21BDS0181 PRATHEEK NISTALA

DIGITAL ASSIGNMENT 1

EXPLORATORATORY DATA ANALYSIS

SLOT - C1

```
import pandas as pd

# Load the dataset
file_path = "C:\\Users\\lulor\\Downloads\\indian_food.csv"
data = pd.read_csv(file_path)

# Display the first few rows of the dataset
data.head()
```

```
             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,...


         diet  prep_time  cook_time flavor_profile   course
state  \
0  vegetarian         45         25          sweet  dessert  West
Bengal
1  vegetarian         80         30          sweet  dessert
Rajasthan
2  vegetarian         15         60          sweet  dessert
Punjab
3  vegetarian         15         30          sweet  dessert
Rajasthan
4  vegetarian         15         40          sweet  dessert  West
Bengal

  region
0   East
1   West
2  North
3   West
4   East
```

```
# Check the dimensions (rows and columns)
data.shape
```

```
(255, 9)
```

```
# Basic information about the dataset (data types, non-null counts, etc.)
data.info()

# Statistical summary for numerical columns
data.describe()
```

```
<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            251 non-null    object
 3   prep_time       255 non-null    int64 
 4   cook_time       255 non-null    int64 
 5   flavor_profile  255 non-null    object
 6   course          254 non-null    object
 7   state           255 non-null    object
 8   region          253 non-null    object
dtypes: int64(2), object(7)
memory usage: 18.1+ KB
```

```
        prep_time   cook_time
count  255.000000  255.000000
mean    31.105882   34.529412
std     72.554409   48.265650
min     -1.000000   -1.000000
25%     10.000000   20.000000
50%     10.000000   30.000000
75%     20.000000   40.000000
max    500.000000  720.000000
```

DATA CLEANING

```
# Check for missing values
data.isnull().sum()
```

```
name              0
ingredients       0
diet              4
prep_time         0
cook_time         0
flavor_profile    0
```

```
course            1
state             0
region            2
dtype: int64
```

```
# Filling missing values (if necessary) or dropping rows/columns
# Example: Filling missing values with mode for categorical data
data.fillna(data.mode().iloc[0], inplace=True)
```

