In [45]:
```
import warnings
warnings.filterwarnings('ignore')

import pandas as pd
import seaborn as sns
import numpy as np
import matplotlib.pyplot as plt
```

In [46]:
```
import pandas as pd
data=pd.read_csv(r"C:\Users\yukta\OneDrive\Desktop\indian_food.csv")
food_raw_df=pd.DataFrame(data)
print(data)
```

```
              name                                        ingredients  \
0        Balu shahi                    Maida flour, yogurt, oil, sugar
1            Boondi                              Gram flour, ghee, sugar
2    Gajar ka halwa       Carrots, milk, sugar, ghee, cashews, raisins
3            Ghevar  Flour, ghee, kewra, milk, clarified butter, su...
4       Gulab jamun  Milk powder, plain flour, baking powder, ghee,...
..              ...                                                ...
250       Til Pitha            Glutinous rice, black sesame seeds, gur
251         Bebinca  Coconut milk, egg yolks, clarified butter, all...
252          Shufta  Cottage cheese, dry dates, dried rose petals, ...
253       Mawa Bati  Milk powder, dry fruits, arrowroot powder, all...
254          Pinaca  Brown rice, fennel seeds, grated coconut, blac...

           diet prep_time  cook_time flavor_profile   course            st
ate  \
0    vegetarian        45       25.0          sweet  dessert      West Ben
gal
1    vegetarian        80       30.0          sweet  dessert        Rajast
han
2    vegetarian        15       60.0          sweet  dessert           Pun
jab
3    vegetarian        15       30.0          sweet  dessert        Rajast
han
4    vegetarian        15       40.0          sweet  dessert      West Ben
gal
..          ...       ...        ...            ...      ...
...
250  vegetarian         5       30.0          sweet  dessert           As
sam
251  vegetarian        20       60.0          sweet  dessert
Goa
252  vegetarian       NaN        NaN          sweet  dessert  Jammu & Kash
mir
253  vegetarian        20       45.0          sweet  dessert   Madhya Prad
esh
254  vegetarian       NaN        NaN          sweet  dessert
Goa

         region
0          East
1           NaN
2         North
3          West
4           NaN
..          ...
250  North East
251        West
252       North
253     Central
254        West

[255 rows x 9 columns]
```

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

Out[49]:

	name	ingredients	diet	prep_time	cook_time	flavor_profile	cou
0	Balu shahi	Maida flour, yogurt, oil, sugar	vegetarian	45	25.0	sweet	des
1	Boondi	Gram flour, ghee, sugar	vegetarian	80	30.0	sweet	des
2	Gajar ka halwa	Carrots, milk, sugar, ghee, cashews, raisins	vegetarian	15	60.0	sweet	des
3	Ghevar	Flour, ghee, kewra, milk, clarified butter, su...	vegetarian	15	30.0	sweet	des
4	Gulab jamun	Milk powder, plain flour, baking powder, ghee,...	vegetarian	15	40.0	sweet	des

In [51]:
```
food_raw_df.tail()
```

Out[51]:

	name	ingredients	diet	prep_time	cook_time	flavor_profile
250	Til Pitha	Glutinous rice, black sesame seeds, gur	vegetarian	5	30.0	sweet
251	Bebinca	Coconut milk, egg yolks, clarified butter, all...	vegetarian	20	60.0	sweet
252	Shufta	Cottage cheese, dry dates, dried rose petals, ...	vegetarian	NaN	NaN	sweet
253	Mawa Bati	Milk powder, dry fruits, arrowroot powder, all...	vegetarian	20	45.0	sweet
254	Pinaca	Brown rice, fennel seeds, grated coconut, blac...	vegetarian	NaN	NaN	sweet

In [15]:
```
food_raw_df.shape
```

Out[15]:
```
(255, 9)
```

In [17]:
```
food_raw_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 255 entries, 0 to 254
Data columns (total 9 columns):
 #   Column          Non-Null Count  Dtype  
---  ------          --------------  -----  
 0   name            255 non-null    object 
 1   ingredients     255 non-null    object 
 2   diet            255 non-null    object 
 3   prep_time       226 non-null    object 
 4   cook_time       227 non-null    float64
 5   flavor_profile  226 non-null    object 
 6   course          255 non-null    object 
 7   state           231 non-null    object 
 8   region          239 non-null    object 
dtypes: float64(1), object(8)
memory usage: 18.1+ KB
```

In [207…
```
food_raw_df.describe()
```

Out[207…

	cook_time
count	227.000000
mean	38.911894
std	49.421711
min	2.000000
25%	20.000000
50%	30.000000
75%	45.000000
max	720.000000

In [193…
```
food_raw_df.dtypes
```

Out[193…
```
name               object
ingredients        object
diet               object
prep_time          object
cook_time         float64
flavor_profile     object
course             object
state              object
region             object
area               object
dtype: object
```

In [195…
```
food_raw_df.isna().sum()
```

Out[195…
```
name              0
ingredients       0
diet              0
prep_time        29
cook_time        28
flavor_profile   29
course            0
state            24
region           16
area              0
dtype: int64
```

In [199…
```
food_raw_df.columns
```

Out[199…
```
Index(['name', 'ingredients', 'diet', 'prep_time', 'cook_time',
       'flavor_profile', 'course', 'state', 'region', 'area'],
      dtype='object')
```

