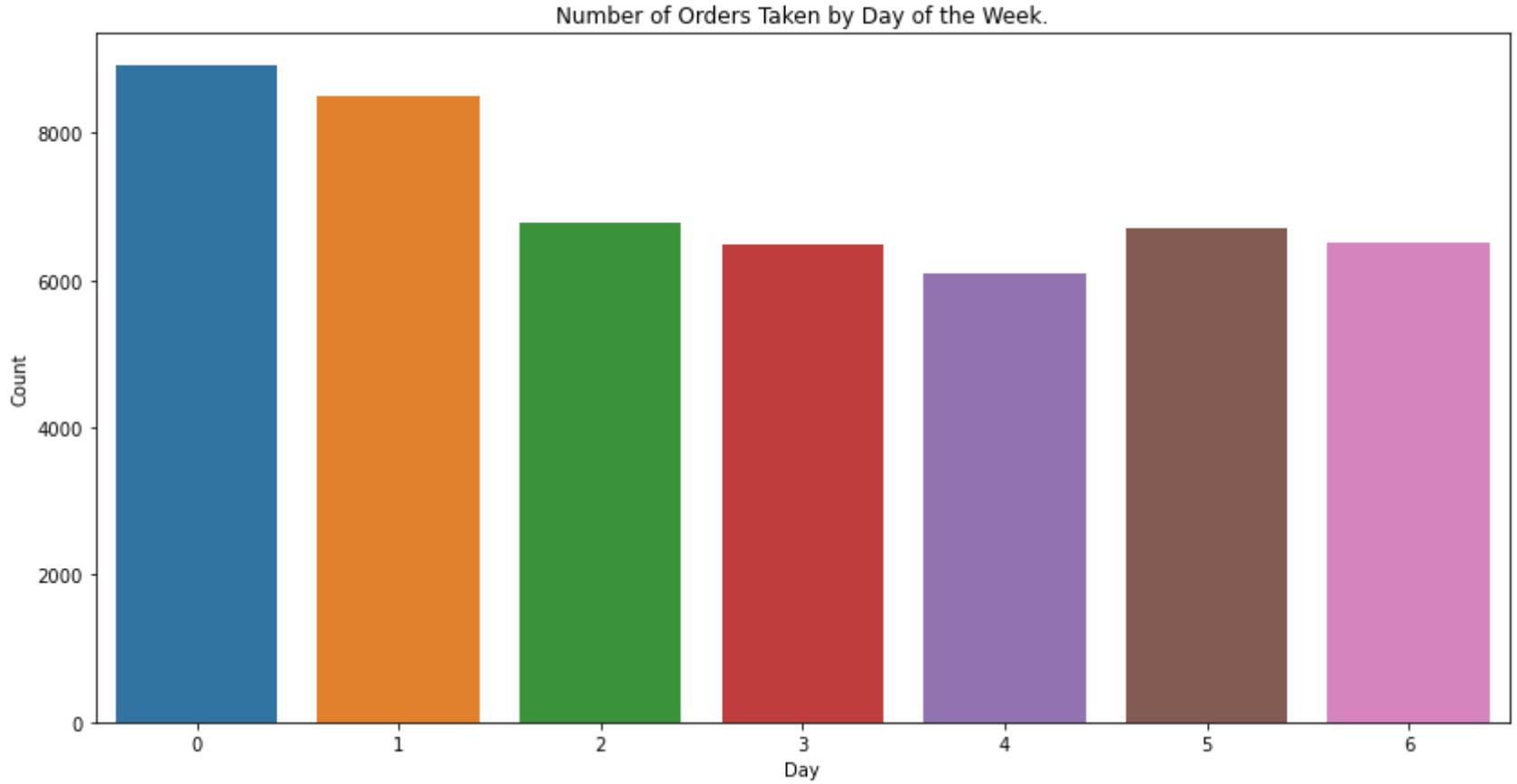
In [20]:
```
plt.figure(figsize = (14,7))
sns.countplot(x='order_hour_of_day', data= orders)
plt.title('Number of Orders Taken by Hour of the Day.')
plt.ylabel('Count')
plt.xlabel('Hour')
```

Out[20]: Text(0.5, 0, 'Hour')