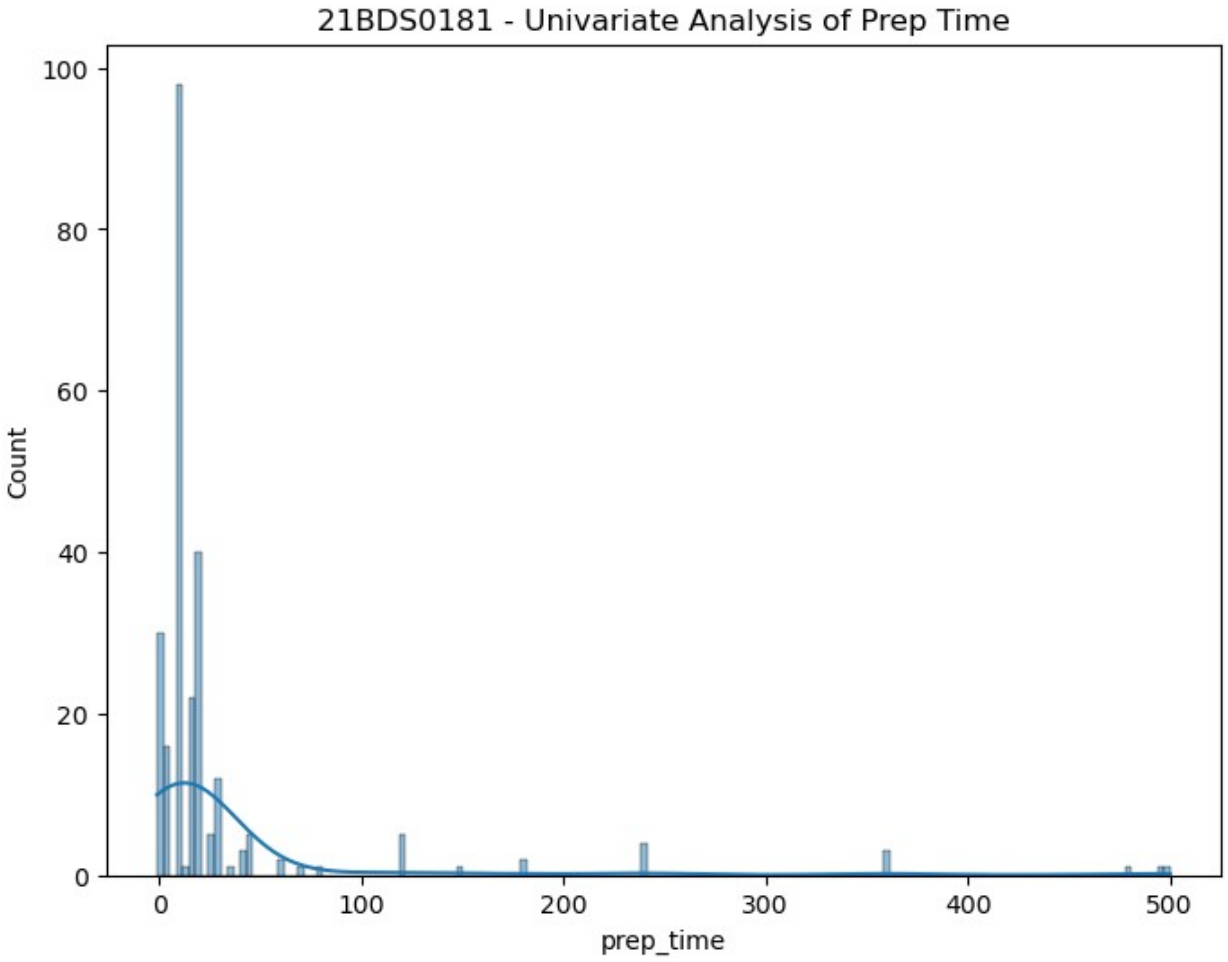
UNIVARIATE, BIVARIATE, AND MULTIVARIATE ANALYSIS

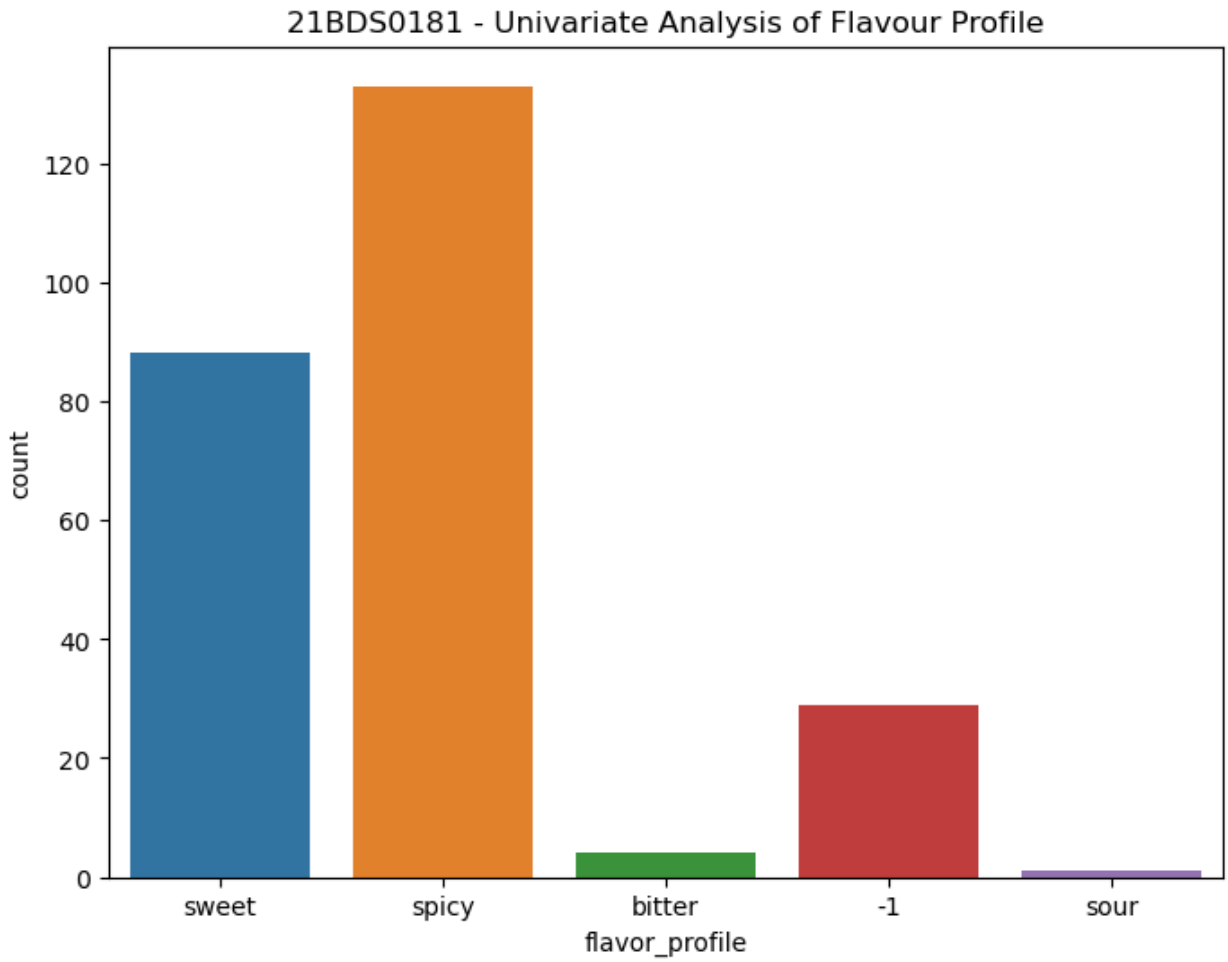
```
import matplotlib.pyplot as plt
import seaborn as sns

# Example of univariate analysis for a numerical variable
plt.figure(figsize=(8,6))
sns.histplot(data['prep_time'], kde=True)
plt.title('21BDS0181 - Univariate Analysis of Prep Time')
plt.show()

# Example of univariate analysis for a categorical variable
plt.figure(figsize=(8,6))
sns.countplot(x='flavor_profile', data=data)
plt.title('21BDS0181 - Univariate Analysis of Flavour Profile')
plt.show()
```