In [53]:
```
food_raw_df[food_raw_df.duplicated('ingredients')]
```

Out[53]:

	name	ingredients	diet	prep_time	cook_time	flavor_profile
10	Laddu	Gram flour, ghee, sugar	vegetarian	10	40.0	sweet
25	Ledikeni	Chhena, sugar, ghee	vegetarian	45	45.0	sweet
199	Patra	Arbi ke patte, sesame seeds, gur, bengal gram ...	vegetarian	10	40.0	spicy

In [31]:
```
food_raw_df.loc[0:5,['name','prep_time','cook_time']]
```

Out[31]:

	name	prep_time	cook_time
0	Balu shahi	45	25.0
1	Boondi	80	30.0
2	Gajar ka halwa	15	60.0
3	Ghevar	15	30.0
4	Gulab jamun	15	40.0
5	Imarti	10	50.0

In [33]:
```
food_raw_df.loc[3,['name','prep_time']]
```

Out[33]:
```
name          Ghevar
prep_time         15
Name: 3, dtype: object
```

In [35]:
```
food_raw_df.iloc[0:3,1:5]
```

Out[35]:

	ingredients	diet	prep_time	cook_time
0	Maida flour, yogurt, oil, sugar	vegetarian	45	25.0
1	Gram flour, ghee, sugar	vegetarian	80	30.0
2	Carrots, milk, sugar, ghee, cashews, raisins	vegetarian	15	60.0

In [57]:
```
food_raw_df['cook_time'].dropna().tail()
```

Out[57]:
```
247    50.0
249    20.0
250    30.0
251    60.0
253    45.0
Name: cook_time, dtype: float64
```

In [55]:
```
food_raw_df[['state','region']].dropna()
```

Out[55]:

	state	region
0	West Bengal	East
2	Punjab	North
3	Rajasthan	West
5	West Bengal	East
6	Uttar Pradesh	North
...	...	...
250	Assam	North East
251	Goa	West
252	Jammu & Kashmir	North
253	Madhya Pradesh	Central
254	Goa	West

228 rows × 2 columns

In [41]:
```
food_raw_df[['state','region']].fillna("currentry unavailable")
```

Out[41]:

	state	region
0	West Bengal	East
1	Rajasthan	currentry unavailable
2	Punjab	North
3	Rajasthan	West
4	West Bengal	currentry unavailable
...	...	...
250	Assam	North East
251	Goa	West
252	Jammu & Kashmir	North
253	Madhya Pradesh	Central
254	Goa	West

255 rows × 2 columns

In [43]:
```
food_raw_df['area']=food_raw_df['state'].astype(str)+food_raw_df['region'
food_raw_df
```

Out[43]:

	name	ingredients	diet	prep_time	cook_time	flavor_profile
0	Balu shahi	Maida flour, yogurt, oil, sugar	vegetarian	45	25.0	sweet
1	Boondi	Gram flour, ghee, sugar	vegetarian	80	30.0	sweet
2	Gajar ka halwa	Carrots, milk, sugar, ghee, cashews, raisins	vegetarian	15	60.0	sweet
3	Ghevar	Flour, ghee, kewra, milk, clarified butter, su...	vegetarian	15	30.0	sweet
4	Gulab jamun	Milk powder, plain flour, baking powder, ghee,...	vegetarian	15	40.0	sweet
...	...	...	...	...	...	...
250	Til Pitha	Glutinous rice, black sesame seeds, gur	vegetarian	5	30.0	sweet
251	Bebinca	Coconut milk, egg yolks, clarified butter, all...	vegetarian	20	60.0	sweet
252	Shufta	Cottage cheese, dry dates, dried rose petals, ...	vegetarian	NaN	NaN	sweet
253	Mawa Bati	Milk powder, dry fruits, arrowroot powder, all...	vegetarian	20	45.0	sweet
254	Pinaca	Brown rice, fennel seeds, grated coconut, blac...	vegetarian	NaN	NaN	sweet

255 rows × 10 columns

In [45]:
```
food_raw_df[food_raw_df.cook_time <= 25.0].count()
```

Out[45]:
```
name              72
ingredients       72
diet              72
prep_time         72
cook_time         72
flavor_profile    59
course            72
state             61
region            63
area              72
dtype: int64
```

In [47]:
```
food_raw_df[food_raw_df.cook_time <= 25.0].count().tail()
```

Out[47]:
```
flavor_profile    59
course            72
state             61
region            63
area              72
dtype: int64
```

In [49]:
```
food_raw_df.flavor_profile.unique()
```

Out[49]:
```
array(['sweet', 'spicy', 'bitter', nan, 'sour'], dtype=object)
```

In [51]:
```
food_raw_df.region.unique()
```

Out[51]:
```
array(['East', nan, 'North', 'West', 'North East', 'South', 'Central'],
      dtype=object)
```

In [61]:
```
food_raw_df.state.nunique()
```

Out[61]:
```
24
```

In [99]:
```
region_counts = food_raw_df.region.value_counts()
region_counts
```

Out[99]:
```
region
West          73
South         59
North         49
East          30
North East    25
Central        3
Name: count, dtype: int64
```