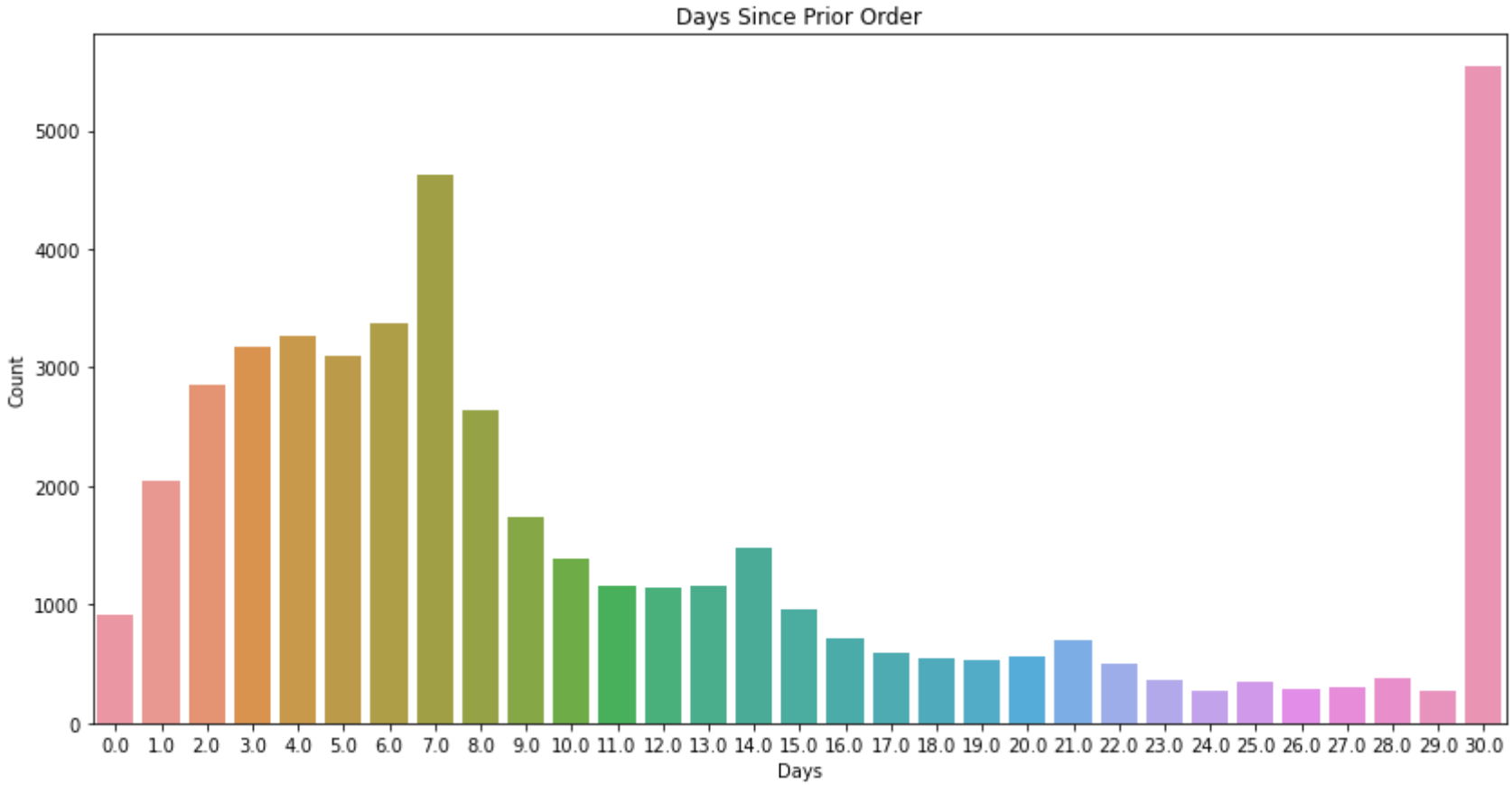
In [21]:
```
plt.figure(figsize = (14,7))
sns.countplot(x='order_dow', data= orders)
plt.title('Number of Orders Taken by Day of the Week.')
plt.ylabel('Count')
plt.xlabel('Day')
```

Out[21]: Text(0.5, 0, 'Day')



In [22]:
```
plt.figure(figsize = (14,7))
sns.countplot(x='days_since_prior_order', data= orders)
plt.title('Days Since Prior Order')
plt.ylabel('Count')
plt.xlabel('Days')
```

Out[22]: Text(0.5, 0, 'Days')



In [23]:
```
orders.head(15)
```

Out[23]:

	order_id	user_id	eval_set	order_number	order_dow	order_hour_of_day	days_since_prior_order
0	2539329	1	prior	1	2	8	NaN
1	2398795	1	prior	2	3	7	15.0
2	473747	1	prior	3	3	12	21.0
3	2254736	1	prior	4	4	7	29.0
4	431534	1	prior	5	4	15	28.0
5	3367565	1	prior	6	2	7	19.0
6	550135	1	prior	7	1	9	20.0
7	3108588	1	prior	8	1	14	14.0
8	2295261	1	prior	9	1	16	0.0
9	2550362	1	prior	10	4	8	30.0
10	1187899	1	train	11	4	8	14.0
11	2168274	2	prior	1	2	11	NaN
12	1501582	2	prior	2	5	10	10.0
13	1901567	2	prior	3	1	10	3.0
14	738281	2	prior	4	2	10	8.0