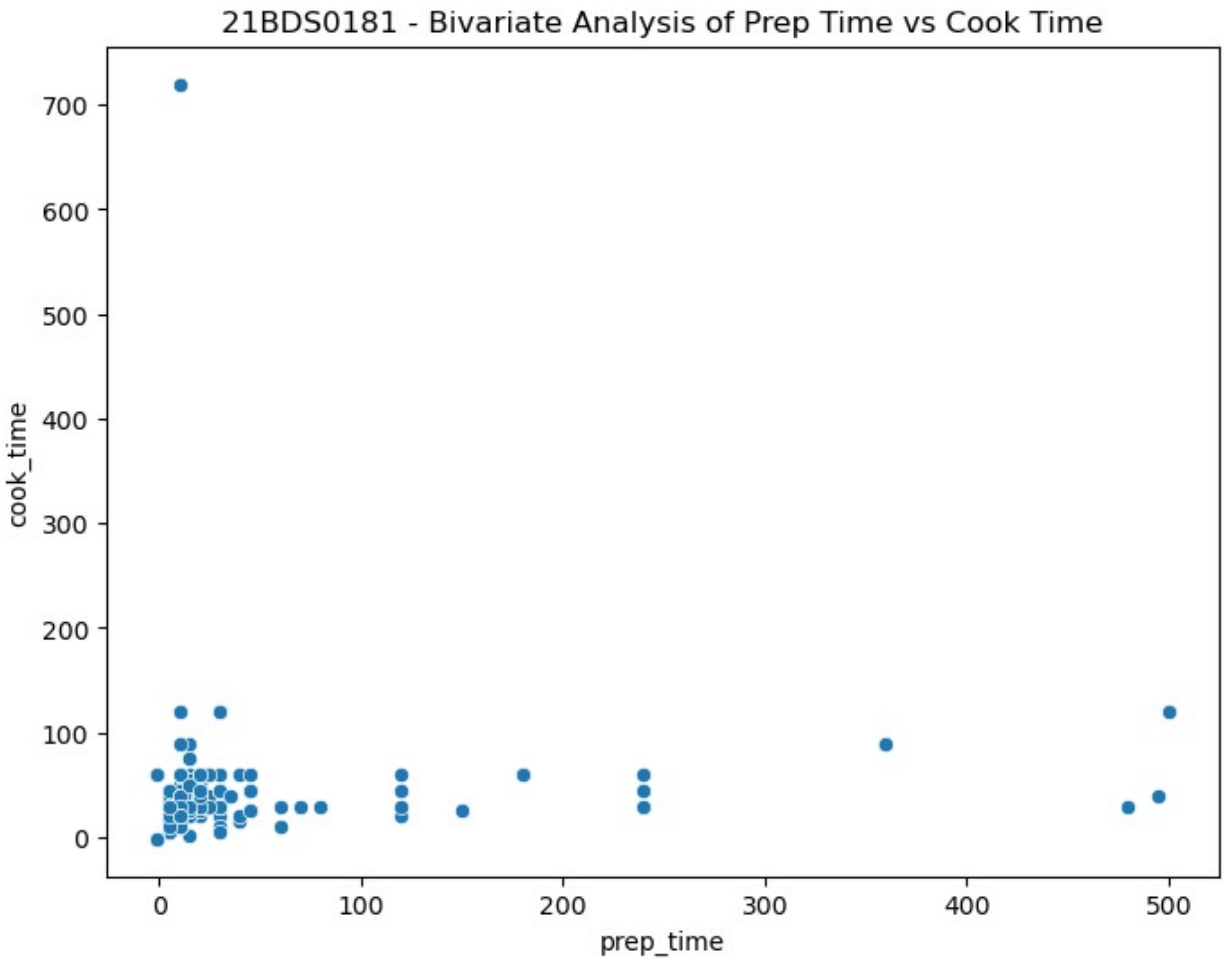
```
C:\Users\lulor\anaconda3\Lib\site-packages\seaborn\_oldcore.py:1119:
FutureWarning: use_inf_as_na option is deprecated and will be removed
in a future version. Convert inf values to NaN before operating
instead.
  with pd.option_context('mode.use_inf_as_na', True):
```

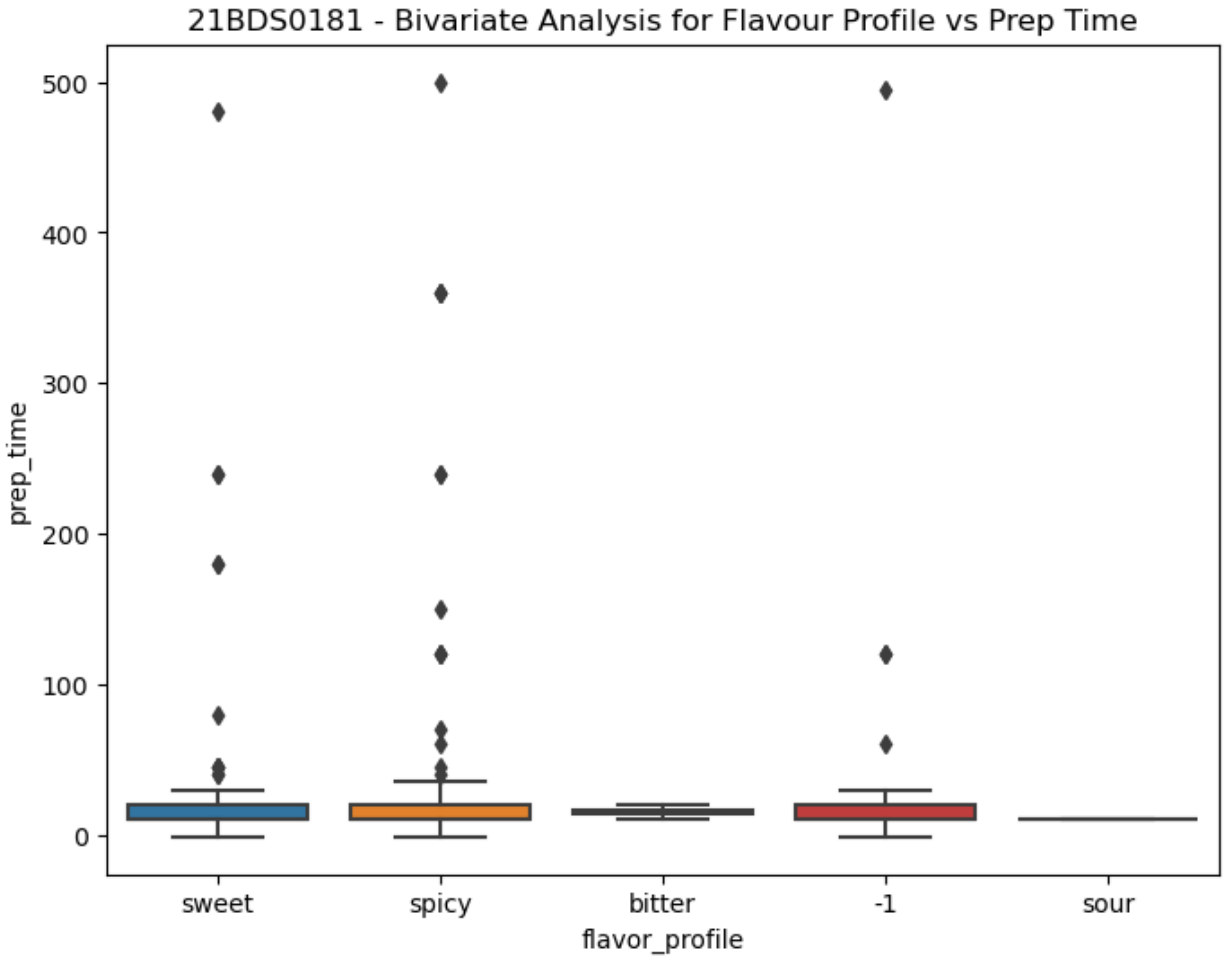

21BDS0181 - Univariate Analysis of Prep Time
Count
prep_time
0
20
40
60
80
100
0
100
200
300
400
500




```
# Scatter plot for bivariate analysis between two numerical variables
plt.figure(figsize=(8,6))
sns.scatterplot(x='prep_time', y='cook_time', data=data)
plt.title('21BDS0181 - Bivariate Analysis of Prep Time vs Cook Time')
plt.show()

# Boxplot for bivariate analysis between a numerical and a categorical variable
plt.figure(figsize=(8,6))
sns.boxplot(x='flavor_profile', y='prep_time', data=data)
plt.title('21BDS0181 - Bivariate Analysis for Flavour Profile vs Prep Time')
plt.show()
```


21BDS0181 - Bivariate Analysis of Prep Time vs Cook Time
cook_time
prep_time
0
100
200
300
400
500
600
700