In [213…
```
food_raw_df['cook_time'].mean()
```

Out[213…
```
38.91189427312775
```

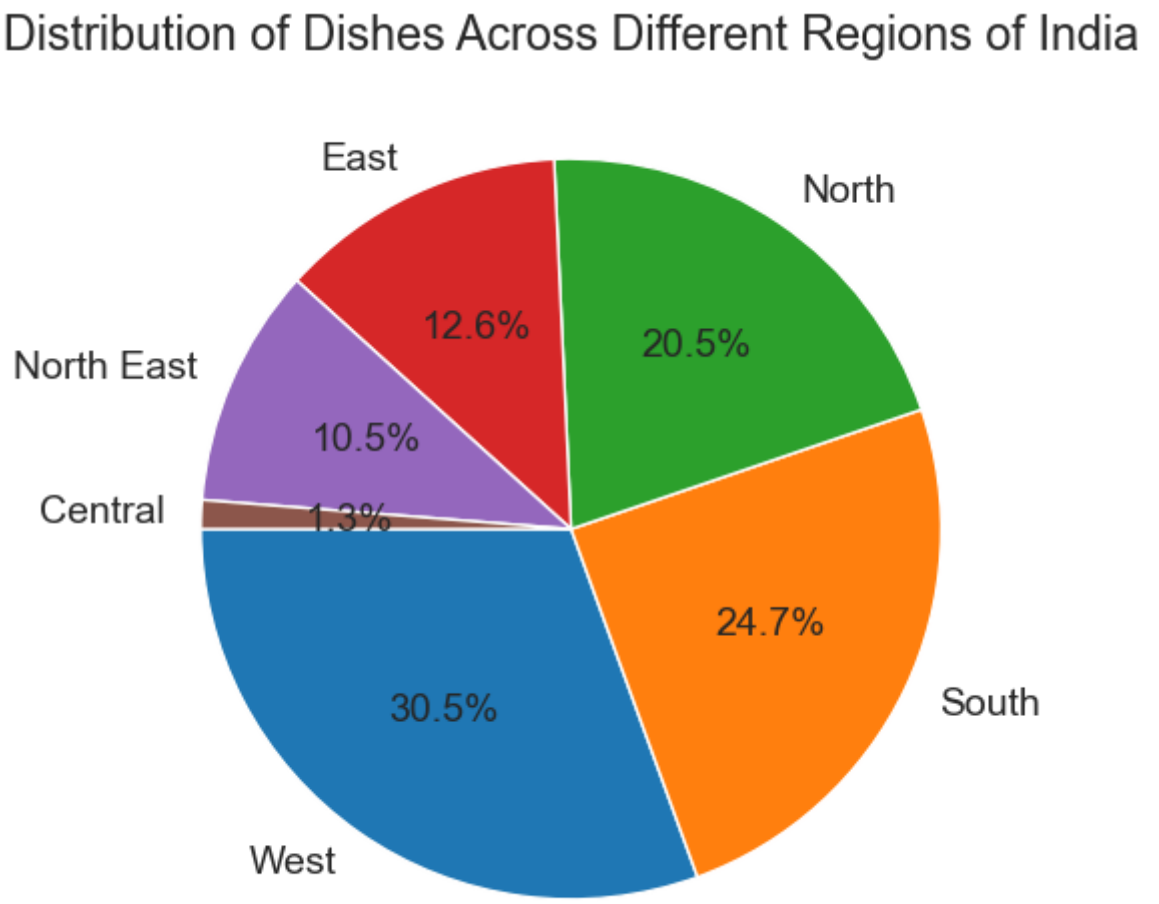
In [215…
```
food_raw_df['cook_time'].min()
```

Out[215…
```
2.0
```

In [217…
```
food_raw_df['cook_time'].max()
```

Out[217…
```
720.0
```

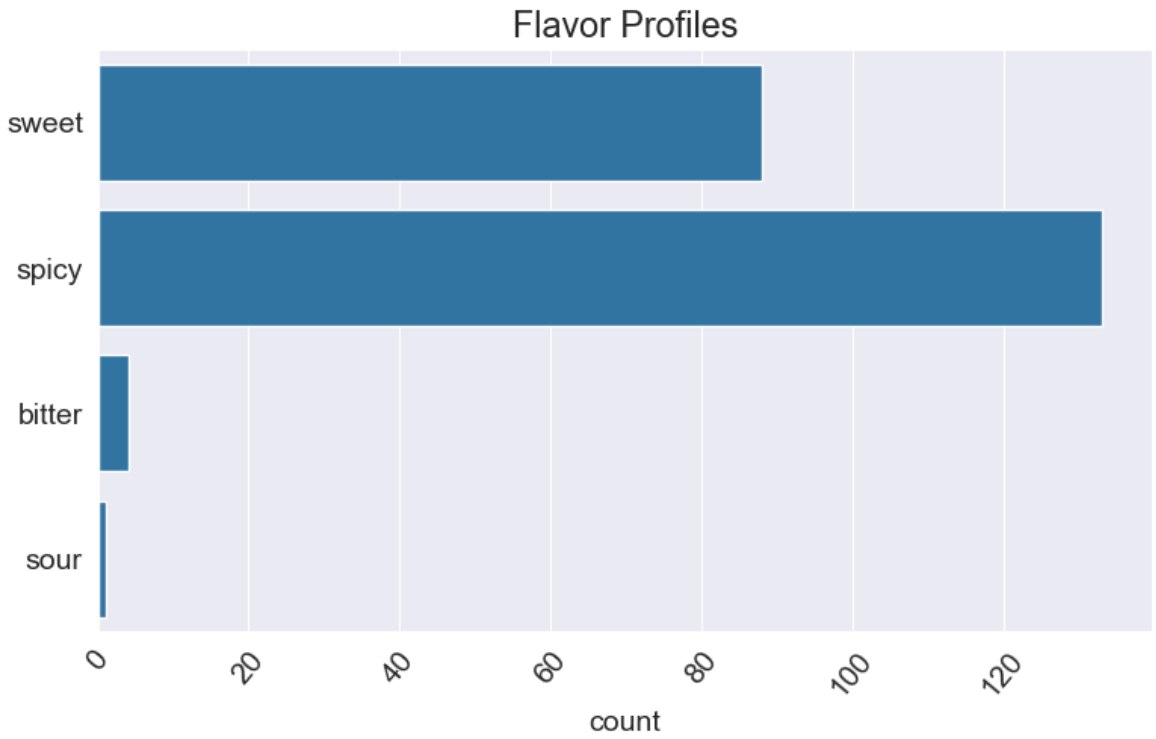
In [117…
```
plt.figure(figsize=(12,6))
plt.title("Distribution of Dishes Across Different Regions of India")
plt.pie(region_counts, labels=region_counts.index, autopct='%1.1f%%', sta
```