In [24]:
```
orders.sort_values('order_id')
```

Out[24]:

	order_id	user_id	eval_set	order_number	order_dow	order_hour_of_day	days_since_prior_order
6226	40	382	prior	29	1	15	23.0
15615	178	971	prior	2	3	11	19.0
8161	214	503	prior	5	0	16	9.0
17195	280	1059	prior	27	1	10	6.0
30445	377	1868	prior	65	1	13	2.0
...	...	...	...	...	...	...	...
48831	3420477	3014	prior	1	1	14	NaN
40127	3420523	2475	prior	1	4	18	NaN
7044	3420572	438	prior	6	1	15	5.0
41111	3420796	2534	prior	17	3	14	7.0
48481	3420836	2991	prior	52	3	21	6.0

49999 rows × 7 columns

In [25]:
```
orders_test = orders[orders['eval_set']=='test']
orders_test
```

Out[25]:

	order_id	user_id	eval_set	order_number	order_dow	order_hour_of_day	days_since_prior_order
38	2774568	3	test	13	5	15	11.0
44	329954	4	test	6	3	12	30.0
53	1528013	6	test	4	3	16	22.0
96	1376945	11	test	8	6	11	8.0
102	1356845	12	test	6	1	20	30.0
...	...	...	...	...	...	...	...
49739	359439	3091	test	7	1	14	30.0
49747	2949998	3092	test	8	5	9	30.0
49900	1015484	3100	test	26	2	10	16.0
49927	2337872	3102	test	5	0	12	21.0
49997	366888	3105	test	18	6	0	6.0

1109 rows × 7 columns

In [26]:
```
orders[orders['user_id']==3]
```

Out[26]:

	order_id	user_id	eval_set	order_number	order_dow	order_hour_of_day	days_since_prior_order
26	1374495	3	prior	1	1	14	NaN
27	444309	3	prior	2	3	19	9.0
28	3002854	3	prior	3	3	16	21.0
29	2037211	3	prior	4	2	18	20.0
30	2710558	3	prior	5	0	17	12.0
31	1972919	3	prior	6	0	16	7.0
32	1839752	3	prior	7	0	15	7.0
33	3225766	3	prior	8	0	17	7.0
34	3160850	3	prior	9	0	16	7.0
35	676467	3	prior	10	3	16	17.0
36	521107	3	prior	11	0	18	11.0
37	1402502	3	prior	12	1	15	15.0
38	2774568	3	test	13	5	15	11.0

In [27]:
```
order_products_train.head()
```

Out[27]:

	order_id	product_id	add_to_cart_order	reordered
0	1	49302	1	1
1	1	11109	2	1
2	1	10246	3	0
3	1	49683	4	0
4	1	43633	5	1

In [28]:
```
print(len(order_products_train))
print(order_products_train.order_id.min())
print(order_products_train.order_id.max())
print(order_products_train.order_id.nunique())
```

```
49999
1
123265
4774
```

In [29]:
```
order_products_prior.head()
```

Out[29]:

	order_id	product_id	add_to_cart_order	reordered
0	2	33120	1	1
1	2	28985	2	1
2	2	9327	3	0
3	2	45918	4	1
4	2	30035	5	0

In [30]:
```
print(len(order_products_prior))
print(order_products_prior.order_id.min())
print(order_products_prior.order_id.max())
print(order_products_prior.order_id.nunique())
```

```
49999
2
5281
4978
```

In [31]:
```
order_products_prior[order_products_prior.order_id == 2]
```

Out[31]:

	order_id	product_id	add_to_cart_order	reordered
0	2	33120	1	1
1	2	28985	2	1
2	2	9327	3	0
3	2	45918	4	1
4	2	30035	5	0
5	2	17794	6	1
6	2	40141	7	1
7	2	1819	8	1
8	2	43668	9	0

In [32]:
```
orders[orders.order_id == 29063]
```

Out[32]:

	order_id	user_id	eval_set	order_number	order_dow	order_hour_of_day	days_since_prior_order

In [33]:
```
orders[orders.user_id == 2022]
```

Out[33]:

	order_id	user_id	eval_set	order_number	order_dow	order_hour_of_day	days_since_prior_order
32809	89455	2022	prior	1	1	13	NaN
32810	256512	2022	prior	2	1	14	7.0
32811	1800883	2022	prior	3	1	11	7.0
32812	148437	2022	prior	4	1	13	7.0
32813	2475757	2022	prior	5	3	10	9.0
32814	3099210	2022	prior	6	0	15	4.0
32815	110115	2022	prior	7	0	11	7.0
32816	414020	2022	prior	8	6	16	13.0
32817	2366671	2022	prior	9	0	12	15.0
32818	178132	2022	prior	10	2	8	9.0
32819	2988065	2022	prior	11	2	10	7.0
32820	729423	2022	prior	12	2	10	7.0
32821	8202	2022	prior	13	0	9	5.0
32822	2231131	2022	prior	14	4	10	4.0
32823	2155990	2022	prior	15	2	12	5.0
32824	449334	2022	prior	16	2	9	7.0
32825	1227054	2022	prior	17	5	10	3.0
32826	1293381	2022	prior	18	2	15	11.0
32827	3211572	2022	prior	19	6	15	4.0
32828	3082870	2022	prior	20	2	13	3.0
32829	1212569	2022	prior	21	0	9	5.0
32830	51992	2022	prior	22	6	16	6.0
32831	985504	2022	prior	23	0	9	8.0
32832	593933	2022	prior	24	0	12	7.0