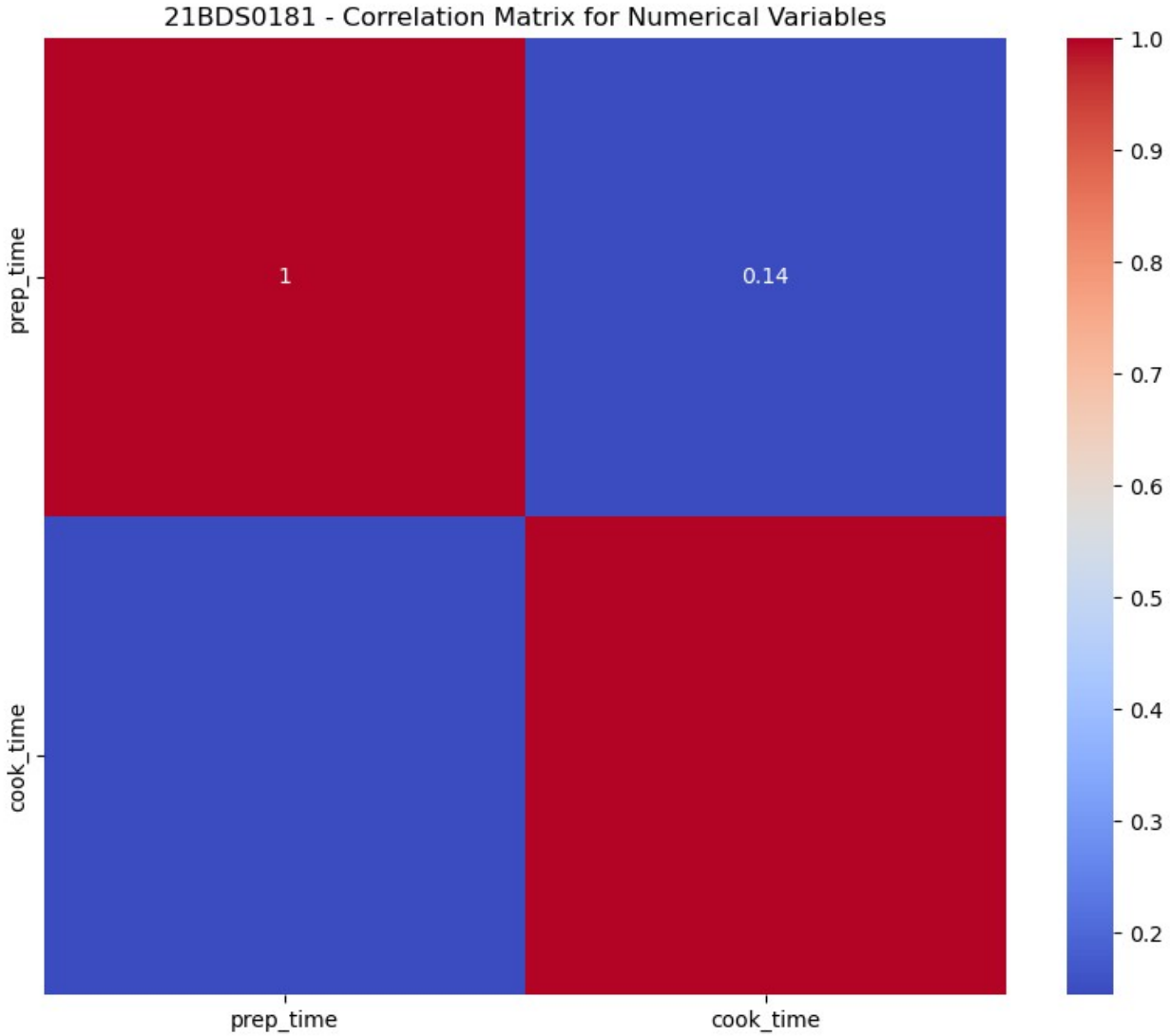



```
# Select only the numerical columns
numerical_data = data.select_dtypes(include=['float64', 'int64'])

# Check the numerical columns and their correlations
corr_matrix = numerical_data.corr()

# Plot the heatmap for the correlation matrix
import seaborn as sns
import matplotlib.pyplot as plt

plt.figure(figsize=(10,8))
sns.heatmap(corr_matrix, annot=True, cmap='coolwarm')
plt.title('21BDS0181 - Correlation Matrix for Numerical Variables')
plt.show()
```



CLUSTERING

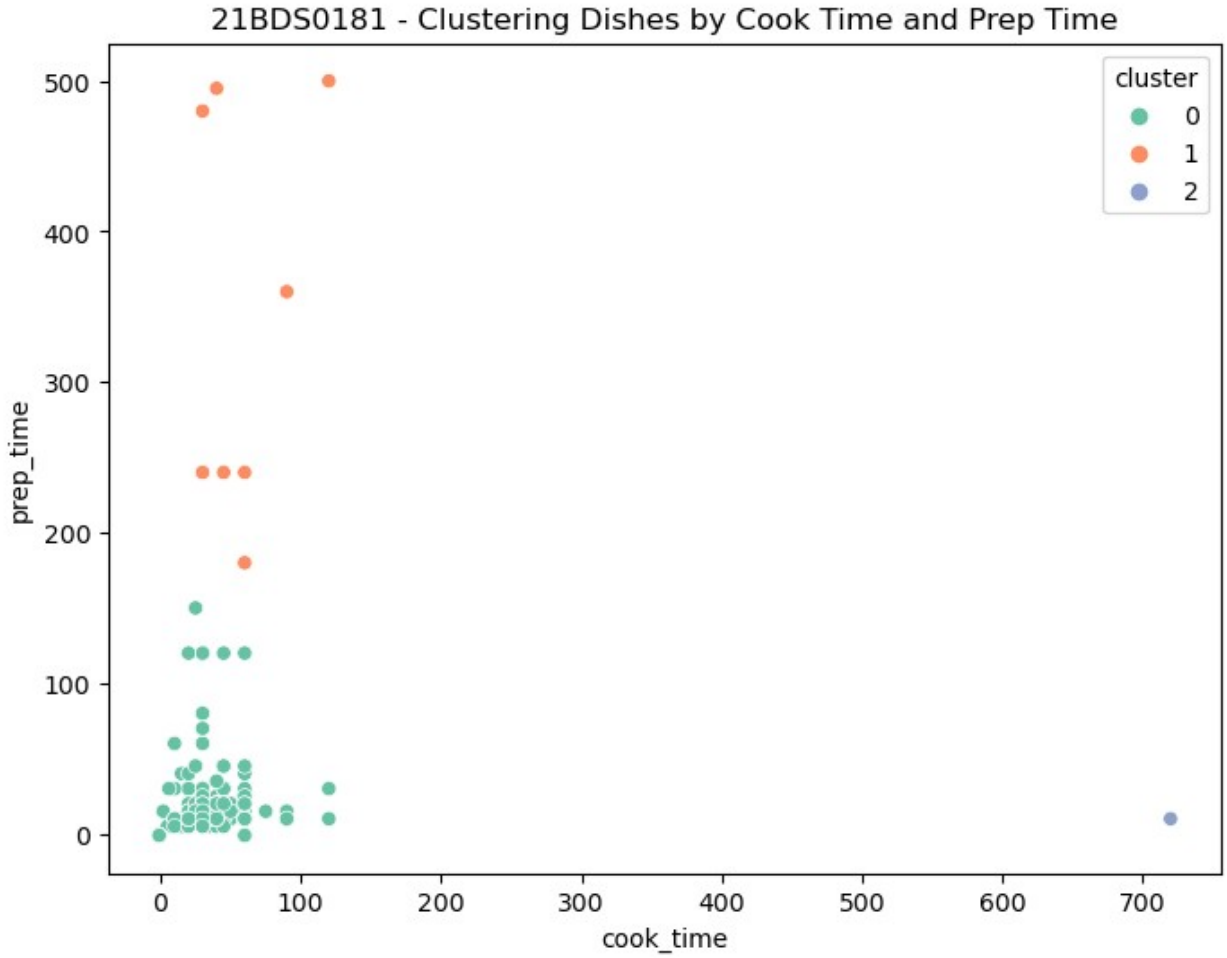
```
from sklearn.cluster import KMeans

# K-means clustering on numerical columns (e.g., cook_time and
prep_time)
X = data[['cook_time', 'prep_time']].dropna()

kmeans = KMeans(n_clusters=3)
data['cluster'] = kmeans.fit_predict(X)

# Visualizing clusters
plt.figure(figsize=(8,6))
sns.scatterplot(x='cook_time', y='prep_time', hue='cluster',
data=data, palette='Set2')
plt.title('21BDS0181 - Clustering Dishes by Cook Time and Prep Time')
plt.show()
```

```
C:\Users\lulor\anaconda3\Lib\site-packages\sklearn\cluster\
_kmeans.py:870: FutureWarning: The default value of `n_init` will
change from 10 to 'auto' in 1.4. Set the value of `n_init` explicitly
to suppress the warning
  warnings.warn(
C:\Users\lulor\anaconda3\Lib\site-packages\sklearn\cluster\
_kmeans.py:1382: UserWarning: KMeans is known to have a memory leak on
Windows with MKL, when there are less chunks than available threads.
You can avoid it by setting the environment variable
OMP_NUM_THREADS=1.
  warnings.warn(
```



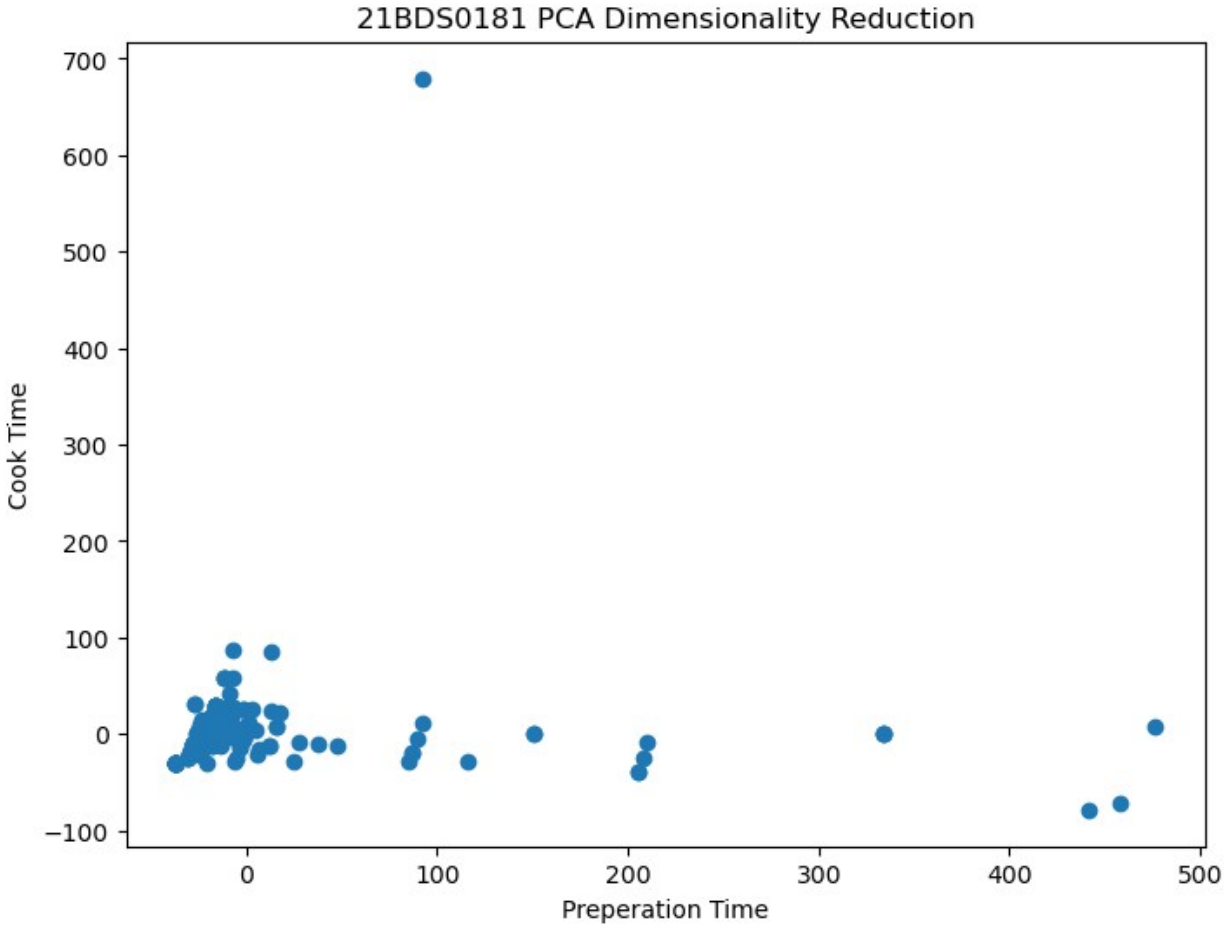
DIMENSIONALITY REDUCTION

```
import matplotlib.pyplot as plt
from sklearn.decomposition import PCA

# Assuming 'data' is a DataFrame and you're selecting specific columns
# Replace 'another_column' with the actual column you want to use
pca = PCA(n_components=2)
```

```
principal_components = pca.fit_transform(data[['prep_time',
'cook_time']])

# Visualizing PCA components
plt.figure(figsize=(8,6))
plt.scatter(principal_components[:, 0], principal_components[:, 1])
plt.title('21BDS0181 PCA Dimensionality Reduction')
plt.xlabel('Preperation Time')
plt.ylabel('Cook Time')
plt.show()
```



MODEL DEVELOPMENT

```
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error

# Assuming we want to predict cooking time based on prep time (modify
as needed)
X = data[['prep_time']]
```

```
y = data['cook_time']

# Splitting the dataset into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y,
test_size=0.2, random_state=42)

# Building the model
model = LinearRegression()
model.fit(X_train, y_train)

# Predicting and evaluating the model
y_pred = model.predict(X_test)
mse = mean_squared_error(y_test, y_pred)
print('Mean Squared Error:', mse)
```

```
Mean Squared Error: 498.30843850328876
```