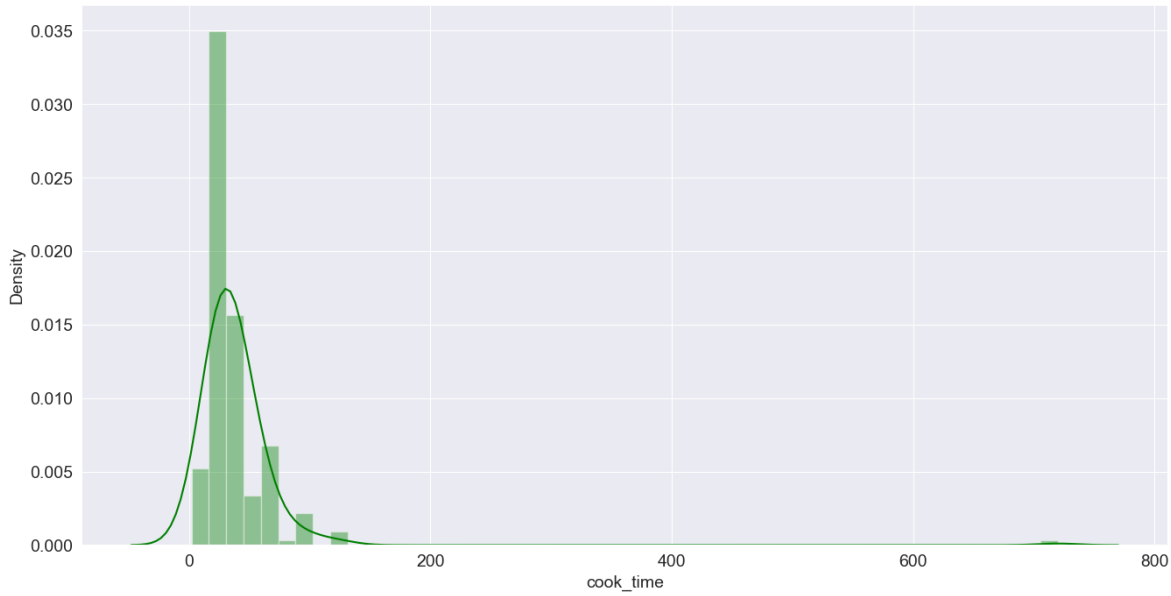
In [121…
```
top_states = food_raw_df.state.value_counts().head(15)
top_states
```

Out[121…
```
state
Gujarat          35
Punjab           32
Maharashtra      30
West Bengal      24
Assam            21
Tamil Nadu       20
Andhra Pradesh   10
Uttar Pradesh     9
Kerala            8
Odisha            7
Karnataka         6
Rajasthan         6
Telangana         5
Bihar             3
Goa               3
Name: count, dtype: int64
```

In [135…
```
sns.countplot(y=food_raw_df.flavor_profile)
plt.xticks(rotation=50);
plt.title("Flavor Profiles")plt.ylabel(None);
```



In [225…
```
plt.figure(figsize=(16,8))
sns.distplot(food_raw_df['cook_time'],color='g')
plt.show()
```



In [229…
```
food_raw_df[food_raw_df['cook_time']==2]
```

Out[229…

	name	ingredients	diet	prep_time	cook_time	flavor_profile	c
109	Pani puri	Kala chana, mashed potato, boondi, sev, lemon	vegetarian	15	2.0	spicy	

In [231…
```
food_raw_df[food_raw_df['cook_time']==720]
```

Out[231…

	name	ingredients	diet	prep_time	cook_time	flavor_profile
62	Shrikhand	Curd, sugar, saffron, cardamom	vegetarian	10	720.0	sweet

In [235…
```
food_raw_df['cook_time'].fillna(value=38.9,inplace=True)
```

In [239…
```
food_raw_df.isna().sum()
```

Out[239…
```
name              0
ingredients       0
diet              0
prep_time        29
cook_time         0
flavor_profile   29
course            0
state            24
region           16
area              0
dtype: int64
```

In [243…
```
food_raw_df[food_raw_df['region'].isna()]  #to see null values rows
```