	order_id	user_id	eval_set	order_number	order_dow	order_hour_of_day	days_since_prior_order
32833	958379	2022	prior	25	3	11	3.0
32834	2461884	2022	prior	26	1	8	5.0
32835	3368478	2022	prior	27	0	8	6.0
32836	494629	2022	prior	28	0	14	7.0
32837	1962565	2022	prior	29	5	13	12.0
32838	3048854	2022	prior	30	1	11	3.0
32839	704725	2022	prior	31	1	8	7.0
32840	3190830	2022	prior	32	0	14	6.0
32841	1410775	2022	prior	33	5	9	5.0
32842	131226	2022	prior	34	2	10	4.0
32843	2658681	2022	train	35	2	14	7.0

In [34]:
```
order_products_train[order_products_train.order_id == 878]
```

Out[34]:

	order_id	product_id	add_to_cart_order	reordered
195	878	48070	1	1
196	878	24852	2	1
197	878	23044	3	0
198	878	45066	4	1
199	878	21903	5	1
200	878	24964	6	0
201	878	47209	7	1
202	878	40706	8	0
203	878	21616	9	0
204	878	10305	10	0
205	878	21137	11	1
206	878	9076	12	0
207	878	27104	13	1
208	878	48679	14	0
209	878	10749	15	1
210	878	31717	16	1
211	878	30720	17	1
212	878	16759	18	0
213	878	5876	19	0
214	878	8193	20	0
215	878	43789	21	0
216	878	26209	22	0
217	878	11262	23	0
218	878	17652	24	0

	order_id	product_id	add_to_cart_order	reordered
219	878	34913	25	0
220	878	47156	26	0
221	878	40174	27	0
222	878	31343	28	0

In [35]:
```
len(orders[orders.user_id == 2906103])
```

Out[35]:
```
0
```

In [36]:
```
orders[orders.user_id == 2906103].order_dow.mode()
```

Out[36]:
```
Series([], dtype: int64)
```

In [37]:
```
orders[orders.user_id == 202279].days_since_prior_order.mean()
```

Out[37]:
```
nan
```

In [38]:
```
orders[orders.user_id == 202279].order_hour_of_day.mean()
```

Out[38]:
```
nan
```

In [39]:
```
list(orders[orders.user_id == 202279]['order_id'].values)
```

Out[39]:
```
[]
```

In [40]:
```
order_products_prior[order_products_prior['order_id'].isin(list(orders[orders.user_id == 10667]['order_id'].values))]
```

Out[40]:

	order_id	product_id	add_to_cart_order	reordered

In [41]:
```
print(len(order_products_train))
print(len(order_products_prior))
```

```
49999
49999
```

In [42]:
```
len(order_products_train)+len(order_products_prior)
```

Out[42]: 99998

In [43]:
```
merged_order_products = pd.merge(order_products_train, order_products_prior, how = 'outer')
merged_order_products.head()
```

Out[43]:

	order_id	product_id	add_to_cart_order	reordered
0	1	49302	1	1
1	1	11109	2	1
2	1	10246	3	0
3	1	49683	4	0
4	1	43633	5	1

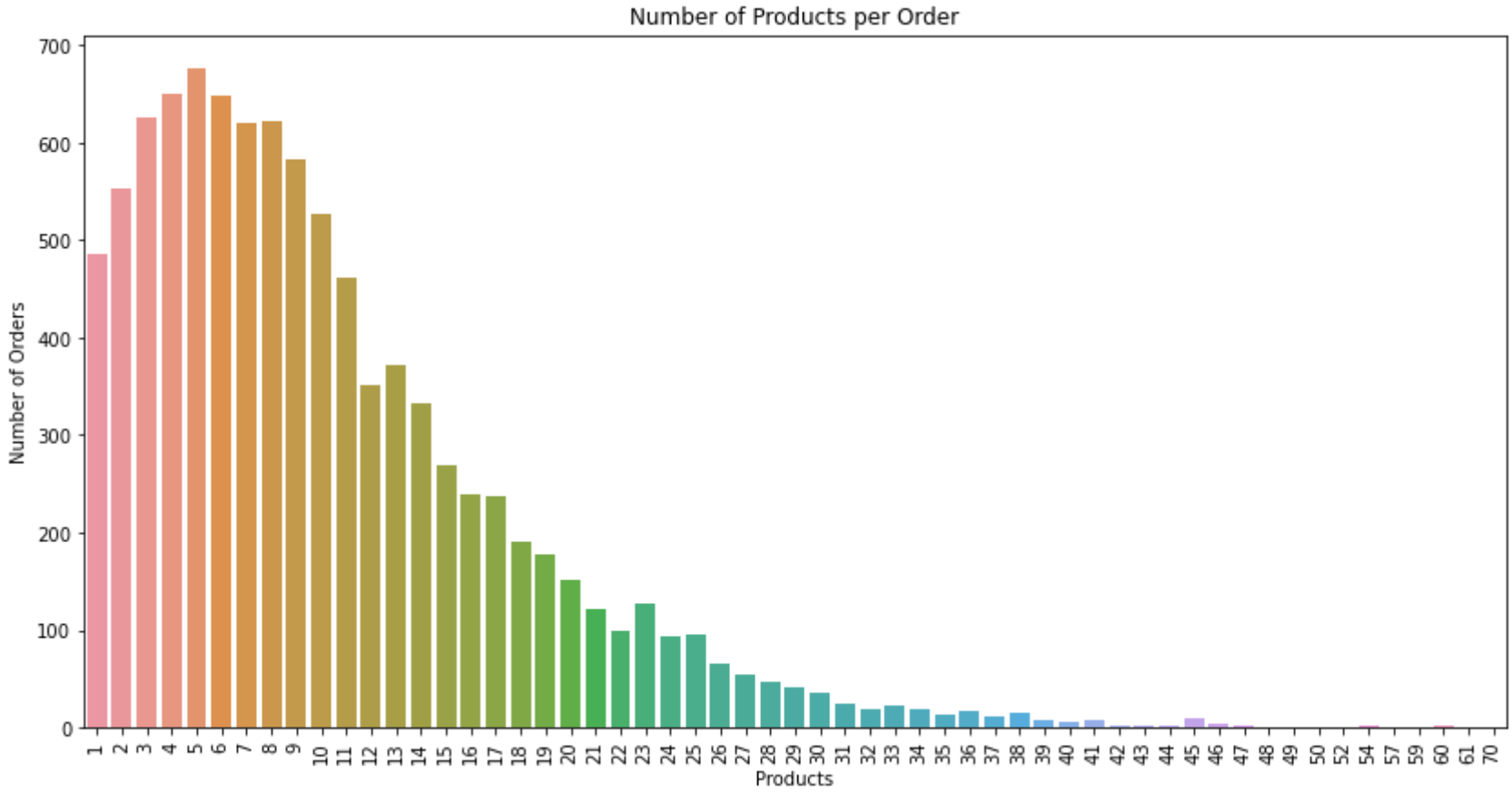
In [44]:
```
len(merged_order_products)
```

Out[44]: 99998

In [45]:
```
products_per_order = merged_order_products.groupby('order_id').count()
```

In [46]:
```
plt.figure(figsize = (14,7))
sns.countplot(x='product_id', data = products_per_order)
plt.title('Number of Products per Order')
plt.xticks(rotation=90)
plt.ylabel('Number of Orders')
plt.xlabel('Products')
```

Out[46]: Text(0.5, 0, 'Products')



In [47]:
```
order_products_desc = pd.merge(merged_order_products, products_desc, on = 'product_id')
order_products_desc.head()
```

Out[47]:

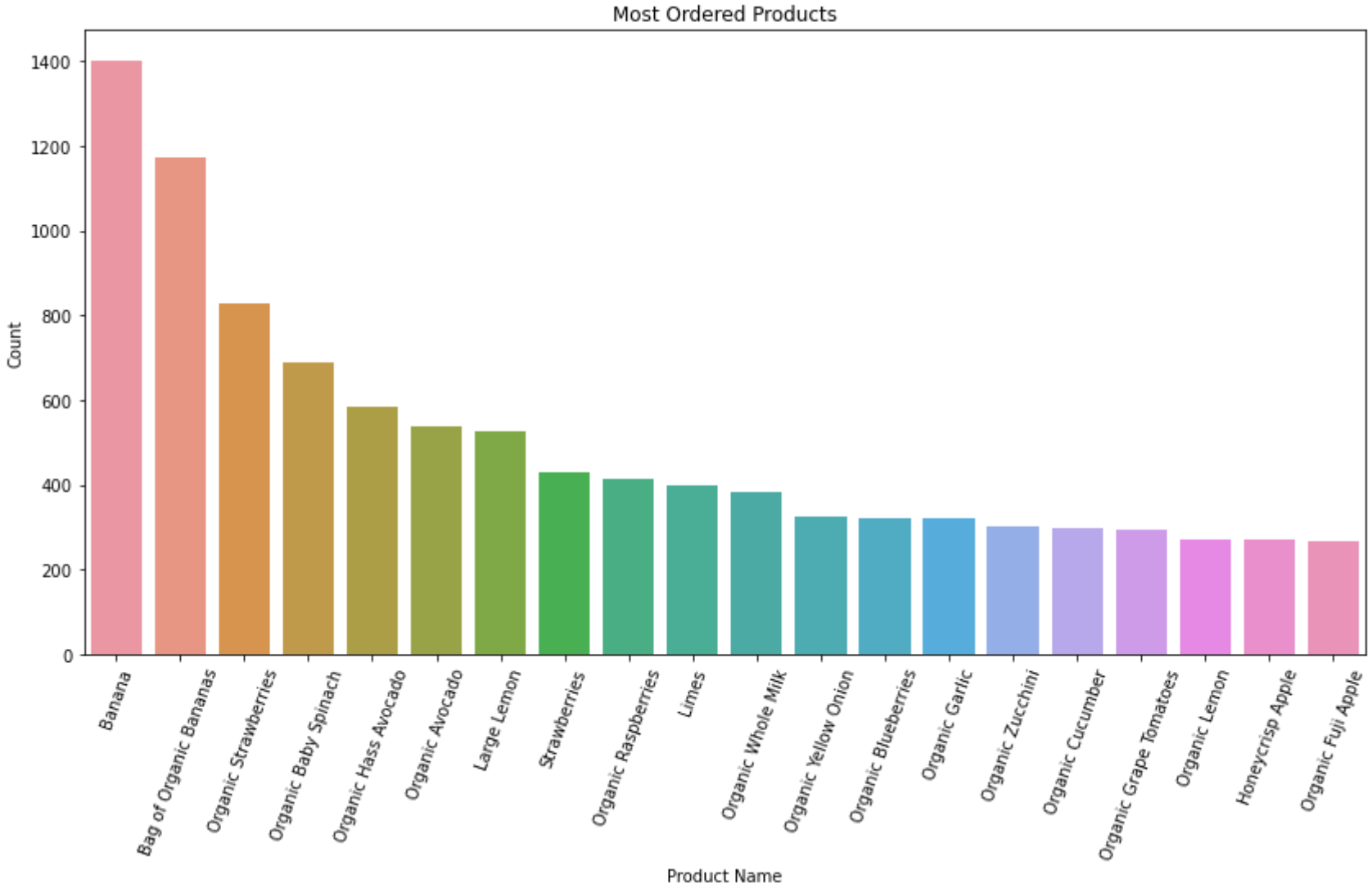
	order_id	product_id	add_to_cart_order	reordered	product_name	aisle_id	department_id	aisle	department
0	1	49302	1	1	Bulgarian Yogurt	120	16	yogurt	dairy eggs
1	1	11109	2	1	Organic 4% Milk Fat Whole Milk Cottage Cheese	108	16	other creams cheeses	dairy eggs
2	68474	11109	8	1	Organic 4% Milk Fat Whole Milk Cottage Cheese	108	16	other creams cheeses	dairy eggs
3	78197	11109	3	1	Organic 4% Milk Fat Whole Milk Cottage Cheese	108	16	other creams cheeses	dairy eggs
4	120619	11109	1	0	Organic 4% Milk Fat Whole Milk Cottage Cheese	108	16	other creams cheeses	dairy eggs

In [48]:
```
order_products_desc['product_name'].value_counts()
```

Out[48]:
```
Banana                                 1403
Bag of Organic Bananas                 1174
Organic Strawberries                    828
Organic Baby Spinach                    690
Organic Hass Avocado                    585
                                       ...
Creamer                                   1
Black Beans, Low Sodium                   1
Gourmet Oyster Mushrooms                  1
100% Carrot 100% Vegetable Juice          1
FreshBurst PocketPaks® Breath Strips      1
Name: product_name, Length: 16492, dtype: int64
```