Out[243…

	name	ingredients	diet	prep_time	cook_time	flavor_profile
1	Boondi	Gram flour, ghee, sugar	vegetarian	80	30.0	swee
4	Gulab jamun	Milk powder, plain flour, baking powder, ghee,...	vegetarian	15	40.0	swee
7	Kaju katli	Cashews, ghee, cardamom, sugar	vegetarian	10	20.0	swee
9	Kheer	Milk, rice, sugar, dried fruits	vegetarian	10	40.0	swee
10	Laddu	Gram flour, ghee, sugar	vegetarian	10	40.0	swee
12	Nankhatai	Refined flour, besan, ghee, powdered sugar, yo...	vegetarian	20	30.0	swee
94	Khichdi	Moong dal, green peas, ginger, tomato, green c...	vegetarian	40	20.0	spicy
96	Kulfi falooda	Rose syrup, falooda sev, mixed nuts, saffron, ...	vegetarian	45	25.0	swee
98	Lauki ki subji	Bottle gourd, coconut oil, garam masala, ginge...	vegetarian	10	20.0	spicy
109	Pani puri	Kala chana, mashed potato, boondi, sev, lemon	vegetarian	15	2.0	spicy
110	Panjeeri	Whole wheat flour, musk melon seeds, poppy see...	vegetarian	10	25.0	swee
111	Papad	Urad dal, sev, lemon juice, chopped tomatoes	vegetarian	5	5.0	spicy
117	Samosa	Potatoes, green peas, garam masala, ginger, dough	vegetarian	30	30.0	spicy

	name	ingredients	diet	prep_time	cook_time	flavor_profile
164	Upma	Chana dal, urad dal, ginger, curry leaves, sugar	vegetarian	10	20.0	spicy
231	Brown Rice	Brown rice, soy sauce, olive oil	vegetarian	15	25.0	NaN
248	Red Rice	Red pepper, red onion, butter, watercress, oli...	vegetarian	NaN	38.9	NaN

In [245…
```
food_raw_df['region'].value_counts()
```

Out[245…
```
region
West          73
South         59
North         49
East          30
North East    25
Central        3
Name: count, dtype: int64
```

In [247…
```
food_raw_df[food_raw_df['flavor_profile'].isna()]  #to see null values ro
```

Out[247…

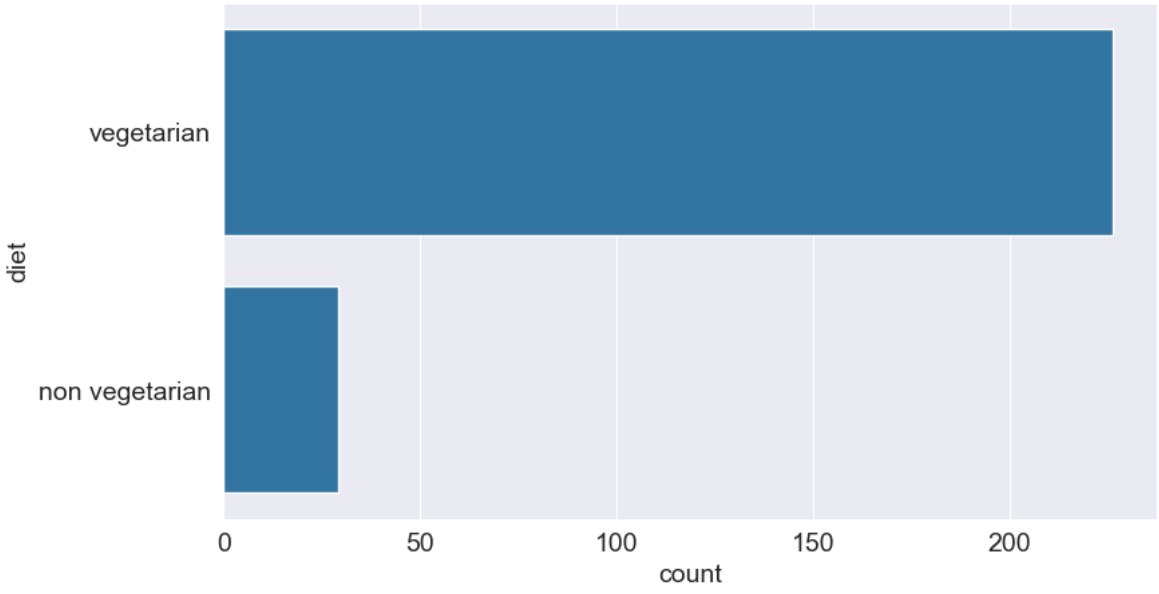
	name	ingredients	diet	prep_time	cook_time	flavor_profil
78	Chapati	Whole wheat flour, olive oil, hot water, all p...	vegetarian	10	10.0	Nal
104	Naan	Whole wheat flour, honey, butter, garlic	vegetarian	60	30.0	Nal
116	Rongi	Garam masala powder, tomato, kasuri methi, cin...	vegetarian	10	30.0	Nal
131	Kanji	Carrot, yellow mustard, red chilli, black salt	vegetarian	10	45.0	Nal
145	Pachadi	Coconut oil, cucumber, curd, curry leaves, mus...	vegetarian	10	25.0	Nal
146	Paniyaram	Yogurt, ginger, curry leaves, baking soda, gre...	vegetarian	10	20.0	Nal
150	Paruppu sadam	Arhar dal, sambar powder, tomato, curry leaves...	vegetarian	10	20.0	Nal
153	Puli sadam	Urad dal, lemon, tamarind, cooked rice, curry ...	vegetarian	10	20.0	Nal
155	Puttu	Brown rice flour, sugar, grated coconut	vegetarian	495	40.0	Nal
157	Sandige	Thin rice flakes, black sesame seeds, curry le...	vegetarian	120	60.0	Nal
158	Sevai	Sevai, parboiled rice, steamer	vegetarian	120	30.0	Nal

	name	ingredients	diet	prep_time	cook_time	flavor_profil
159	Thayir sadam	Urad dal, curd, sesame oil, ginger, curry leav...	vegetarian	10	20.0	Nal
160	Theeyal	Coconut, whole red beans, masala, sesame oil, ...	vegetarian	15	20.0	Nal
171	Bhakri	Jowar flour, sesame seeds	vegetarian	20	25.0	Nal
176	Copra paak	Condensed milk, nestle cream, coconut ice, red...	vegetarian	20	30.0	Nal
179	Dahi vada	Urad dal, bhuna chana, garam masala, dates, ta...	vegetarian	30	30.0	Nal
180	Dalithoy	Arhar dal, coconut oil, curry leaves, mustard ...	vegetarian	5	20.0	Nal
189	Kansar	Wheat flour, cashews, rapeseed oil	vegetarian	10	40.0	Nal
216	Farsi Puri	Semolina, clarified butter, oil, white flour, ...	vegetarian	NaN	38.9	Nal
222	Khar	Raw papaya, panch phoran masala, nigella seeds...	vegetarian	10	20.0	Nal
224	Luchi	Maida, vegetable oil	vegetarian	20	30.0	Nal
227	Bengena Pitika	Brinjal, onions, salt, sesame seeds, coriander	vegetarian	v	38.9	Nal
228	Bilahi Maas	Potatoes, garam masala, tomatoes, mustard oil,...	non vegetarian	10	20.0	Nal

	name	ingredients	diet	prep_time	cook_time	flavor_profil
229	Black rice	Forbidden black rice, chicken, olive oil, sliv...	non vegetarian	NaN	38.9	Nal
231	Brown Rice	Brown rice, soy sauce, olive oil	vegetarian	15	25.0	Nal
236	Chingri Bhape	Coconut, prawns, curd, mustard seed, green chili	non vegetarian	15	30.0	Nal
244	Pakhala	Curd, cooked rice, curry leaves, dry chilli	vegetarian	NaN	38.9	Nal
245	Pani Pitha	Tea leaves, white sesame seeds, dry coconut, s...	vegetarian	10	20.0	Nal
248	Red Rice	Red pepper, red onion, butter, watercress, oli...	vegetarian	NaN	38.9	Nal

In [251…
```
sns.countplot(food_raw_df['diet'])
food_raw_df['diet'].value_counts()
```

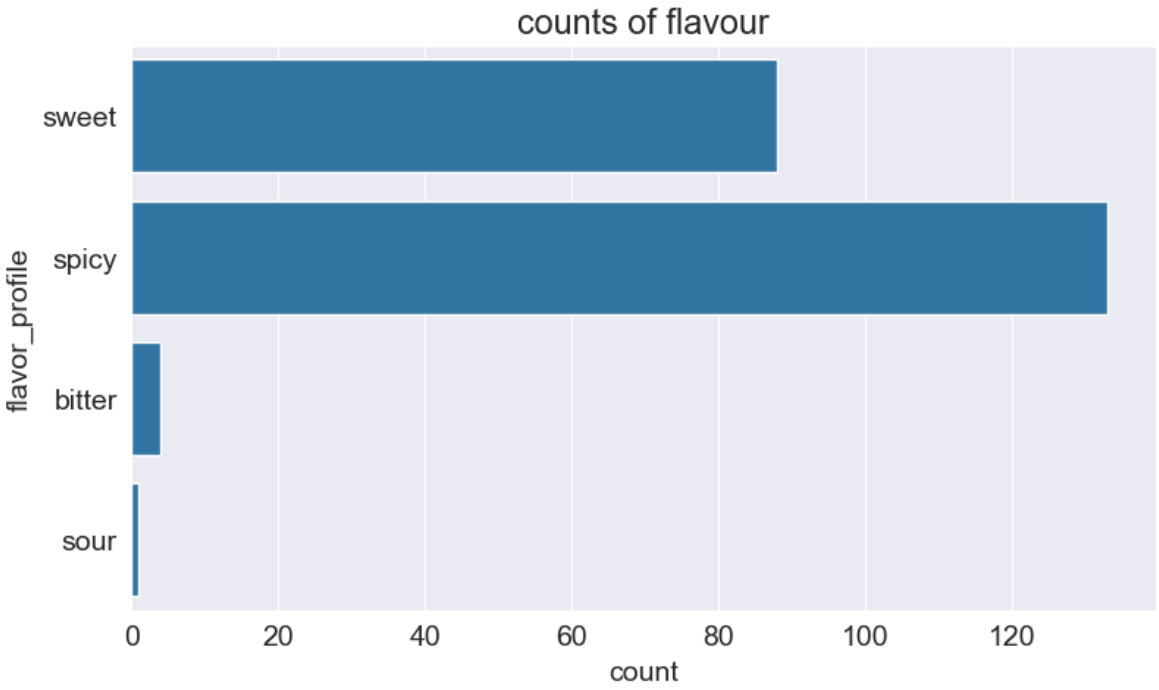
Out[251…
```
diet
vegetarian        226
non vegetarian     29
Name: count, dtype: int64
```



In [257…
```
sns.countplot(food_raw_df['flavor_profile'])
food_raw_df['flavor_profile'].value_counts()
```

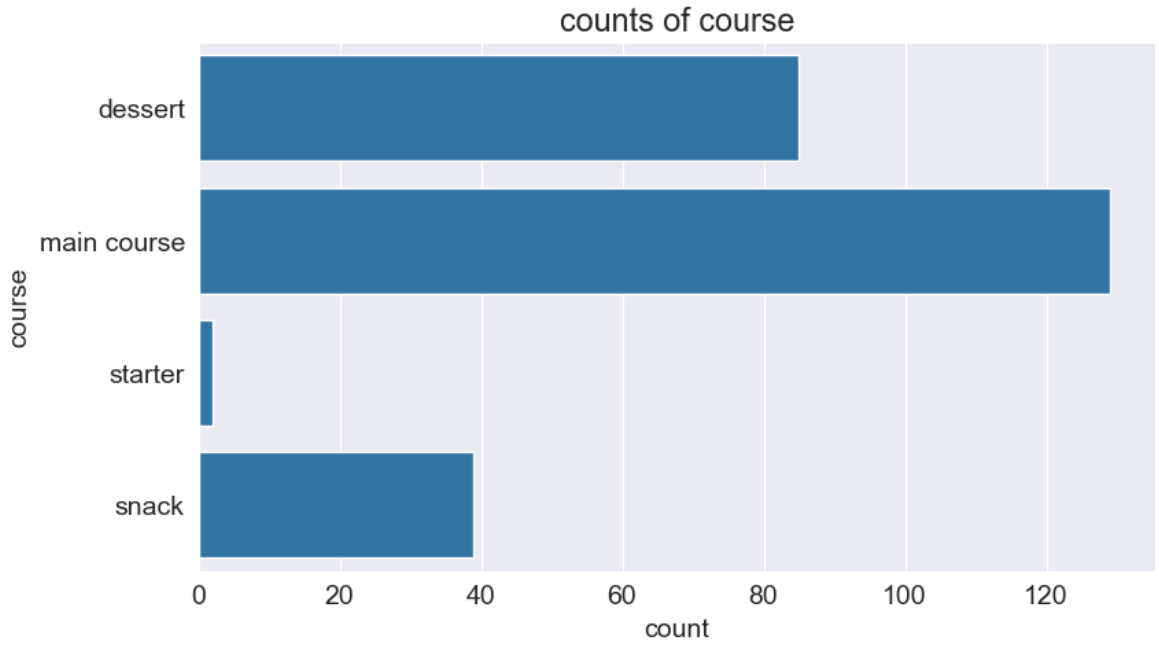
```
plt.title("counts of flavour")
```

Out[257… Text(0.5, 1.0, 'counts of flavour')



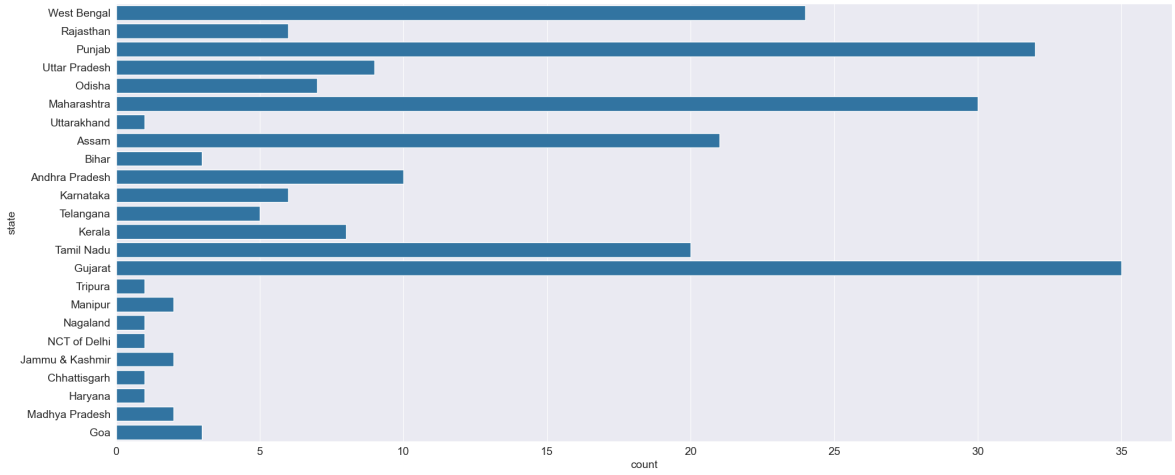
In [259…
```
sns.countplot(food_raw_df['course'])
food_raw_df['course'].value_counts()
plt.title("counts of course")
```

Out[259… Text(0.5, 1.0, 'counts of course')



In [263…
```
plt.figure(figsize=(24,10))
sns.countplot(food_raw_df['state'])
food_raw_df['state'].value_counts()
```

Out[263…
```
state
Gujarat            35
Punjab             32
Maharashtra        30
West Bengal        24
Assam              21
Tamil Nadu         20
Andhra Pradesh     10
Uttar Pradesh       9
Kerala              8
Odisha              7
Karnataka           6
Rajasthan           6
Telangana           5
Bihar               3
Goa                 3
Manipur             2
Jammu & Kashmir     2
Madhya Pradesh      2
Uttarakhand         1
Tripura             1
Nagaland            1
NCT of Delhi        1
Chhattisgarh        1
Haryana             1
Name: count, dtype: int64
```



In [265…
```
state_reciepies=food_raw_df.groupby('state')
```

In [267…
```
state_reciepies['diet'].value_counts()
```

Out[267…

```
state            diet
Andhra Pradesh   vegetarian        10
Assam            vegetarian        11
                 non vegetarian    10
Bihar            vegetarian         3
Chhattisgarh     vegetarian         1
Goa              vegetarian         2
                 non vegetarian     1
Gujarat          vegetarian        35
Haryana          vegetarian         1
Jammu & Kashmir  vegetarian         2
Karnataka        vegetarian         6
Kerala           vegetarian         7
                 non vegetarian     1
Madhya Pradesh   vegetarian         2
Maharashtra      vegetarian        28
                 non vegetarian     2
Manipur          non vegetarian     1
                 vegetarian         1
NCT of Delhi     non vegetarian     1
Nagaland         non vegetarian     1
Odisha           vegetarian         7
Punjab           vegetarian        28
                 non vegetarian     4
Rajasthan        vegetarian         6
Tamil Nadu       vegetarian        19
                 non vegetarian     1
Telangana        vegetarian         4
                 non vegetarian     1
Tripura          non vegetarian     1
Uttar Pradesh    vegetarian         9
Uttarakhand      vegetarian         1
West Bengal      vegetarian        19
                 non vegetarian     5
Name: count, dtype: int64
```

In [271…

```
food_raw_df[food_raw_df['state']=='Karnataka']
```

Out[271…

	name	ingredients	diet	prep_time	cook_time	flavor_profil
40	Dharwad pedha	Milk, Sugar, Dharwadi buffalo milk	vegetarian	20	60.0	swee
45	Mysore pak	Besan flour, semolina, mung bean, jaggery, coc...	vegetarian	5	20.0	swee
46	Obbattu holige	Maida flour, turmeric, coconut, chickpeas, jag...	vegetarian	180	60.0	swee
126	Bisi bele bath	Split pigeon peas, chana dal, urad dal, green ...	vegetarian	30	45.0	spic
140	Koshambri	Moong dal, cucumber, curry leaves, green chili...	vegetarian	10	20.0	spic
157	Sandige	Thin rice flakes, black sesame seeds, curry le...	vegetarian	120	60.0	Nal

In [273…

```
food_raw_df[food_raw_df['state']=='Telangana']
```

Out[273…

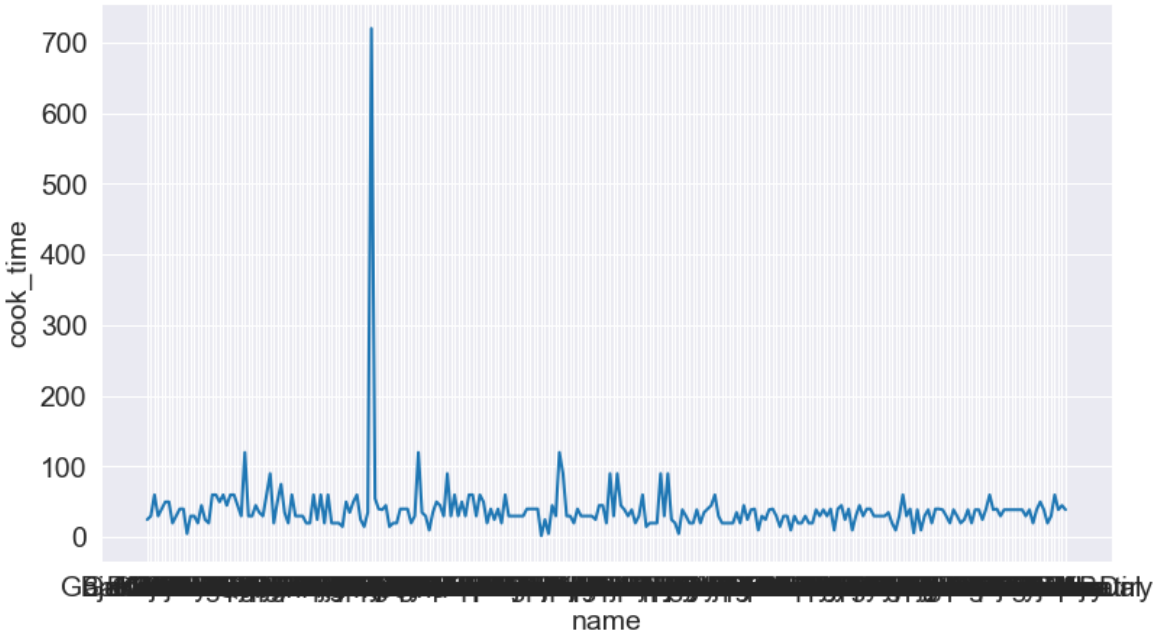
	name	ingredients	diet	prep_time	cook_time	flavor_profile
41	Double ka meetha	Loaf bread, milk	vegetarian	20	30.0	sweet
51	Qubani ka meetha	Apricots, sugar syrup	vegetarian	10	20.0	sweet
52	Sheer korma	Vermicelli pudding, milk	vegetarian	10	20.0	sweet
75	Biryani	Chicken thighs, basmati rice, star anise, swee...	non vegetarian	30	120.0	spicy
120	Shahi tukra	Rose water, milk, white bread slices, saffron,...	vegetarian	10	30.0	sweet

In [303…

```
sns.lineplot(data=food_raw_df,x='name',y='cook_time')
```

Out[303…

```
<Axes: xlabel='name', ylabel='cook_time'>
```



In [309…
```
plt.hist(food_raw_df.cook_time)
```

Out[309…
```
(array([243.,  11.,   0.,   0.,   0.,   0.,   0.,   0.,   0.,   1.]),
 array([  2. ,  73.8, 145.6, 217.4, 289.2, 361. , 432.8, 504.6, 576.4,
        648.2, 720. ]),
 <BarContainer object of 10 artists>)
```