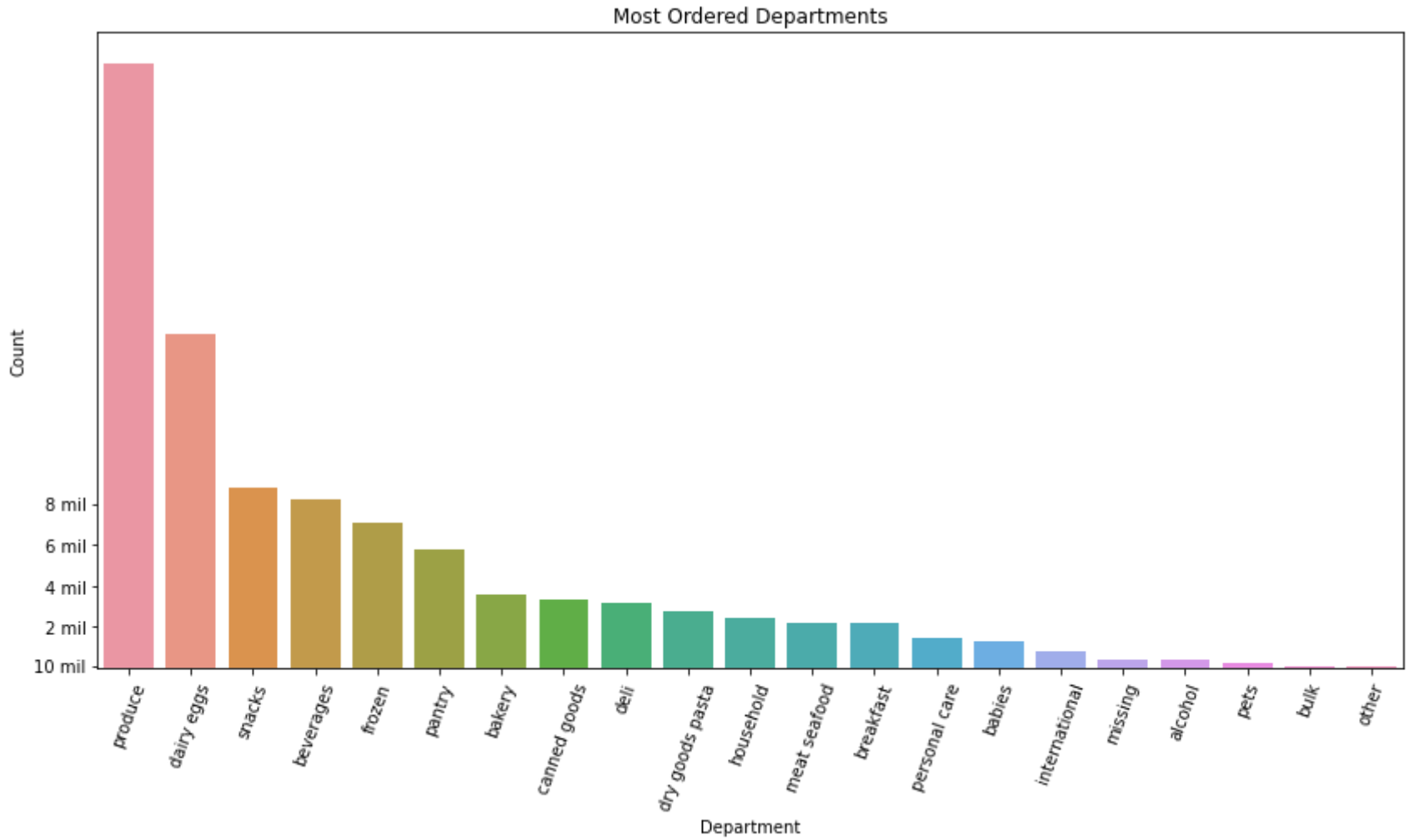
In [49]:
```
plt.figure(figsize = (14,7))
sns.countplot(x='product_name', data= order_products_desc,
              order = order_products_desc.product_name.value_counts().index[:20])
plt.title('Most Ordered Products')
plt.xticks(rotation=70)
plt.ylabel('Count')
plt.xlabel('Product Name')
```

Out[49]:
```
Text(0.5, 0, 'Product Name')
```


Most Ordered Products
Count
0
200
400
600
800
1000
1200
1400
Banana
Bag of Organic Bananas
Organic Strawberries
Organic Baby Spinach
Organic Hass Avocado
Organic Avocado
Large Lemon
Strawberries
Organic Raspberries
Limes
Organic Whole Milk
Organic Yellow Onion
Organic Blueberries
Organic Garlic
Organic Zucchini
Organic Cucumber
Organic Grape Tomatoes
Organic Lemon
Honeycrisp Apple
Organic Fuji Apple
Product Name

In [50]:
```
plt.figure(figsize = (14,7))
sns.countplot(x='department', data= order_products_desc, order = order_products_desc.department.value_counts().index)
plt.title('Most Ordered Departments')
plt.xticks(rotation=70)
plt.yticks([2000,4000,6000,8000,100],['2 mil','4 mil','6 mil','8 mil','10 mil'])
plt.ylabel('Count')
plt.xlabel('Department')
```

Out[50]: Text(0.5, 0, 'Department')



In [51]:
```
merged_orders = pd.merge(orders, order_products_desc, on = 'order_id')
merged_orders.head()
```

Out[51]:

	order_id	user_id	eval_set	order_number	order_dow	order_hour_of_day	days_since_prior_order	product_id	add_to_cart_order	reordered	prod
0	62370	30	train	9	2	13	22.0	23288	1	1	Dist
1	39325	55	train	8	2	18	30.0	27509	11	0	Yu
2	39325	55	train	8	2	18	30.0	47766	2	1	
3	39325	55	train	8	2	18	30.0	12481	13	0	
4	39325	55	train	8	2	18	30.0	46906	7	1	W

In [52]:
```
len(merged_orders)
```

Out[52]: 1540

In [53]:
```
merged_orders[merged_orders['user_id']==55]
```

Out[53]:

	order_id	user_id	eval_set	order_number	order_dow	order_hour_of_day	days_since_prior_order	product_id	add_to_cart_order	reordered	pro
1	39325	55	train	8	2	18	30.0	27509	11	0	Y
2	39325	55	train	8	2	18	30.0	47766	2	1	
3	39325	55	train	8	2	18	30.0	12481	13	0	
4	39325	55	train	8	2	18	30.0	46906	7	1	\
5	39325	55	train	8	2	18	30.0	7736	1	1	Ori
6	39325	55	train	8	2	18	30.0	48183	9	1	F
7	39325	55	train	8	2	18	30.0	4658	3	1	M
8	39325	55	train	8	2	18	30.0	7413	4	1	
9	39325	55	train	8	2	18	30.0	39491	5	1	P Bal
10	39325	55	train	8	2	18	30.0	18175	6	1	Ch
11	39325	55	train	8	2	18	30.0	39349	8	0	

	order_id	user_id	eval_set	order_number	order_dow	order_hour_of_day	days_since_prior_order	product_id	add_to_cart_order	reordered	pro
12	39325	55	train	8	2	18	30.0	48890	10	0	Ju
13	39325	55	train	8	2	18	30.0	2389	12	0	B

In [54]:
```
orders[orders['user_id']==3]
```

Out[54]:

	order_id	user_id	eval_set	order_number	order_dow	order_hour_of_day	days_since_prior_order
26	1374495	3	prior	1	1	14	NaN
27	444309	3	prior	2	3	19	9.0
28	3002854	3	prior	3	3	16	21.0
29	2037211	3	prior	4	2	18	20.0
30	2710558	3	prior	5	0	17	12.0
31	1972919	3	prior	6	0	16	7.0
32	1839752	3	prior	7	0	15	7.0
33	3225766	3	prior	8	0	17	7.0
34	3160850	3	prior	9	0	16	7.0
35	676467	3	prior	10	3	16	17.0
36	521107	3	prior	11	0	18	11.0
37	1402502	3	prior	12	1	15	15.0
38	2774568	3	test	13	5	15	11.0

In [55]:
```
# Creating the test set of orders
test = orders[orders['eval_set']=='test']
test.head()
```

Out[55]:

	order_id	user_id	eval_set	order_number	order_dow	order_hour_of_day	days_since_prior_order
38	2774568	3	test	13	5	15	11.0
44	329954	4	test	6	3	12	30.0
53	1528013	6	test	4	3	16	22.0
96	1376945	11	test	8	6	11	8.0
102	1356845	12	test	6	1	20	30.0

In [56]:
```
# Now I can see everything a particular user has ordered, and how often
merged_orders[merged_orders['user_id']==55]['product_name'].value_counts()
```

Out[56]:
```
Organic Seasoned Yukon Select Potatoes Hashed Browns          1
Organic Avocado                                               1
Oreo Chocolate Sandwich Cookies                               1
Grape White/Green Seedless                                    1
Premium Original Saltine Crackers                             1
Flour Tortillas                                               1
Imported Mineral Water                                        1
Chocolate Peppermint Stick Bar                                1
Pirate's Booty Aged White Cheddar Baked Rice and Corn Puffs   1
Organics Chocolate Milk with DHA                              1
Sliced Varzi Salami Meat                                      1
Jumbo Brown Eggs                                              1
Breakfast Hot & Spicy Sausage Patties                         1
Name: product_name, dtype: int64
```

In [57]:
```
pickle.dump(merged_orders, open("Pickle/merged_orders.p", "wb"))
```

Clustering

In [58]:
```
user_item = merged_orders[['user_id', 'product_id', 'reordered']]
```

In [59]:
```
user_item[user_item.duplicated(subset = ['user_id', 'product_id'], keep = 'first')]
```

Out[59]:

	user_id	product_id	reordered
34	66	8143	1
162	382	33198	1
165	382	10070	1
166	382	42450	1
168	382	34866	1
439	787	9175	1
440	787	36107	1
442	787	45154	1

In [60]:
```
user_item[user_item['user_id']==55].product_id.value_counts()
```

Out[60]:
```
27509    1
47766    1
12481    1
46906    1
7736     1
48183    1
4658     1
7413     1
39491    1
18175    1
39349    1
48890    1
2389     1
Name: product_id, dtype: int64
```

In [ ]: