Importing Libraries we are going to use

```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sb
```

Data Collection

Read the excel file

```python
data= pd.read_excel("coffee-house-satisfactory-survey.xlsx")
data
```

```
                      Timestamp 1. Your Gender    2. Your Age  \
0      2019/10/01 12:38:43 PM GMT+8         Female  From 20 to 29
1      2019/10/01 12:38:54 PM GMT+8         Female  From 20 to 29
2      2019/10/01 12:38:56 PM GMT+8           Male  From 20 to 29
3      2019/10/01 12:39:08 PM GMT+8         Female  From 20 to 29
4      2019/10/01 12:39:20 PM GMT+8           Male  From 20 to 29
..                            ...            ...            ...
117    2019/10/04 12:24:26 AM GMT+8           Male   40 and above
118     2019/10/04 9:30:09 AM GMT+8           Male  From 20 to 29
119     2019/10/04 1:46:07 PM GMT+8           Male  From 20 to 29
120    2019/10/05 11:01:14 AM GMT+8         Female  From 20 to 29
121     2019/10/05 4:57:22 PM GMT+8           Male  From 20 to 29

    3. Are you currently....? 4. What is your annual income?  \
0                     Student              Less than RM25,000
1                     Student              Less than RM25,000
2                    Employed              Less than RM25,000
3                     Student              Less than RM25,000
4                     Student              Less than RM25,000
..                        ...                             ...
117             Self-employed             RM25,000 - RM50,000
118                  Employed              Less than RM25,000
119                   Student              Less than RM25,000
120                  Employed              Less than RM25,000
121                  Employed            RM50,000 - RM100,000

    5. How often do you visit Coffee House?  \
0                                     Rarely
1                                     Rarely
2                                    Monthly
3                                     Rarely
4                                    Monthly
..                                       ...
```

```
117                                    Monthly
118                                    Monthly
119                                     Rarely
120                                     Rarely
121                                     Rarely

     6. How do you usually enjoy Coffee House?  \
0                                     Dine in
1                                   Take away
2                                     Dine in
3                                   Take away
4                                   Take away
..                                        ...
117                                   Dine in
118                                   Dine in
119                                   Dine in
120                                 Take away
121                                   Dine in

     7. How much time do you normally  spend during your visit?  \
0                     Between 30 minutes to 1 hour
1                                 Below 30 minutes
2                     Between 30 minutes to 1 hour
3                                 Below 30 minutes
4                     Between 30 minutes to 1 hour
..                                            ...
117                     Between 1 hour to 2 hours
118                     Between 1 hour to 2 hours
119                   Between 30 minutes to 1 hour
120                               Below 30 minutes
121                   Between 30 minutes to 1 hour

     8. The nearest Coffee House's outlet to you is...?  \
0                                      within 1km
1                                       1km - 3km
2                                   more than 3km
3                                   more than 3km
4                                       1km - 3km
..                                            ...
117                                     1km - 3km
118                                     1km - 3km
119                                     1km - 3km
120                                    within 1km
121                                     1km - 3km

     9. Do you have Coffee House membership card?   ...  \
0                                            Yes  ...
1                                            Yes  ...
2                                            Yes  ...
3                                             No  ...
```

```
4                                          No  ...
..                                        ...  ...
117                                       Yes  ...
118                                       Yes  ...
119                                        No  ...
120                                        No  ...
121                                        No  ...

    11. On average, how much would you spend at Coffee House per
visit?  \
0                                  Less than RM20

1                                  Less than RM20

2                                  Less than RM20

3                                  Less than RM20

4                              Around RM20 - RM40

..                                            ...

117                            Around RM20 - RM40

118                                More than RM40

119                                Less than RM20

120                                Less than RM20

121                                Less than RM20


    12. How would you rate the quality of Coffee House compared to
other brands (Coffee Bean, Old Town White Coffee..) to be:  \
0                                              4

1                                              4

2                                              4

3                                              2

4                                              3

..                                           ...

117                                            3

118                                            5
```

119	3
120	4
121	1

```
     13. How would you rate the price range at Coffee House?  \
0                                                             3
1                                                             3
2                                                             3
3                                                             1
4                                                             3
..                                                          ...
117                                                           3
118                                                           5
119                                                           2
120                                                           4
121                                                           1
```

```
     14. How important are sales and promotions in your purchase
decision?  \
```

0	5
1	4
2	4
3	4
4	4
..	...
117	5
118	5
119	4
120	4
121	5

```
     15. How would you rate the ambiance at Coffee House? (lighting,
music, etc...)  \
```

0	5
1	4

2	4
3	3
4	2
..	...
117	3
118	5
119	3
120	4
121	4

```
     16. You rate the WiFi quality at Coffee House as..  \
0                                                     4
1                                                     4
2                                                     4
3                                                     3
4                                                     2
..                                                  ...
117                                                   2
118                                                   5
119                                                   3
120                                                   4
121                                                   3
```

17. How would you rate the service at Coffee House? (Promptness, friendliness, etc..) \	
0	4
1	5
2	4
3	3
4	3
..	...
117	4
118	5
119	3

```
120                                                        4

121                                                        3


    18. How likely you will choose Coffee House for doing business
meetings or hangout with friends?  \
0                                                          3

1                                                          2

2                                                          3

3                                                          3

4                                                          3

..                                                       ...

117                                                        4

118                                                        5

119                                                        4

120                                                        4

121                                                        2


    19. How do you come to hear of promotions at Coffee House? Check
all that apply.  \
0    Starbucks Website/Apps;Social Media;Emails;Dea...

1                         Social Media;In Store displays

2                         In Store displays;Billboards

3                         Through friends and word of mouth

4                         Starbucks Website/Apps;Social Media

..                                                       ...

117                 Starbucks Website/Apps;Social Media

118  Starbucks Website/Apps;Social Media;Emails;Dea...

119  Social Media;Through friends and word of mouth...

120  Social Media;Through friends and word of mouth...
```

```
121                                In Store displays


     20. Will you continue buying Coffee House?
0                                            Yes
1                                            Yes
2                                            Yes
3                                             No
4                                            Yes
..                                           ...
117                                          Yes
118                                          Yes
119                                           No
120                                          Yes
121                                           No

[122 rows x 21 columns]
```

Data Cleaning

Let's know our current data columns

```
data.columns

Index(['Timestamp', '1. Your Gender', '2. Your Age',
       '3. Are you currently....?', '4. What is your annual income?',
       '5. How often do you visit Coffee House?',
       '6. How do you usually enjoy Coffee House?',
       '7. How much time do you normally  spend during your visit?',
       '8. The nearest Coffee House's outlet to you is...?',
       '9. Do you have Coffee House membership card?',
       '10. What do you most frequently purchase at Coffee House?',
       '11. On average, how much would you spend at Coffee House per
visit?',
       '12. How would you rate the quality of Coffee House compared to
other brands (Coffee Bean, Old Town White Coffee..) to be:',
       '13. How would you rate the price range at Coffee House?',
       '14. How important are sales and promotions in your purchase
decision?',
       '15. How would you rate the ambiance at Coffee House?
(lighting, music, etc...)',
       '16. You rate the WiFi quality at Coffee House as..',
       '17. How would you rate the service at Coffee House?
(Promptness, friendliness, etc..)',
       '18. How likely you will choose Coffee House for doing business
meetings or hangout with friends?',
       '19. How do you come to hear of promotions at Coffee House?
```

```
Check all that apply.',
       '20. Will you continue buying Coffee House?'],
      dtype='object')
```

Renaming columns to shorter names for improved manageability

```
data.rename(columns={'Timestamp': 'Timestamp', '1. Your Gender':
'Gender','2. Your Age': 'Age','3. Are you currently....?':
'Current','4. What is your annual income?': 'Income','5. How often do
you visit Coffee House?': 'Visits','6. How do you usually enjoy Coffee
House?': 'Enjoyment','7. How much time do you normally  spend during
your visit?': 'Duration',"8. The nearest Coffee House's outlet to you
is...?": 'Distance','9. Do you have Coffee House membership card?':
'MembershipCard','10. What do you most frequently purchase at Coffee
House?': 'FavProduct','11. On average, how much would you spend at
Coffee House per visit?': 'SpendingLimit','12. How would you rate the
quality of Coffee House compared to other brands (Coffee Bean, Old
Town White Coffee..) to be:': 'Quality','13. How would you rate the
price range at Coffee House?': 'PriceRange','14. How important are
sales and promotions in your purchase decision?':
'PromotionImportance','15. How would you rate the ambiance at Coffee
House? (lighting, music, etc...)': 'Ambiance','16. You rate the WiFi
quality at Coffee House as..': 'WifiQuality','17. How would you rate
the service at Coffee House? (Promptness, friendliness, etc..)':
'Service','18. How likely you will choose Coffee House for doing
business meetings or hangout with friends?': 'BussinessMeetings','19.
How do you come to hear of promotions at Coffee House? Check all that
apply.': 'Advertiser','20. Will you continue buying Coffee House?':
'ContinueBuying'}, inplace=True)
```

Verifying the presence of null values in the dataset.

```
data.isnull().sum().sum()

2
```

Identifying the columns where null values exist

```
data.isnull().sum()

Timestamp            0
Gender               0
Age                  0
Current              0
Income               0
Visits               0
Enjoyment            1
Duration             0
Distance             0
```

```
MembershipCard          0
FavProduct              0
SpendingLimit           0
Quality                 0
PriceRange              0
PromotionImportance     0
Ambiance                0
WifiQuality             0
Service                 0
BussinessMeetings       0
Advertiser              1
ContinueBuying          0
dtype: int64
```

Identifying the rows where null values exist

```
rows_with_null = data[data.isnull().any(axis=1)]
rows_with_null

                          Timestamp Gender           Age    Current  \
81  2019/10/03 9:11:28 AM GMT+8    Male  From 20 to 29   Employed

                 Income Visits Enjoyment          Duration
Distance  \
81  Less than RM25,000  Never        NaN  Below 30 minutes   more than
3km

    MembershipCard   ... SpendingLimit Quality  PriceRange
PromotionImportance  \
81              No  ...          Zero       1           1
1

    Ambiance  WifiQuality  Service  BussinessMeetings  Advertiser  \
81         3            3        3                  3         NaN

    ContinueBuying
81              No

[1 rows x 21 columns]
```

Removing this row as the individual's review lacks credibility due to the absence of a visit

```
data.drop(81, inplace=True)
data

                          Timestamp  Gender             Age
Current  \
0     2019/10/01 12:38:43 PM GMT+8  Female   From 20 to 29
Student
1     2019/10/01 12:38:54 PM GMT+8  Female   From 20 to 29
```

```
                                                                      Student
2     2019/10/01 12:38:56 PM GMT+8    Male  From 20 to 29
Employed
3     2019/10/01 12:39:08 PM GMT+8  Female  From 20 to 29
Student
4     2019/10/01 12:39:20 PM GMT+8    Male  From 20 to 29
Student
..                             ...     ...            ...          ..
.
117  2019/10/04 12:24:26 AM GMT+8    Male   40 and above  Self-
employed
118   2019/10/04 9:30:09 AM GMT+8    Male  From 20 to 29
Employed
119   2019/10/04 1:46:07 PM GMT+8    Male  From 20 to 29
Student
120  2019/10/05 11:01:14 AM GMT+8  Female  From 20 to 29
Employed
121   2019/10/05 4:57:22 PM GMT+8    Male  From 20 to 29
Employed

                    Income   Visits  Enjoyment
Duration  \
0      Less than RM25,000    Rarely    Dine in  Between 30 minutes to 1
hour
1      Less than RM25,000    Rarely  Take away               Below 30
minutes
2      Less than RM25,000   Monthly    Dine in  Between 30 minutes to 1
hour
3      Less than RM25,000    Rarely  Take away               Below 30
minutes
4      Less than RM25,000   Monthly  Take away  Between 30 minutes to 1
hour
..                    ...       ...        ...
...
117    RM25,000 - RM50,000   Monthly    Dine in    Between 1 hour to 2
hours
118    Less than RM25,000   Monthly    Dine in    Between 1 hour to 2
hours
119    Less than RM25,000    Rarely    Dine in  Between 30 minutes to 1
hour
120    Less than RM25,000    Rarely  Take away               Below 30
minutes
121  RM50,000 - RM100,000    Rarely    Dine in  Between 30 minutes to 1
hour

          Distance MembershipCard  ...       SpendingLimit Quality  \
0      within 1km            Yes  ...     Less than RM20        4
1        1km - 3km            Yes  ...     Less than RM20        4
2    more than 3km            Yes  ...     Less than RM20        4
```

```
3       more than 3km              No  ...       Less than RM20        2
4          1km - 3km              No  ...  Around RM20 - RM40        3
..              ...              ...  ...                 ...      ...
117        1km - 3km             Yes  ...  Around RM20 - RM40        3
118        1km - 3km             Yes  ...       More than RM40        5
119        1km - 3km              No  ...       Less than RM20        3
120       within 1km              No  ...       Less than RM20        4
121        1km - 3km              No  ...       Less than RM20        1
```

	PriceRange	PromotionImportance	Ambiance	WifiQuality	Service
0	3	5	5	4	4
1	3	4	4	4	5
2	3	4	4	4	4
3	1	4	3	3	3
4	3	4	2	2	3
..	...	...	...	...	...
117	3	5	3	2	4
118	5	5	5	5	5
119	2	4	3	3	3
120	4	4	4	4	4
121	1	5	4	3	3

	BussinessMeetings	Advertiser
0	3	Starbucks Website/Apps;Social Media;Emails;Dea...
1	2	Social Media;In Store displays
2	3	In Store displays;Billboards
3	3	Through friends and word of mouth
4	3	Starbucks Website/Apps;Social Media
..	...	...
117	4	Starbucks Website/Apps;Social Media

```
118                   5  Starbucks Website/Apps;Social
Media;Emails;Dea...
119                   4  Social Media;Through friends and word of
mouth...
120                   4  Social Media;Through friends and word of
mouth...
121                   2                              In Store
displays

     ContinueBuying
0                Yes
1                Yes
2                Yes
3                 No
4                Yes
..               ...
117              Yes
118              Yes
119               No
120              Yes
121               No

[121 rows x 21 columns]
```

Verifying the presence of null values in the dataset.

```
data.isnull().sum().sum()

0
```

Verifying the presence of duplicated values in the dataset.

```
data.duplicated().sum()

0
```

Identify the unique values in each column for more in-depth analysis

```
for column in data.columns:
    unique_values = data[column].unique()
    print("\nUnique values in '{}' column:".format(column))
    print(unique_values)


Unique values in 'Timestamp' column:
['2019/10/01 12:38:43 PM GMT+8' '2019/10/01 12:38:54 PM GMT+8'
 '2019/10/01 12:38:56 PM GMT+8' '2019/10/01 12:39:08 PM GMT+8'
 '2019/10/01 12:39:20 PM GMT+8' '2019/10/01 12:39:39 PM GMT+8'
 '2019/10/01 12:39:42 PM GMT+8' '2019/10/01 12:40:58 PM GMT+8'
```

```
'2019/10/01 12:42:27 PM GMT+8'  '2019/10/01 12:43:36 PM GMT+8'
'2019/10/01 12:47:00 PM GMT+8'  '2019/10/01 12:48:26 PM GMT+8'
'2019/10/01 12:49:25 PM GMT+8'  '2019/10/01 12:53:09 PM GMT+8'
'2019/10/01 12:53:16 PM GMT+8'  '2019/10/01 12:57:31 PM GMT+8'
'2019/10/01 12:59:11 PM GMT+8'  '2019/10/01 1:08:15 PM GMT+8'
'2019/10/01 1:09:12 PM GMT+8'  '2019/10/01 1:13:03 PM GMT+8'
'2019/10/01 1:13:45 PM GMT+8'  '2019/10/01 1:14:43 PM GMT+8'
'2019/10/01 1:21:50 PM GMT+8'  '2019/10/01 1:24:04 PM GMT+8'
'2019/10/01 1:24:21 PM GMT+8'  '2019/10/01 1:25:56 PM GMT+8'
'2019/10/01 1:29:11 PM GMT+8'  '2019/10/01 1:33:54 PM GMT+8'
'2019/10/01 1:34:30 PM GMT+8'  '2019/10/01 1:37:27 PM GMT+8'
'2019/10/01 1:39:16 PM GMT+8'  '2019/10/01 1:40:23 PM GMT+8'
'2019/10/01 1:45:12 PM GMT+8'  '2019/10/01 1:45:43 PM GMT+8'
'2019/10/01 1:51:47 PM GMT+8'  '2019/10/01 1:51:56 PM GMT+8'
'2019/10/01 1:53:05 PM GMT+8'  '2019/10/01 1:55:52 PM GMT+8'
'2019/10/01 1:57:01 PM GMT+8'  '2019/10/01 2:00:32 PM GMT+8'
'2019/10/01 2:03:08 PM GMT+8'  '2019/10/01 2:06:24 PM GMT+8'
'2019/10/01 2:27:41 PM GMT+8'  '2019/10/01 2:35:40 PM GMT+8'
'2019/10/01 2:41:01 PM GMT+8'  '2019/10/01 2:41:31 PM GMT+8'
'2019/10/01 2:41:56 PM GMT+8'  '2019/10/01 2:42:02 PM GMT+8'
'2019/10/01 2:45:52 PM GMT+8'  '2019/10/01 3:08:53 PM GMT+8'
'2019/10/01 3:12:11 PM GMT+8'  '2019/10/01 3:16:32 PM GMT+8'
'2019/10/01 3:20:55 PM GMT+8'  '2019/10/01 3:21:16 PM GMT+8'
'2019/10/01 3:57:29 PM GMT+8'  '2019/10/01 4:02:35 PM GMT+8'
'2019/10/01 4:03:17 PM GMT+8'  '2019/10/01 4:03:57 PM GMT+8'
'2019/10/01 4:05:59 PM GMT+8'  '2019/10/01 6:19:46 PM GMT+8'
'2019/10/01 8:32:12 PM GMT+8'  '2019/10/02 12:13:06 AM GMT+8'
'2019/10/02 9:29:28 AM GMT+8'  '2019/10/02 7:14:30 PM GMT+8'
'2019/10/02 7:15:13 PM GMT+8'  '2019/10/02 7:15:27 PM GMT+8'
'2019/10/02 7:23:55 PM GMT+8'  '2019/10/02 7:27:56 PM GMT+8'
'2019/10/02 7:29:53 PM GMT+8'  '2019/10/02 7:31:32 PM GMT+8'
'2019/10/02 7:33:51 PM GMT+8'  '2019/10/02 8:04:41 PM GMT+8'
'2019/10/02 8:08:37 PM GMT+8'  '2019/10/02 8:29:35 PM GMT+8'
'2019/10/02 8:31:21 PM GMT+8'  '2019/10/02 8:35:08 PM GMT+8'
'2019/10/02 8:52:13 PM GMT+8'  '2019/10/02 9:19:50 PM GMT+8'
'2019/10/03 7:19:36 AM GMT+8'  '2019/10/03 7:21:08 AM GMT+8'
'2019/10/03 8:46:25 AM GMT+8'  '2019/10/03 11:14:37 AM GMT+8'
'2019/10/03 11:14:44 AM GMT+8'  '2019/10/03 11:15:13 AM GMT+8'
'2019/10/03 11:17:27 AM GMT+8'  '2019/10/03 11:18:48 AM GMT+8'
'2019/10/03 11:22:03 AM GMT+8'  '2019/10/03 11:25:13 AM GMT+8'
'2019/10/03 11:32:03 AM GMT+8'  '2019/10/03 12:12:22 PM GMT+8'
'2019/10/03 12:13:56 PM GMT+8'  '2019/10/03 1:30:06 PM GMT+8'
'2019/10/03 2:13:11 PM GMT+8'  '2019/10/03 2:34:09 PM GMT+8'
'2019/10/03 3:11:13 PM GMT+8'  '2019/10/03 3:44:13 PM GMT+8'
'2019/10/03 4:25:38 PM GMT+8'  '2019/10/03 4:41:10 PM GMT+8'
'2019/10/03 5:19:31 PM GMT+8'  '2019/10/03 6:24:46 PM GMT+8'
'2019/10/03 6:31:44 PM GMT+8'  '2019/10/03 6:35:21 PM GMT+8'
'2019/10/03 6:41:20 PM GMT+8'  '2019/10/03 6:44:10 PM GMT+8'
'2019/10/03 6:45:28 PM GMT+8'  '2019/10/03 6:46:53 PM GMT+8'
```

```
 '2019/10/03 7:00:47 PM GMT+8' '2019/10/03 7:14:53 PM GMT+8'
 '2019/10/03 7:40:31 PM GMT+8' '2019/10/03 7:43:00 PM GMT+8'
 '2019/10/03 7:47:00 PM GMT+8' '2019/10/03 7:58:17 PM GMT+8'
 '2019/10/03 8:58:26 PM GMT+8' '2019/10/03 9:25:36 PM GMT+8'
 '2019/10/03 10:38:42 PM GMT+8' '2019/10/03 11:24:55 PM GMT+8'
 '2019/10/04 12:24:26 AM GMT+8' '2019/10/04 9:30:09 AM GMT+8'
 '2019/10/04 1:46:07 PM GMT+8' '2019/10/05 11:01:14 AM GMT+8'
 '2019/10/05 4:57:22 PM GMT+8']

Unique values in 'Gender' column:
['Female' 'Male']

Unique values in 'Age' column:
['From 20 to 29' 'From 30 to 39' '40 and above' 'Below 20']

Unique values in 'Current' column:
['Student' 'Employed' 'Self-employed' 'Housewife']

Unique values in 'Income' column:
['Less than RM25,000' 'RM50,000 - RM100,000' 'RM25,000 - RM50,000'
 'RM100,000 - RM150,000' 'More than RM150,000']

Unique values in 'Visits' column:
['Rarely' 'Monthly' 'Weekly' 'Never' 'Daily']

Unique values in 'Enjoyment' column:
['Dine in' 'Take away' 'Drive-thru' 'never' 'Never buy'
 'I dont like coffee' 'Never']

Unique values in 'Duration' column:
['Between 30 minutes to 1 hour' 'Below 30 minutes' 'More than 3 hours'
 'Between 1 hour to 2 hours' 'Between 2 hours to 3 hours']

Unique values in 'Distance' column:
['within 1km' '1km - 3km' 'more than 3km']

Unique values in 'MembershipCard' column:
['Yes' 'No']

Unique values in 'FavProduct' column:
['Coffee' 'Cold drinks;Pastries' 'Coffee;Sandwiches' 'Cold drinks'
 'Coffee;Cold drinks' 'Cold drinks;Pastries;Sandwiches'
 'Coffee;Juices;Pastries;Sandwiches' 'Coffee;Pastries;Sandwiches'
 'Coffee;Pastries' 'Cold drinks;Juices;Pastries'
 'Coffee;Cold drinks;Pastries;Sandwiches' 'Never' 'Jaws chip' 'cake'
 'Pastries' 'Cold drinks;Never' 'never' 'Nothing'
 'Coffee;Cold drinks;Juices;Pastries;Sandwiches']

Unique values in 'SpendingLimit' column:
['Less than RM20' 'Around RM20 - RM40' 'More than RM40' 'Zero']
```

```
Unique values in 'Quality' column:
[4 2 3 5 1]

Unique values in 'PriceRange' column:
[3 1 5 2 4]

Unique values in 'PromotionImportance' column:
[5 4 3 2 1]

Unique values in 'Ambiance' column:
[5 4 3 2 1]

Unique values in 'WifiQuality' column:
[4 3 2 5 1]

Unique values in 'Service' column:
[4 5 3 2 1]

Unique values in 'BussinessMeetings' column:
[3 2 4 5 1]

Unique values in 'Advertiser' column:
['Starbucks Website/Apps;Social Media;Emails;Deal sites (fave, iprice,
etc...)'
 'Social Media;In Store displays' 'In Store displays;Billboards'
 'Through friends and word of mouth' 'Starbucks Website/Apps;Social
Media'
 'Social Media'
 'Starbucks Website/Apps;Social Media;Emails;Through friends and word
of mouth'
 'Starbucks Website/Apps;Social Media;Through friends and word of
mouth'
 'Social Media;Through friends and word of mouth'
 'Social Media;Through friends and word of mouth;In Store displays'
 'Starbucks Website/Apps' 'Emails' 'Social Media;Emails'
 'Through friends and word of mouth;In Store displays'
 'Social Media;In Store displays;Billboards' 'Application offer'
 'Starbucks Website/Apps;Social Media;Through friends and word of
mouth;In Store displays'
 'In Store displays'
 'Social Media;Through friends and word of mouth;Billboards'
 'Starbucks Website/Apps;Social Media;Emails;Billboards'
 'Social Media;Emails;Deal sites (fave, iprice, etc...);Through
friends and word of mouth;In Store displays;Billboards'
 'Starbucks Website/Apps;Social Media;Deal sites (fave, iprice,
etc...);Through friends and word of mouth'
 'Never hear'
 'Social Media;Through friends and word of mouth;In Store
displays;Billboards'
```

```
 'Starbucks Website/Apps;Deal sites (fave, iprice, etc...)'
 'Social Media;Deal sites (fave, iprice, etc...);Through friends and
word of mouth'
 'Social Media;Emails;Through friends and word of mouth'
 'Social Media;Deal sites (fave, iprice, etc...)'
 'Starbucks Website/Apps;Emails' 'Billboards'
 'Starbucks Website/Apps;Social Media;Emails;Deal sites (fave, iprice,
etc...);Through friends and word of mouth;In Store
displays;Billboards']

Unique values in 'ContinueBuying' column:
['Yes' 'No']
```

Data Preprocessing

Filtering out reviews from individuals that lack credibility due to the absence of a visit

```
neverVisitsData = data[data['Visits'] == 'Never']
neverVisitsData

                           Timestamp  Gender             Age        Current
\
40    2019/10/01 2:03:08 PM GMT+8  Female  From 20 to 29       Employed

44    2019/10/01 2:41:01 PM GMT+8  Female        Below 20        Student

46    2019/10/01 2:41:56 PM GMT+8  Female        Below 20        Student

67    2019/10/02 7:27:56 PM GMT+8  Female  From 20 to 29  Self-employed

92    2019/10/03 1:30:06 PM GMT+8  Female  From 20 to 29       Employed

107   2019/10/03 7:00:47 PM GMT+8  Female        Below 20        Student

108   2019/10/03 7:14:53 PM GMT+8    Male  From 20 to 29        Student

112   2019/10/03 7:58:17 PM GMT+8    Male  From 20 to 29        Student


                  Income Visits  Enjoyment            Duration
Distance  \
40    RM25,000 - RM50,000  Never  Take away  Below 30 minutes       1km
- 3km
44      Less than RM25,000  Never      never  Below 30 minutes       1km
- 3km
46      Less than RM25,000  Never    Dine in  Below 30 minutes   more
than 3km
67      Less than RM25,000  Never  Never buy  Below 30 minutes   more
```

```
       than 3km
92      RM25,000 - RM50,000  Never     Dine in  Below 30 minutes
within 1km
107     Less than RM25,000  Never       Never  Below 30 minutes  more
than 3km
108     Less than RM25,000  Never       never  Below 30 minutes
within 1km
112   More than RM150,000  Never       Never  Below 30 minutes  more
than 3km
```

	MembershipCard	...	SpendingLimit	Quality	PriceRange	\
40	No	...	Less than RM20	4	4	
44	No	...	Zero	3	3	
46	No	...	Less than RM20	3	2	
67	No	...	Zero	3	3	
92	No	...	Zero	3	3	
107	No	...	Zero	3	2	
108	No	...	Zero	3	3	
112	No	...	Zero	1	1	

	PromotionImportance	Ambiance	WifiQuality	Service	BussinessMeetings \
40	4	4	4	4	4
44	3	3	3	3	3
46	5	4	3	3	5
67	3	3	3	3	3
92	3	3	3	3	3
107	2	2	3	3	3
108	3	1	3	3	4
112	1	1	1	1	1

	Advertiser	ContinueBuying
40	Social Media	Yes
44	Social Media	Yes
46	Through friends and word of mouth	Yes
67	Never hear	No
92	Social Media	No

```
107   Starbucks Website/Apps;Social Media;Through fr...                    Yes

108                    Through friends and word of mouth                    No

112                                          Billboards                     No


[8 rows x 21 columns]

data = data[data['Visits'] != 'Never']
data

                         Timestamp  Gender          Age
Current  \
0     2019/10/01 12:38:43 PM GMT+8  Female  From 20 to 29
Student
1     2019/10/01 12:38:54 PM GMT+8  Female  From 20 to 29
Student
2     2019/10/01 12:38:56 PM GMT+8    Male  From 20 to 29
Employed
3     2019/10/01 12:39:08 PM GMT+8  Female  From 20 to 29
Student
4     2019/10/01 12:39:20 PM GMT+8    Male  From 20 to 29
Student
..                             ...     ...            ...           ..
.
117   2019/10/04 12:24:26 AM GMT+8    Male   40 and above  Self-
employed
118    2019/10/04 9:30:09 AM GMT+8    Male  From 20 to 29
Employed
119    2019/10/04 1:46:07 PM GMT+8    Male  From 20 to 29
Student
120   2019/10/05 11:01:14 AM GMT+8  Female  From 20 to 29
Employed
121    2019/10/05 4:57:22 PM GMT+8    Male  From 20 to 29
Employed

                     Income   Visits  Enjoyment
Duration  \
0      Less than RM25,000    Rarely    Dine in  Between 30 minutes to 1
hour
1      Less than RM25,000    Rarely  Take away                 Below 30
minutes
2      Less than RM25,000   Monthly    Dine in  Between 30 minutes to 1
hour
3      Less than RM25,000    Rarely  Take away                 Below 30
minutes
4      Less than RM25,000   Monthly  Take away  Between 30 minutes to 1
hour
```

```
..                   ...      ...         ...
...
117   RM25,000 - RM50,000   Monthly     Dine in      Between 1 hour to 2
hours
118    Less than RM25,000   Monthly     Dine in      Between 1 hour to 2
hours
119    Less than RM25,000    Rarely     Dine in  Between 30 minutes to 1
hour
120    Less than RM25,000    Rarely  Take away               Below 30
minutes
121  RM50,000 - RM100,000    Rarely     Dine in  Between 30 minutes to 1
hour

           Distance MembershipCard  ...       SpendingLimit Quality  \
0        within 1km           Yes  ...     Less than RM20        4
1         1km - 3km           Yes  ...     Less than RM20        4
2      more than 3km          Yes  ...     Less than RM20        4
3      more than 3km           No  ...     Less than RM20        2
4         1km - 3km            No  ...  Around RM20 - RM40       3
..           ...              ...  ...                ...      ...
117       1km - 3km           Yes  ...  Around RM20 - RM40       3
118       1km - 3km           Yes  ...     More than RM40        5
119       1km - 3km            No  ...     Less than RM20        3
120      within 1km            No  ...     Less than RM20        4
121       1km - 3km            No  ...     Less than RM20        1

      PriceRange  PromotionImportance  Ambiance  WifiQuality
Service  \
0            3                    5         5            4        4

1            3                    4         4            4        5

2            3                    4         4            4        4

3            1                    4         3            3        3

4            3                    4         2            2        3

..         ...                  ...       ...          ...      ...

117          3                    5         3            2        4

118          5                    5         5            5        5

119          2                    4         3            3        3

120          4                    4         4            4        4

121          1                    5         4            3        3
```

```
      BussinessMeetings
Advertiser  \
0                    3  Starbucks Website/Apps;Social
Media;Emails;Dea...
1                    2               Social Media;In Store
displays
2                    3                      In Store
displays;Billboards
3                    3              Through friends and word of
mouth
4                    3              Starbucks Website/Apps;Social
Media
..                 ...
...
117                  4              Starbucks Website/Apps;Social
Media
118                  5  Starbucks Website/Apps;Social
Media;Emails;Dea...
119                  4  Social Media;Through friends and word of
mouth...
120                  4  Social Media;Through friends and word of
mouth...
121                  2                               In Store
displays

    ContinueBuying
0               Yes
1               Yes
2               Yes
3                No
4               Yes
..              ...
117             Yes
118             Yes
119              No
120             Yes
121              No

[113 rows x 21 columns]
```

Data Visualization

Visualizing the percentage of customers who continue to buy

```
ContinueBuying_counts=data['ContinueBuying'].value_counts()
ContinueBuying_counts
```

```
ContinueBuying
Yes    90
No     23
Name: count, dtype: int64

plt.figure(figsize=(8, 8))
plt.pie(ContinueBuying_counts, labels=ContinueBuying_counts.index,
autopct='%1.1f%%', startangle=140)
plt.title('Percentage of the Continue Buying')
plt.show()
```

Percentage of the Continue Buying
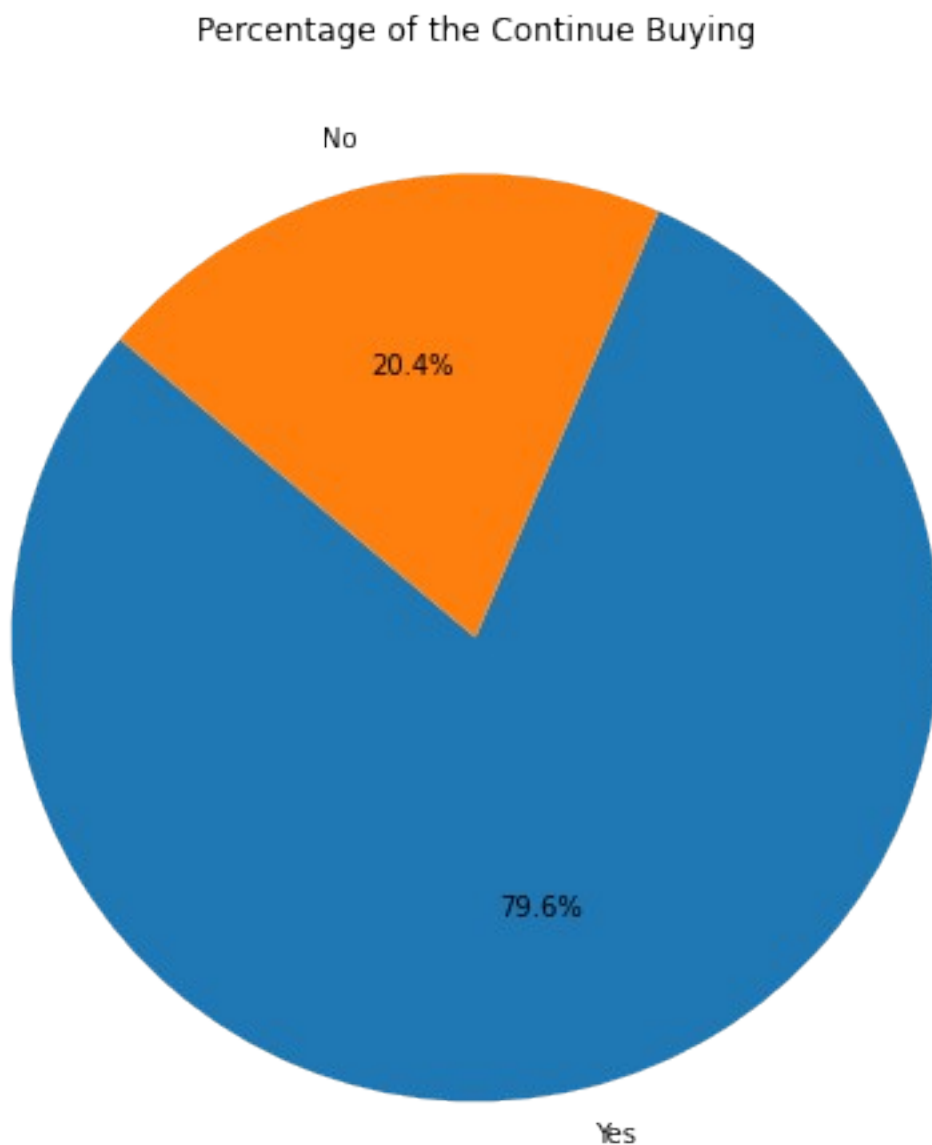
Why they are not continuing to purchase the products

Getting a dataset for the non-continual buying reviewers

```
data_of_no_continue= data[data['ContinueBuying'] == 'No']
data_of_no_continue

                          Timestamp  Gender             Age
Current  \
3     2019/10/01 12:39:08 PM GMT+8  Female   From 20 to 29
Student
11    2019/10/01 12:48:26 PM GMT+8  Female   From 20 to 29
Student
14    2019/10/01 12:53:16 PM GMT+8  Female   From 20 to 29
Student
15    2019/10/01 12:57:31 PM GMT+8  Female   From 20 to 29
Employed
20     2019/10/01 1:13:45 PM GMT+8    Male   From 30 to 39
Employed
22     2019/10/01 1:21:50 PM GMT+8    Male   From 20 to 29
Employed
26     2019/10/01 1:29:11 PM GMT+8    Male   From 30 to 39
Employed
33     2019/10/01 1:45:43 PM GMT+8  Female   From 20 to 29
Employed
35     2019/10/01 1:51:56 PM GMT+8  Female   From 20 to 29
Student
51     2019/10/01 3:16:32 PM GMT+8  Female        Below 20
Student
64     2019/10/02 7:15:13 PM GMT+8  Female   From 20 to 29
Employed
65     2019/10/02 7:15:27 PM GMT+8  Female   From 20 to 29
Student
68     2019/10/02 7:29:53 PM GMT+8  Female   From 20 to 29
Employed
78     2019/10/03 7:19:36 AM GMT+8  Female   From 20 to 29
Student
79     2019/10/03 7:21:08 AM GMT+8  Female        Below 20
Student
80     2019/10/03 8:46:25 AM GMT+8  Female   From 20 to 29
Employed
84    2019/10/03 11:15:13 AM GMT+8    Male   From 20 to 29
Employed
104    2019/10/03 6:44:10 PM GMT+8    Male        Below 20
Student
109    2019/10/03 7:40:31 PM GMT+8    Male   From 20 to 29
Student
```

```
110    2019/10/03 7:43:00 PM GMT+8     Male   From 20 to 29
Student
114    2019/10/03 9:25:36 PM GMT+8     Male    40 and above   Self-
employed
119    2019/10/04 1:46:07 PM GMT+8     Male   From 20 to 29
Student
121    2019/10/05 4:57:22 PM GMT+8     Male   From 20 to 29
Employed

                        Income    Visits    Enjoyment
Duration  \
3       Less than RM25,000    Rarely    Take away              Below 30
minutes
11      Less than RM25,000    Rarely     Dine in   Between 30 minutes to
1 hour
14      Less than RM25,000    Rarely    Take away              Below 30
minutes
15      Less than RM25,000    Rarely    Take away   Between 30 minutes to
1 hour
20    RM100,000 - RM150,000   Rarely    Take away              Below 30
minutes
22      RM25,000 - RM50,000   Rarely     Dine in              More than
3 hours
26      More than RM150,000   Rarely   Drive-thru              Below 30
minutes
33      RM25,000 - RM50,000   Rarely     Dine in   Between 30 minutes to
1 hour
35      Less than RM25,000    Rarely    Take away              Below 30
minutes
51      Less than RM25,000    Rarely     Dine in              Below 30
minutes
64      Less than RM25,000    Rarely    Take away              Below 30
minutes
65      Less than RM25,000    Rarely     Dine in   Between 30 minutes to
1 hour
68      Less than RM25,000    Rarely     Dine in              Below 30
minutes
78      Less than RM25,000    Rarely    Take away              Below 30
minutes
79      Less than RM25,000    Rarely    Take away              Below 30
minutes
80     RM50,000 - RM100,000   Monthly  Drive-thru              More than
3 hours
84      RM25,000 - RM50,000   Rarely     Dine in      Between 1 hour to
2 hours
104      Less than RM25,000   Rarely   Drive-thru  Between 30 minutes to
1 hour
109      Less than RM25,000   Rarely     Dine in              Below 30
minutes
```

```
110     Less than RM25,000     Rarely    Take away                 Below 30
minutes
114    RM25,000 - RM50,000     Rarely     Dine in   Between 30 minutes to
1 hour
119     Less than RM25,000     Rarely     Dine in   Between 30 minutes to
1 hour
121   RM50,000 - RM100,000     Rarely     Dine in   Between 30 minutes to
1 hour

          Distance MembershipCard   ...       SpendingLimit Quality  \
3     more than 3km            No   ...      Less than RM20        2
11    more than 3km            No   ...      Less than RM20        3
14       within 1km           Yes   ...      Less than RM20        5
15    more than 3km           Yes   ...      Less than RM20        4
20       within 1km           Yes   ...  Around RM20 - RM40        2
22       within 1km            No   ...      Less than RM20        5
26        1km - 3km            No   ...      Less than RM20        4
33        1km - 3km           Yes   ...      Less than RM20        3
35    more than 3km            No   ...      Less than RM20        4
51    more than 3km            No   ...      Less than RM20        3
64    more than 3km            No   ...                Zero        3
65        1km - 3km            No   ...      Less than RM20        4
68    more than 3km            No   ...                Zero        2
78    more than 3km            No   ...      Less than RM20        2
79    more than 3km            No   ...      Less than RM20        2
80        1km - 3km           Yes   ...  Around RM20 - RM40        3
84    more than 3km            No   ...  Around RM20 - RM40        4
104   more than 3km            No   ...      Less than RM20        4
109   more than 3km            No   ...      Less than RM20        3
110   more than 3km            No   ...                Zero        4
114   more than 3km            No   ...      Less than RM20        2
119       1km - 3km            No   ...      Less than RM20        3
121       1km - 3km            No   ...      Less than RM20        1

      PriceRange  PromotionImportance  Ambiance  WifiQuality
Service  \
3              1                    4         3            3         3

11             2                    4         4            3         4

14             2                    5         5            5         5

15             1                    5         4            3         4

20             2                    5         3            3         4

22             2                    5         5            2         4

26             2                    4         4            4         4
```

33	2	3	3	3	4
35	2	4	4	3	4
51	3	2	2	2	4
64	1	5	3	4	4
65	3	2	4	3	4
68	1	5	4	4	4
78	1	5	2	2	2
79	2	3	2	2	2
80	2	4	3	1	3
84	2	4	3	4	4
104	4	4	4	4	4
109	3	3	3	3	3
110	2	3	5	4	4
114	2	1	2	2	3
119	2	4	3	3	3
121	1	5	4	3	3

```
        BussinessMeetings   
Advertiser  \
3                     3                 Through friends and word of
mouth
11                    4  Starbucks Website/Apps;Social Media;Through
fr...
14                    2  Social Media;Through friends and word of
mouth...
15                    4                          Starbucks
Website/Apps
20                    3                              Social
Media;Emails
22                    3                 Through friends and word of
mouth
26                    2                            Application
offer
33                    3                                Social
Media
```

35	1	Social Media
51	3	Social Media;Through friends and word of mouth
64	5	Social Media
65	4	Through friends and word of mouth
68	1	Starbucks Website/Apps;Social Media;Through fr...
78	2	Social Media;Through friends and word of mouth
79	2	Social Media;Deal sites (fave, iprice, etc...)
80	3	Starbucks Website/Apps
84	4	In Store displays
104	4	Social Media;Emails
109	2	Social Media
110	2	Social Media
114	2	In Store displays
119	4	Social Media;Through friends and word of mouth...
121	2	In Store displays

	ContinueBuying
3	No
11	No
14	No
15	No
20	No
22	No
26	No
33	No
35	No
51	No
64	No
65	No
68	No
78	No
79	No
80	No
84	No

```
104              No
109              No
110              No
114              No
119              No
121              No

[23 rows x 21 columns]
```

Creating visualizations to illustrate the distinctions between the data from all feedback contributors and the data from those who did not continue to buy

```
fig = plt.figure(figsize =(20, 5))
data.boxplot()
plt.title('The ranges in the rating')
plt.show()
```


The ranges in the rating
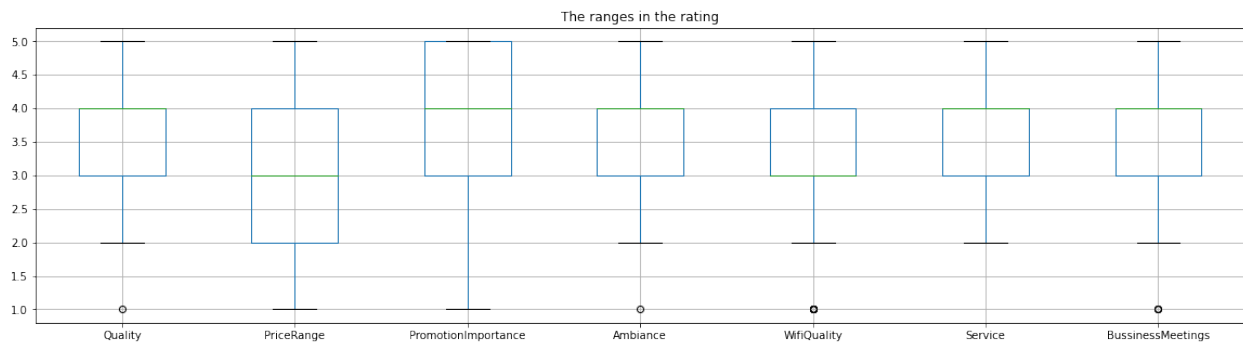
```
fig = plt.figure(figsize =(20, 5))
data_of_no_continue.boxplot()
plt.title('The ranges in the rating for the not buying')
plt.show()
```


The ranges in the rating for the not buying
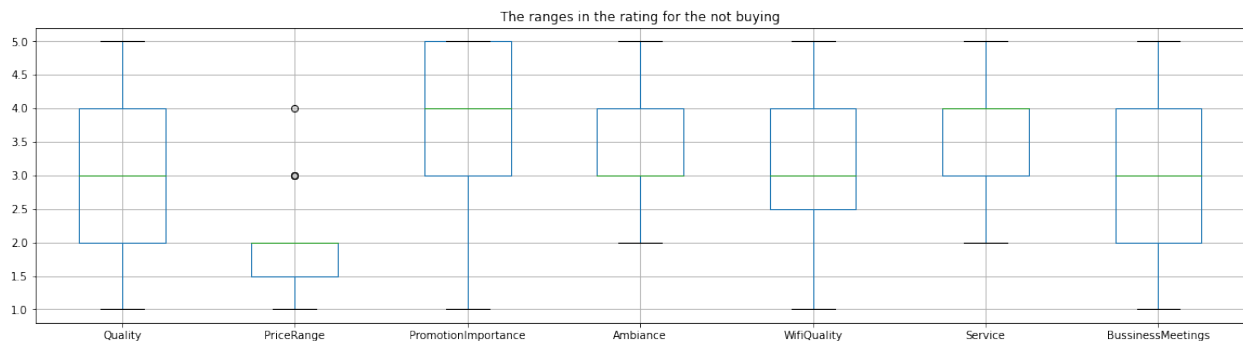
To correlate the features, the data should be numeric

Dropping the timestamp since it's considered an Index

```
data_notimestamp = data.drop('Timestamp', axis=1)
data_of_no_continue_notimestamp =
data_of_no_continue.drop('Timestamp', axis=1)
```

Encoding the unique values of each columns that we extracted earlier into numeric digits

```
mappings = {
    'Gender': {'Male': 1, 'Female': 2},
    'Age': {'Below 20': 1, 'From 20 to 29': 2, 'From 30 to 39': 3, '40
and above': 4},
    'Current': {'Student': 1, 'Employed': 2, 'Self-employed': 3,
'Housewife': 4},
    'Income': {'Less than RM25,000': 1, 'RM25,000 - RM50,000': 2,
'RM50,000 - RM100,000': 3, 'RM100,000 - RM150,000': 4, 'More than
RM150,000': 5},
    'Visits': {'Never': 1, 'Rarely': 2, 'Weekly': 3, 'Monthly': 4,
'Daily': 5},
    'Enjoyment': {'never': 1, 'Never': 2, 'Dine in': 3, 'Take away':
4, 'Drive-thru': 5, 'Never buy': 6, 'I dont like coffee': 7},
    'Duration': {'Below 30 minutes': 1, 'Between 30 minutes to 1
hour': 2, 'Between 1 hour to 2 hours': 3,
                'Between 2 hours to 3 hours': 4, 'More than 3 hours':
5},
    'Distance' : {'within 1km': 1, '1km - 3km': 2, 'more than 3km':
3},
    'MembershipCard' : {'Yes': 1, 'No': 2},
    'FavProduct' : {'Coffee': 1, 'Cold drinks;Pastries': 2,
'Coffee;Sandwiches': 3, 'Cold drinks': 4, 'Coffee;Cold drinks': 5,
                    'Cold drinks;Pastries;Sandwiches': 6,
'Coffee;Juices;Pastries;Sandwiches': 7, 'Coffee;Pastries;Sandwiches':
8,
                    'Coffee;Pastries': 9, 'Cold
drinks;Juices;Pastries': 10, 'Coffee;Cold drinks;Pastries;Sandwiches':
11,
                    'Never': 12, 'Jaws chip': 13, 'cake': 14,
'Pastries': 15, 'Cold drinks;Never': 16, 'never': 17, 'Nothing': 18,
                    'Coffee;Cold
drinks;Juices;Pastries;Sandwiches': 19},
    'SpendingLimit' : {'Less than RM20': 1, 'Around RM20 - RM40': 2,
'More than RM40': 3, 'Zero': 4},
    'Quality': {1: 1, 2: 2, 3: 3, 4: 4, 5: 5},
    'PriceRange': {1: 1, 2: 2, 3: 3, 4: 4, 5: 5},
    'PromotionImportance': {1: 1, 2: 2, 3: 3, 4: 4, 5: 5},
    'Ambiance': {1: 1, 2: 2, 3: 3, 4: 4, 5: 5},
    'WifiQuality': {1: 1, 2: 2, 3: 3, 4: 4, 5: 5},
    'Service': {1: 1, 2: 2, 3: 3, 4: 4, 5: 5},
    'BussinessMeetings': {1: 1, 2: 2, 3: 3, 4: 4, 5: 5},
    'Advertiser' : {
    'Starbucks Website/Apps;Social Media;Emails;Deal sites (fave,
```

```python
iprice, etc...)': 1,
    'Social Media;In Store displays': 2,
    'In Store displays;Billboards': 3,
    'Through friends and word of mouth': 4,
    'Starbucks Website/Apps;Social Media': 5,
    'Social Media': 6,
    'Starbucks Website/Apps;Social Media;Emails;Through friends and
word of mouth': 7,
    'Starbucks Website/Apps;Social Media;Through friends and word of
mouth': 8,
    'Social Media;Through friends and word of mouth': 9,
    'Social Media;Through friends and word of mouth;In Store
displays': 10,
    'Starbucks Website/Apps': 11,
    'Emails': 12,
    'Social Media;Emails': 13,
    'Through friends and word of mouth;In Store displays': 14,
    'Social Media;In Store displays;Billboards': 15,
    'Application offer': 16,
    'Starbucks Website/Apps;Social Media;Through friends and word of
mouth;In Store displays': 17,
    'In Store displays': 18,
    'Social Media;Through friends and word of mouth;Billboards': 19,
    'Starbucks Website/Apps;Social Media;Emails;Billboards': 20,
    'Social Media;Emails;Deal sites (fave, iprice, etc...);Through
friends and word of mouth;In Store displays;Billboards': 21,
    'Starbucks Website/Apps;Social Media;Deal sites (fave, iprice,
etc...);Through friends and word of mouth': 22,
    'Never hear': 23,
    'Social Media;Through friends and word of mouth;In Store
displays;Billboards': 24,
    'Starbucks Website/Apps;Deal sites (fave, iprice, etc...)': 25,
    'Social Media;Deal sites (fave, iprice, etc...);Through friends
and word of mouth': 26,
    'Social Media;Emails;Through friends and word of mouth': 27,
    'Social Media;Deal sites (fave, iprice, etc...)': 28,
    'Starbucks Website/Apps;Emails': 29,
    'Billboards': 30,
    'Starbucks Website/Apps;Social Media;Emails;Deal sites (fave,
iprice, etc...);Through friends and word of mouth;In Store
displays;Billboards': 31},
    'ContinueBuying' : {'Yes': 1, 'No': 2}
}
data_notimestamp_encoded = data_notimestamp.apply(lambda col:
col.map(mappings.get(col.name, col)))
data_of_no_continue_notimestamp_encoded =
data_of_no_continue_notimestamp.apply(lambda col:
col.map(mappings.get(col.name, col)))

data_notimestamp_encoded
```

```
        Gender  Age  Current  Income  Visits  Enjoyment  Duration  \
Distance
0            2    2        1       1       2          3         2
1
1            2    2        1       1       2          4         1
2
2            1    2        2       1       4          3         2
3
3            2    2        1       1       2          4         1
3
4            1    2        1       1       4          4         2
2
..         ...  ...      ...     ...     ...        ...       ...   .
..
117          1    4        3       2       4          3         3
2
118          1    2        2       1       4          3         3
2
119          1    2        1       1       2          3         2
2
120          2    2        2       1       2          4         1
1
121          1    2        2       3       2          3         2
2

     MembershipCard  FavProduct  SpendingLimit  Quality  PriceRange  \
0                 1           1              1        4           3
1                 1           2              1        4           3
2                 1           1              1        4           3
3                 2           1              1        2           1
4                 2           3              2        3           3
..              ...         ...            ...      ...         ...
117               1           1              2        3           3
118               1          19              3        5           5
119               2           5              1        3           2
120               2           1              1        4           4
121               2           1              1        1           1

     PromotionImportance  Ambiance  WifiQuality  Service
BussinessMeetings  \
0                      5         5            4        4
3
1                      4         4            4        5
2
2                      4         4            4        4
3
3                      4         3            3        3
3
4                      4         2            2        3
3
```

```
..                        ...        ...          ...         ...
...
117                       5          3            2           4
4
118                       5          5            5           5
5
119                       4          3            3           3
4
120                       4          4            4           4
4
121                       5          4            3           3
2

      Advertiser   ContinueBuying
0              1                1
1              2                1
2              3                1
3              4                2
4              5                1
..           ...              ...
117            5                1
118           31                1
119           10                2
120           19                1
121           18                2

[113 rows x 20 columns]
```
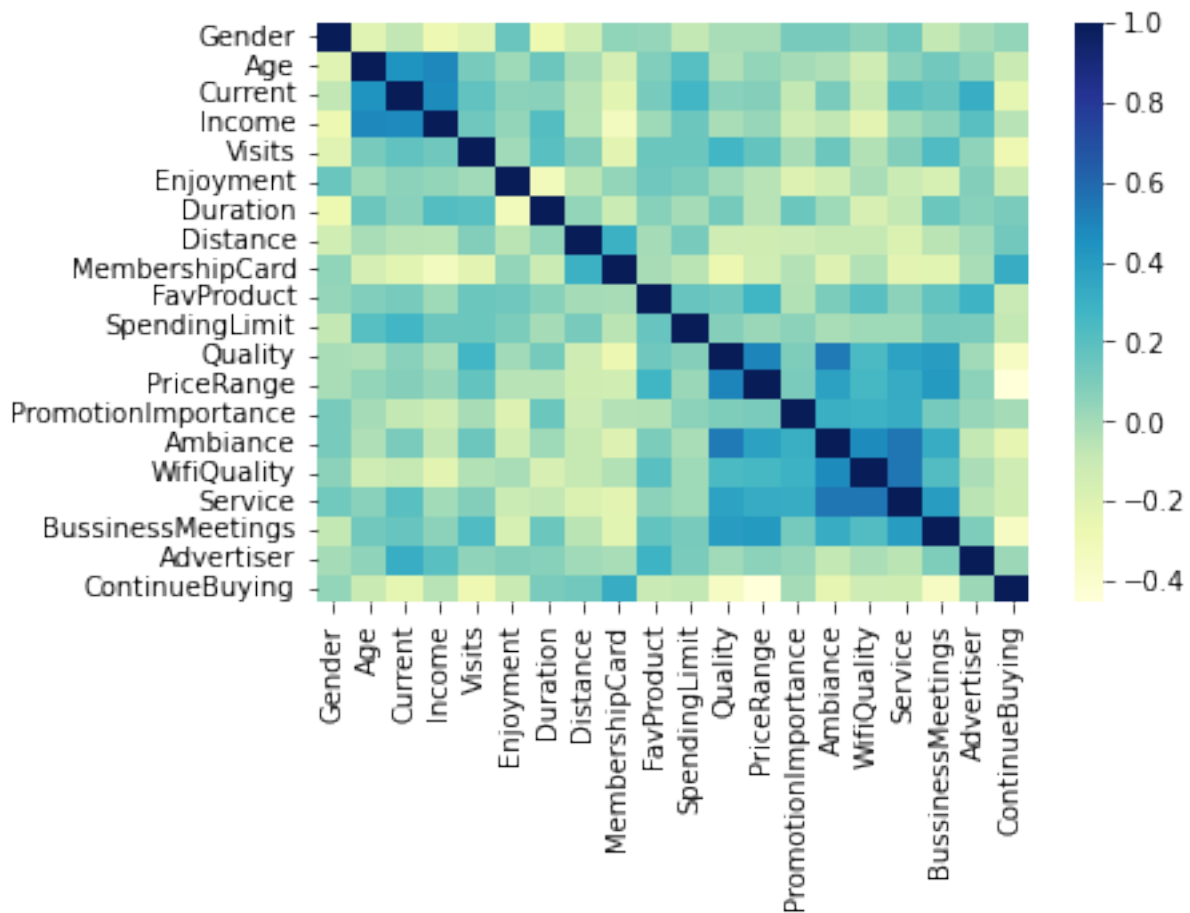
The correlations among the features in the dataset

```
dataplot = sb.heatmap(data_notimestamp_encoded.corr(), cmap="YlGnBu")
```

data_of_no_continue_notimestamp_encoded

	Gender	Age	Current	Income	Visits	Enjoyment	Duration	Distance
3	2	2	1	1	2	4	1	3
11	2	2	1	1	2	3	2	3
14	2	2	1	1	2	4	1	1
15	2	2	2	1	2	4	2	3
20	1	3	2	4	2	4	1	1
22	1	2	2	2	2	3	5	1
26	1	3	2	5	2	5	1	2
33	2	2	2	2	2	3	2	2
35	2	2	1	1	2	4	1	

							3
51	2	1	1	1	2	3	1
							3
64	2	2	2	1	2	4	1
							3
65	2	2	1	1	2	3	2
							2
68	2	2	2	1	2	3	1
							3
78	2	2	1	1	2	4	1
							3
79	2	1	1	1	2	4	1
							3
80	2	2	2	3	4	5	5
							2
84	1	2	2	2	2	3	3
							3
104	1	1	1	1	2	5	2
							3
109	1	2	1	1	2	3	1
							3
110	1	2	1	1	2	4	1
							3
114	1	4	3	2	2	3	2
							3
119	1	2	1	1	2	3	2
							2
121	1	2	2	3	2	3	2
							2

	MembershipCard	FavProduct	SpendingLimit	Quality	PriceRange	\
3	2	1	1	2	1	
11	2	1	1	3	2	
14	1	1	1	5	2	
15	1	1	1	4	1	
20	1	1	2	2	2	
22	2	1	1	5	2	
26	2	1	1	4	2	
33	1	1	1	3	2	
35	2	1	1	4	2	
51	2	4	1	3	3	
64	2	1	4	3	1	
65	2	1	1	4	3	
68	2	1	4	2	1	
78	2	1	1	2	1	
79	2	4	1	2	2	
80	1	1	2	3	2	
84	2	1	2	4	2	
104	2	15	1	4	4	

109	2	9	1	3	3
110	2	4	4	4	2
114	2	4	1	2	2
119	2	5	1	3	2
121	2	1	1	1	1

	PromotionImportance	Ambiance	WifiQuality	Service	BussinessMeetings \
3	4	3	3	3	3
11	4	4	3	4	4
14	5	5	5	5	2
15	5	4	3	4	4
20	5	3	3	4	3
22	5	5	2	4	3
26	4	4	4	4	2
33	3	3	3	4	3
35	4	4	3	4	1
51	2	2	2	4	3
64	5	3	4	4	5
65	2	4	3	4	4
68	5	4	4	4	1
78	5	2	2	2	2
79	3	2	2	2	2
80	4	3	1	3	3
84	4	3	4	4	4
104	4	4	4	4	4
109	3	3	3	3	2
110	3	5	4	4	2
114	1	2	2	3	

2				
119	4	3	3	3
4				
121	5	4	3	3
2				

	Advertiser	ContinueBuying
3	4	2
11	8	2
14	10	2
15	11	2
20	13	2
22	4	2
26	16	2
33	6	2
35	6	2
51	9	2
64	6	2
65	4	2
68	8	2
78	9	2
79	28	2
80	11	2
84	18	2
104	13	2
109	6	2
110	6	2
114	18	2
119	10	2
121	18	2

The correlations among the features in the dataset of non continue buying

```
dataplot = sb.heatmap(data_of_no_continue_notimestamp_encoded.corr(),
cmap="YlGnBu")
```
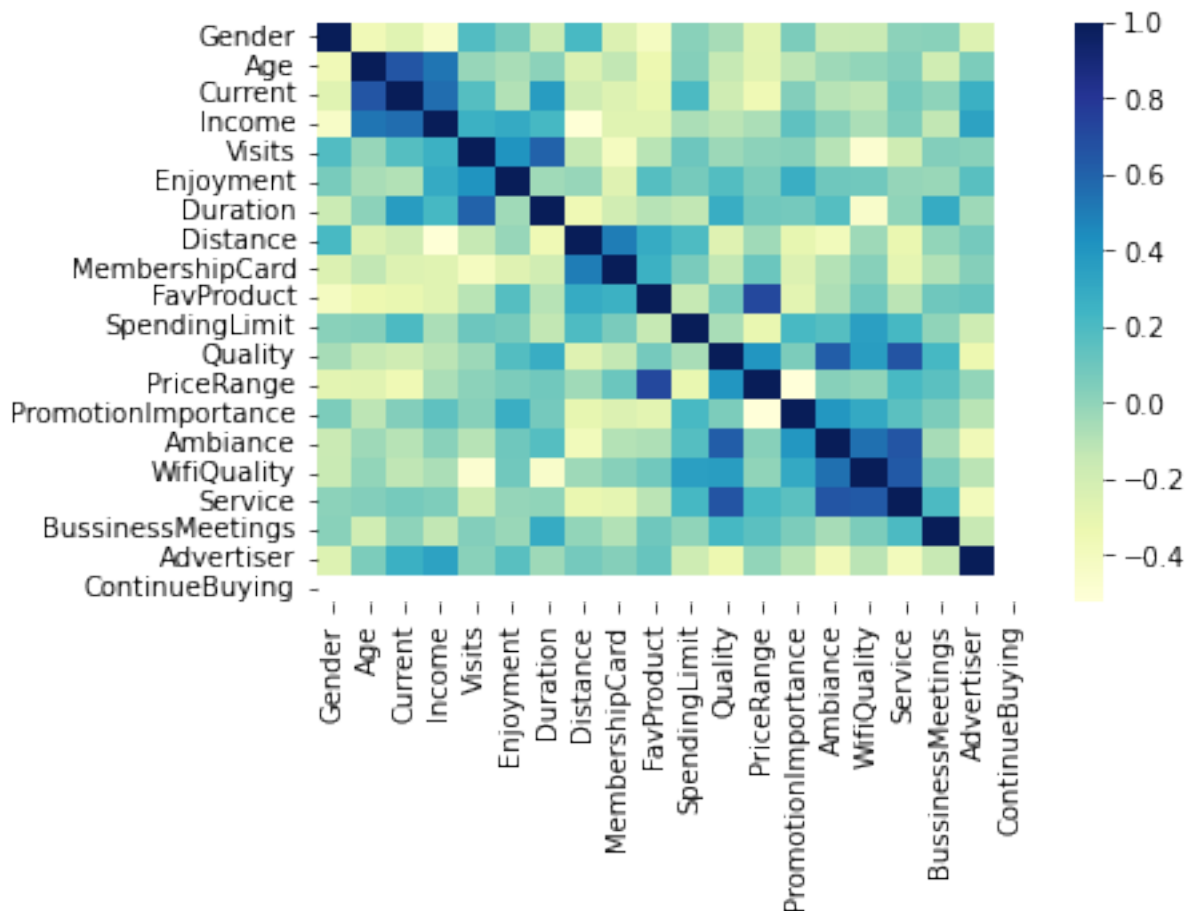
Using these correlations, the following features are considered the most influential in determining whether a customer continues or discontinues their purchasing behavior

Membership Card, Distance, Duration, PromotionImportance, Advertiser, Gender, Income, Enjoyment

Creating visualizations to illustrate the influence of the membership card on purchasing behavior

```
data_of_no_continue_MBcardcounts=data_of_no_continue['MembershipCard']
.value_counts()
data_of_no_continue_MBcardcounts

MembershipCard
No      18
Yes      5
Name: count, dtype: int64

plt.figure(figsize=(8, 8))
plt.pie(data_of_no_continue_MBcardcounts,
labels=data_of_no_continue_MBcardcounts.index, autopct='%1.1f%%',
startangle=140)
```

```
plt.title('Percentage of the people not continue Buying with
Membership Cards')
plt.show()
```

Percentage of the people not continue Buying with Membership Cards

Yes

21.7%

78.3%

No
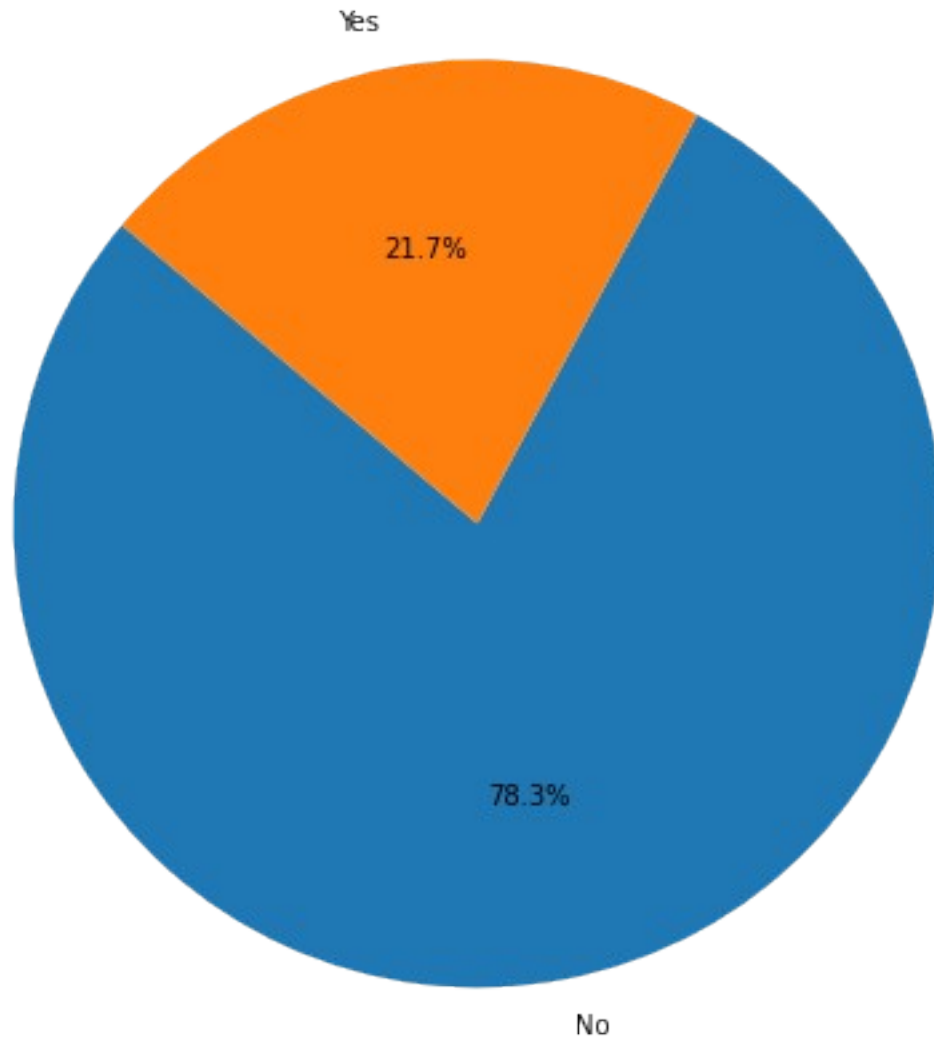
Creating visualizations to illustrate the influence of the duration spent inside the coffeeshop on purchasing behavior

```
data_of_no_continue_durationcounts=data_of_no_continue['Duration'].val
ue_counts()
data_of_no_continue_durationcounts
```

```
Duration
Below 30 minutes   12
Between 30 minutes to 1 hour   8
More than 3 hours   2
Between 1 hour to 2 hours   1
Name: count, dtype: int64

plt.figure(figsize=(8, 8))
plt.pie(data_of_no_continue_durationcounts,
labels=data_of_no_continue_durationcounts.index, autopct='%1.1f%%',
startangle=140)
plt.title('Percentage of the duration spent inside the coffeeshop for
people not continue Buying')
plt.show()
```



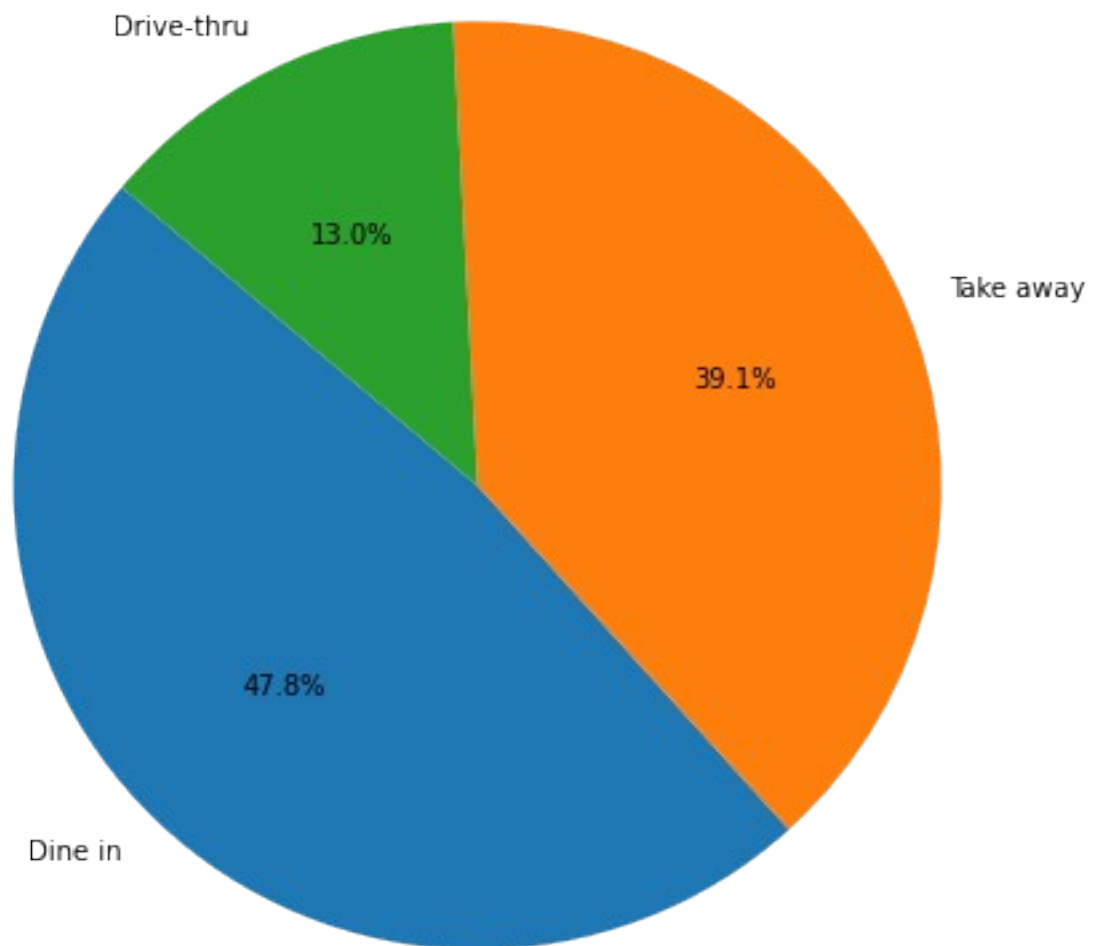Percentage of the duration spent inside the coffeeshop for people not continue Buying
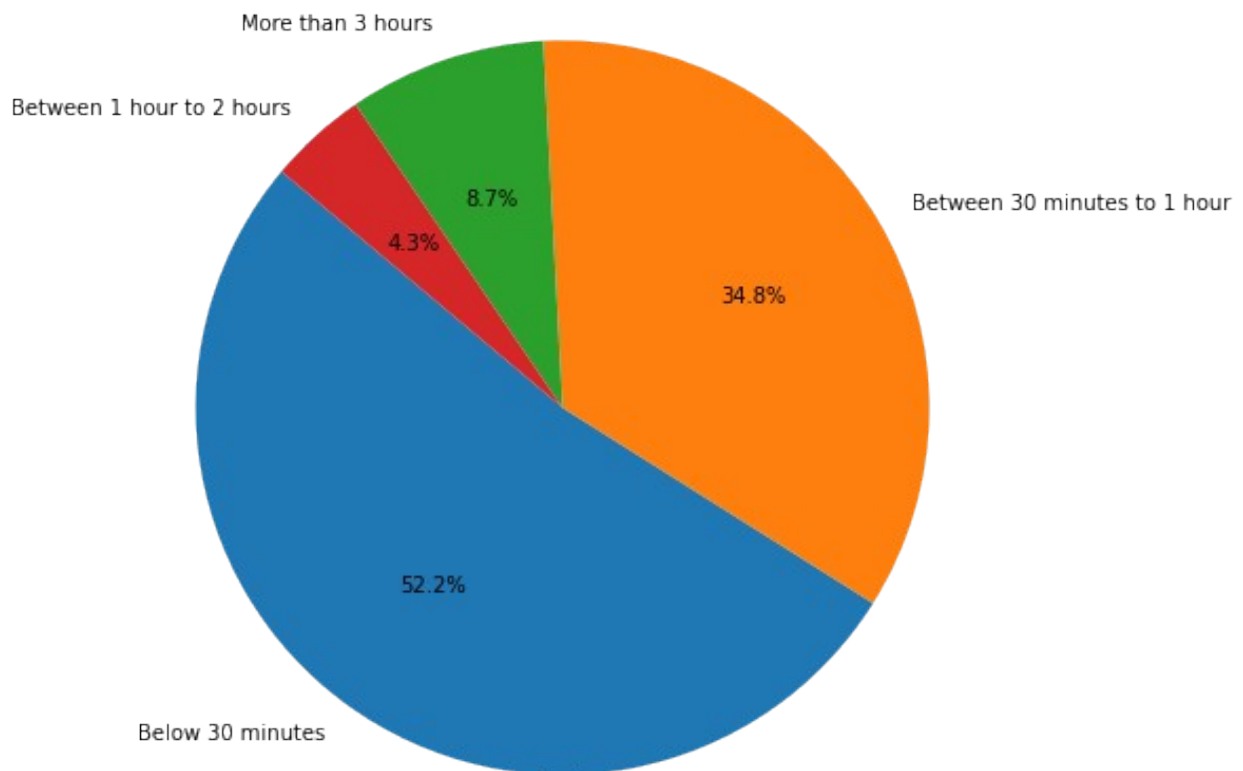
Creating visualizations to illustrate the influence of the ways of enjoyment their coffee on purchasing behavior

```
data_of_no_continue_Enjoymentcounts=data_of_no_continue['Enjoyment'].v
alue_counts()
data_of_no_continue_Enjoymentcounts

Enjoyment
Dine in        11
Take away       9
Drive-thru      3
Name: count, dtype: int64

plt.figure(figsize=(8, 8))
plt.pie(data_of_no_continue_Enjoymentcounts,
labels=data_of_no_continue_Enjoymentcounts.index, autopct='%1.1f%%',
startangle=140)
plt.title('Percentage of the ways of enjoyment for people not continue
Buying')
plt.show()
```

Percentage of the ways of enjoyment for people not continue Buying

Creating visualizations to illustrate the influence of the distance needed to travel on purchasing behavior

```
data_of_no_continue_Distancecounts=data_of_no_continue['Distance'].val
ue_counts()
data_of_no_continue_Distancecounts

Distance
more than 3km     14
1km - 3km          6
within 1km         3
Name: count, dtype: int64
```

```
plt.figure(figsize=(8, 8))
plt.pie(data_of_no_continue_Distancecounts,
labels=data_of_no_continue_Distancecounts.index, autopct='%1.1f%%',
startangle=140)
plt.title('Percentage of the distance away from the coffeshop for
people not continue Buying')
plt.show()
```

Percentage of the distance away from the coffeshop for people not continue Buying
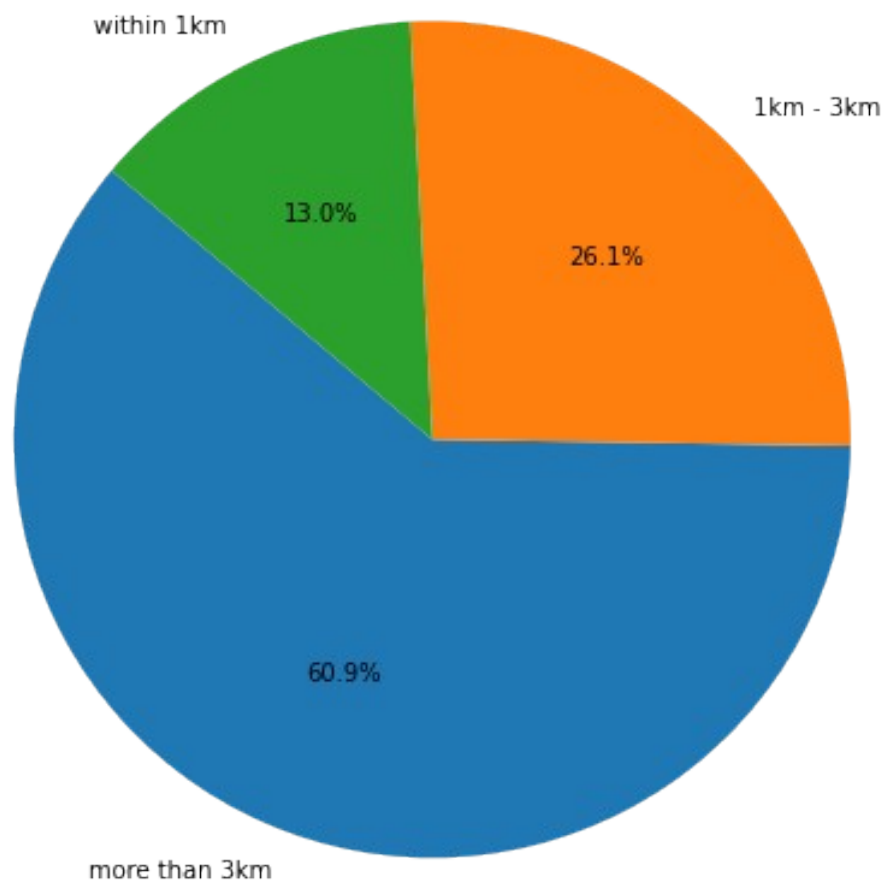

```
threekmdisData = data[(data['Distance'] == 'more than 3km')]
threekmdisData
```

```
                          Timestamp  Gender           Age
Current  \
2    2019/10/01 12:38:56 PM GMT+8    Male   From 20 to 29
Employed
```

3   2019/10/01 12:39:08 PM GMT+8   Female   From 20 to 29   Student
5   2019/10/01 12:39:39 PM GMT+8   Female   From 20 to 29   Student
7   2019/10/01 12:40:58 PM GMT+8   Male   From 20 to 29   Employed
8   2019/10/01 12:42:27 PM GMT+8   Female   From 20 to 29   Student
9   2019/10/01 12:43:36 PM GMT+8   Male   From 20 to 29   Employed
10   2019/10/01 12:47:00 PM GMT+8   Female   From 20 to 29   Student
11   2019/10/01 12:48:26 PM GMT+8   Female   From 20 to 29   Student
15   2019/10/01 12:57:31 PM GMT+8   Female   From 20 to 29   Employed
24   2019/10/01 1:24:21 PM GMT+8   Male   40 and above   Self-employed
27   2019/10/01 1:33:54 PM GMT+8   Male   From 20 to 29   Self-employed
30   2019/10/01 1:39:16 PM GMT+8   Female   From 20 to 29   Employed
32   2019/10/01 1:45:12 PM GMT+8   Female   From 30 to 39   Employed
35   2019/10/01 1:51:56 PM GMT+8   Female   From 20 to 29   Student
37   2019/10/01 1:55:52 PM GMT+8   Male   Below 20   Student
38   2019/10/01 1:57:01 PM GMT+8   Male   From 20 to 29   Employed
43   2019/10/01 2:35:40 PM GMT+8   Female   From 20 to 29   Employed
47   2019/10/01 2:42:02 PM GMT+8   Female   From 20 to 29   Self-employed
50   2019/10/01 3:12:11 PM GMT+8   Male   40 and above   Employed
51   2019/10/01 3:16:32 PM GMT+8   Female   Below 20   Student
52   2019/10/01 3:20:55 PM GMT+8   Female   40 and above   Housewife
53   2019/10/01 3:21:16 PM GMT+8   Female   Below 20   Student
57   2019/10/01 4:03:57 PM GMT+8   Male   Below 20   Student
59   2019/10/01 6:19:46 PM GMT+8   Female   From 20 to 29   Student
62   2019/10/02 9:29:28 AM GMT+8   Male   From 30 to 39   Student
64   2019/10/02 7:15:13 PM GMT+8   Female   From 20 to 29

```
Employed
68     2019/10/02 7:29:53 PM GMT+8   Female   From 20 to 29
Employed
72     2019/10/02 8:08:37 PM GMT+8   Female   From 20 to 29
Employed
74     2019/10/02 8:31:21 PM GMT+8   Female   From 20 to 29
Housewife
75     2019/10/02 8:35:08 PM GMT+8    Male   From 20 to 29
Employed
77     2019/10/02 9:19:50 PM GMT+8    Male   From 20 to 29
Employed
78     2019/10/03 7:19:36 AM GMT+8   Female   From 20 to 29
Student
79     2019/10/03 7:21:08 AM GMT+8   Female      Below 20
Student
82    2019/10/03 11:14:37 AM GMT+8    Male   From 20 to 29   Self-
employed
84    2019/10/03 11:15:13 AM GMT+8    Male   From 20 to 29
Employed
85    2019/10/03 11:17:27 AM GMT+8    Male   From 30 to 39   Self-
employed
86    2019/10/03 11:18:48 AM GMT+8    Male   From 20 to 29   Self-
employed
90    2019/10/03 12:12:22 PM GMT+8   Female   From 30 to 39
Employed
93     2019/10/03 2:13:11 PM GMT+8   Female   From 20 to 29
Employed
94     2019/10/03 2:34:09 PM GMT+8    Male   From 20 to 29
Employed
96     2019/10/03 3:44:13 PM GMT+8   Female   From 20 to 29   Self-
employed
99     2019/10/03 5:19:31 PM GMT+8    Male   From 30 to 39
Employed
100    2019/10/03 6:24:46 PM GMT+8    Male   From 20 to 29
Student
101    2019/10/03 6:31:44 PM GMT+8    Male   From 20 to 29
Student
102    2019/10/03 6:35:21 PM GMT+8    Male   From 20 to 29   Self-
employed
103    2019/10/03 6:41:20 PM GMT+8    Male   From 30 to 39
Employed
104    2019/10/03 6:44:10 PM GMT+8    Male      Below 20
Student
105    2019/10/03 6:45:28 PM GMT+8    Male    40 and above
Employed
106    2019/10/03 6:46:53 PM GMT+8    Male   From 20 to 29
Student
109    2019/10/03 7:40:31 PM GMT+8    Male   From 20 to 29
Student
```

```
110    2019/10/03 7:43:00 PM GMT+8     Male  From 20 to 29
Student
111    2019/10/03 7:47:00 PM GMT+8  Female  From 20 to 29
Employed
113    2019/10/03 8:58:26 PM GMT+8  Female       Below 20
Student
114    2019/10/03 9:25:36 PM GMT+8     Male   40 and above  Self-
employed
115   2019/10/03 10:38:42 PM GMT+8     Male        Below 20
Student
116   2019/10/03 11:24:55 PM GMT+8     Male  From 30 to 39
Student

                        Income   Visits    Enjoyment
Duration  \
2      Less than RM25,000  Monthly    Dine in  Between 30 minutes to
1 hour
3      Less than RM25,000   Rarely  Take away               Below 30
minutes
5      Less than RM25,000   Rarely    Dine in  Between 30 minutes to
1 hour
7     RM50,000 - RM100,000   Rarely    Dine in  Between 30 minutes to
1 hour
8      Less than RM25,000   Rarely  Drive-thru              Below 30
minutes
9      Less than RM25,000  Monthly  Take away               Below 30
minutes
10      Less than RM25,000   Rarely    Dine in               Below 30
minutes
11      Less than RM25,000   Rarely    Dine in  Between 30 minutes to
1 hour
15      Less than RM25,000   Rarely  Take away  Between 30 minutes to
1 hour
24    RM100,000 - RM150,000   Rarely    Dine in    Between 1 hour to
2 hours
27      Less than RM25,000  Monthly  Take away               Below 30
minutes
30      RM25,000 - RM50,000  Monthly  Take away  Between 30 minutes to
1 hour
32      RM25,000 - RM50,000   Rarely  Take away               Below 30
minutes
35      Less than RM25,000   Rarely  Take away               Below 30
minutes
37      Less than RM25,000   Rarely    Dine in    Between 1 hour to
2 hours
38      Less than RM25,000   Rarely  Take away               Below 30
minutes
43      Less than RM25,000  Monthly  Take away               Below 30
minutes
```

47	Less than RM25,000	Rarely	Take away	Between 30 minutes to 1 hour
50	RM100,000 - RM150,000	Rarely	Dine in	Below 30 minutes
51	Less than RM25,000	Rarely	Dine in	Below 30 minutes
52	Less than RM25,000	Monthly	Take away	Below 30 minutes
53	Less than RM25,000	Rarely	Drive-thru	Below 30 minutes
57	Less than RM25,000	Monthly	Dine in	Between 30 minutes to 1 hour
59	Less than RM25,000	Rarely	Drive-thru	Below 30 minutes
62	Less than RM25,000	Rarely	Dine in	Between 30 minutes to 1 hour
64	Less than RM25,000	Rarely	Take away	Below 30 minutes
68	Less than RM25,000	Rarely	Dine in	Below 30 minutes
72	Less than RM25,000	Monthly	Take away	Below 30 minutes
74	RM50,000 - RM100,000	Rarely	Drive-thru	Below 30 minutes
75	RM25,000 - RM50,000	Rarely	Take away	Below 30 minutes
77	RM50,000 - RM100,000	Monthly	Dine in	Between 30 minutes to 1 hour
78	Less than RM25,000	Rarely	Take away	Below 30 minutes
79	Less than RM25,000	Rarely	Take away	Below 30 minutes
82	RM50,000 - RM100,000	Rarely	Dine in	Between 1 hour to 2 hours
84	RM25,000 - RM50,000	Rarely	Dine in	Between 1 hour to 2 hours
85	More than RM150,000	Monthly	Dine in	Between 2 hours to 3 hours
86	More than RM150,000	Rarely	Drive-thru	Between 30 minutes to 1 hour
90	RM50,000 - RM100,000	Weekly	Dine in	Between 1 hour to 2 hours
93	Less than RM25,000	Rarely	Take away	Below 30 minutes
94	RM50,000 - RM100,000	Monthly	Take away	Below 30 minutes
96	Less than RM25,000	Rarely	Take away	Below 30 minutes
99	Less than RM25,000	Rarely	Drive-thru	Between 30 minutes to

```
1 hour
100     Less than RM25,000     Rarely  Drive-thru   Between 30 minutes to
1 hour
101     Less than RM25,000     Rarely     Dine in   Between 30 minutes to
1 hour
102   RM50,000 - RM100,000     Daily   Drive-thru              Below 30
minutes
103    RM25,000 - RM50,000     Weekly     Dine in     Between 1 hour to
2 hours
104     Less than RM25,000     Rarely  Drive-thru   Between 30 minutes to
1 hour
105   RM50,000 - RM100,000    Monthly  Drive-thru   Between 30 minutes to
1 hour
106     Less than RM25,000     Rarely   Take away              Below 30
minutes
109     Less than RM25,000     Rarely     Dine in              Below 30
minutes
110     Less than RM25,000     Rarely   Take away              Below 30
minutes
111     Less than RM25,000    Monthly   Take away              Below 30
minutes
113     Less than RM25,000     Rarely   Take away              Below 30
minutes
114    RM25,000 - RM50,000     Rarely     Dine in   Between 30 minutes to
1 hour
115     Less than RM25,000     Daily    Take away              Below 30
minutes
116     Less than RM25,000    Monthly     Dine in     Between 1 hour to
2 hours

          Distance MembershipCard  ...        SpendingLimit Quality  \
2     more than 3km           Yes  ...       Less than RM20        4
3     more than 3km            No  ...       Less than RM20        2
5     more than 3km            No  ...       Less than RM20        4
7     more than 3km           Yes  ...       Less than RM20        4
8     more than 3km           Yes  ...       More than RM40        5
9     more than 3km            No  ...  Around RM20 - RM40        4
10    more than 3km            No  ...       Less than RM20        4
11    more than 3km            No  ...       Less than RM20        3
15    more than 3km           Yes  ...       Less than RM20        4
24    more than 3km            No  ...  Around RM20 - RM40        4
27    more than 3km            No  ...  Around RM20 - RM40        5
30    more than 3km           Yes  ...  Around RM20 - RM40        3
32    more than 3km            No  ...  Around RM20 - RM40        2
35    more than 3km            No  ...       Less than RM20        4
37    more than 3km            No  ...       Less than RM20        5
38    more than 3km           Yes  ...  Around RM20 - RM40        4
43    more than 3km            No  ...  Around RM20 - RM40        4
47    more than 3km            No  ...                Zero        3
```

50	more than 3km	Yes	...	Around RM20 - RM40	4
51	more than 3km	No	...	Less than RM20	3
52	more than 3km	Yes	...	More than RM40	5
53	more than 3km	No	...	Around RM20 - RM40	3
57	more than 3km	Yes	...	Less than RM20	5
59	more than 3km	No	...	Less than RM20	4
62	more than 3km	No	...	Around RM20 - RM40	3
64	more than 3km	No	...	Zero	3
68	more than 3km	No	...	Zero	2
72	more than 3km	Yes	...	Less than RM20	4
74	more than 3km	No	...	Around RM20 - RM40	3
75	more than 3km	Yes	...	Less than RM20	3
77	more than 3km	Yes	...	Around RM20 - RM40	4
78	more than 3km	No	...	Less than RM20	2
79	more than 3km	No	...	Less than RM20	2
82	more than 3km	Yes	...	Less than RM20	5
84	more than 3km	No	...	Around RM20 - RM40	4
85	more than 3km	Yes	...	Around RM20 - RM40	4
86	more than 3km	Yes	...	More than RM40	4
90	more than 3km	Yes	...	Around RM20 - RM40	4
93	more than 3km	Yes	...	Less than RM20	5
94	more than 3km	Yes	...	Around RM20 - RM40	3
96	more than 3km	No	...	Less than RM20	3
99	more than 3km	Yes	...	Less than RM20	4
100	more than 3km	No	...	Around RM20 - RM40	3
101	more than 3km	No	...	Less than RM20	3
102	more than 3km	Yes	...	Around RM20 - RM40	4
103	more than 3km	No	...	More than RM40	4
104	more than 3km	No	...	Less than RM20	4
105	more than 3km	No	...	Around RM20 - RM40	4
106	more than 3km	No	...	Around RM20 - RM40	3
109	more than 3km	No	...	Less than RM20	3
110	more than 3km	No	...	Zero	4
111	more than 3km	No	...	Less than RM20	5
113	more than 3km	No	...	Less than RM20	3
114	more than 3km	No	...	Less than RM20	2
115	more than 3km	No	...	Around RM20 - RM40	5
116	more than 3km	No	...	Less than RM20	4

	PriceRange	PromotionImportance	Ambiance	WifiQuality	Service \
2	3	4	4	4	4
3	1	4	3	3	3
5	3	5	5	4	5
7	2	3	3	3	3
8	4	4	4	4	4

9	3	3	4	3	3
10	1	4	5	3	3
11	2	4	4	3	4
15	1	5	4	3	4
24	3	4	4	3	3
27	3	4	4	3	4
30	1	4	4	3	4
32	3	5	5	3	5
35	2	4	4	3	4
37	2	3	4	4	3
38	4	4	4	4	4
43	4	5	4	4	5
47	1	5	4	3	3
50	4	4	4	2	3
51	3	2	2	2	4
52	4	3	5	3	5
53	3	2	3	3	3
57	5	5	5	5	5
59	3	4	4	3	4
62	3	4	3	3	3
64	1	5	3	4	4
68	1	5	4	4	4
72	2	4	4	3	4
74	2	3	3	3	5
75	3	4	5	4	4
77	2	1	4	1	4

78	1	5	2	2	2
79	2	3	2	2	2
82	5	5	5	5	5
84	2	4	3	4	4
85	3	4	4	3	4
86	3	2	3	1	2
90	4	5	4	4	5
93	3	5	5	4	4
94	1	3	3	1	3
96	3	1	4	3	4
99	2	3	4	4	4
100	2	3	3	3	3
101	4	3	3	1	2
102	2	4	4	3	3
103	5	5	4	4	3
104	4	4	4	4	4
105	3	5	4	4	4
106	3	3	3	3	3
109	3	3	3	3	3
110	2	3	5	4	4
111	4	4	4	4	4
113	4	5	5	5	4
114	2	1	2	2	3
115	5	5	5	5	5
116	4	5	4	2	3

```
      BussinessMeetings
Advertiser  \
2                    3                        In Store
displays;Billboards
3                    3                Through friends and word of
mouth
5                    4                                     Social
Media
7                    3    Starbucks Website/Apps;Social
Media;Emails;Thr...
8                    4    Starbucks Website/Apps;Social Media;Through
fr...
9                    4      Social Media;Through friends and word of
mouth
10                   4                                     Social
Media
11                   4    Starbucks Website/Apps;Social Media;Through
fr...
15                   4                                  Starbucks
Website/Apps
24                   5    Through friends and word of mouth;In Store
dis...
27                   3                                     Social
Media
30                   4    Starbucks Website/Apps;Social
Media;Emails;Thr...
32                   5                                     Social
Media
35                   1                                     Social
Media
37                   5               Starbucks Website/Apps;Social
Media
38                   4                                    In Store
displays
43                   5    Starbucks Website/Apps;Social
Media;Emails;Bil...
47                   2    Social Media;Emails;Deal sites (fave,
iprice, ...
50                   4                  Social Media;In Store
displays
51                   3      Social Media;Through friends and word of
mouth
52                   5    Starbucks Website/Apps;Social Media;Deal
sites...
53                   3                                     Social
Media
57                   5                Through friends and word of
mouth
59                   3                Starbucks Website/Apps;Social
```

ID	Value	Source
		Media
62	3	Social Media
64	5	Social Media
68	1	Starbucks Website/Apps;Social Media;Through fr...
72	3	Through friends and word of mouth
74	4	Social Media
75	4	Social Media;Deal sites (fave, iprice, etc...)...
77	4	Social Media
78	2	Social Media;Through friends and word of mouth
79	2	Social Media;Deal sites (fave, iprice, etc...)
82	5	Starbucks Website/Apps
84	4	In Store displays
85	4	Starbucks Website/Apps;Emails
86	2	Social Media;Through friends and word of mouth
90	4	Emails
93	1	Social Media;In Store displays
94	2	Social Media;Through friends and word of mouth
96	4	Social Media;Through friends and word of mouth
99	4	Social Media
100	3	Through friends and word of mouth
101	3	Through friends and word of mouth
102	3	Social Media;Emails
103	3	Starbucks Website/Apps;Social Media;Through fr...
104	4	Social Media;Emails
105	4	Starbucks Website/Apps
106	3	Starbucks Website/Apps;Social

Media		
109	2	Social Media
110	2	Social Media
111	4	Social Media;Through friends and word of mouth...
113	4	Social Media
114	2	In Store displays
115	5	Social Media;Through friends and word of mouth
116	4	Social Media

	ContinueBuying
2	Yes
3	No
5	Yes
7	Yes
8	Yes
9	Yes
10	Yes
11	No
15	No
24	Yes
27	Yes
30	Yes
32	Yes
35	No
37	Yes
38	Yes
43	Yes
47	Yes
50	Yes
51	No
52	Yes
53	Yes
57	Yes
59	Yes
62	Yes
64	No
68	No
72	Yes
74	Yes
75	Yes
77	Yes
78	No

```
79             No
82            Yes
84             No
85            Yes
86            Yes
90            Yes
93            Yes
94            Yes
96            Yes
99            Yes
100           Yes
101           Yes
102           Yes
103           Yes
104            No
105           Yes
106           Yes
109            No
110            No
111           Yes
113           Yes
114            No
115           Yes
116           Yes

[56 rows x 21 columns]

threekmdisData_Continuecounts =
threekmdisData['ContinueBuying'].value_counts()
threekmdisData_Continuecounts

ContinueBuying
Yes    42
No     14
Name: count, dtype: int64

plt.figure(figsize=(8, 8))
plt.pie(threekmdisData_Continuecounts,
labels=threekmdisData_Continuecounts.index, autopct='%1.1f%%',
startangle=140)
plt.title('Percentage of the three km away in continue Buying')
plt.show()
```

Percentage of the three km away in continue Buying

No

25.0%

75.0%

Yes
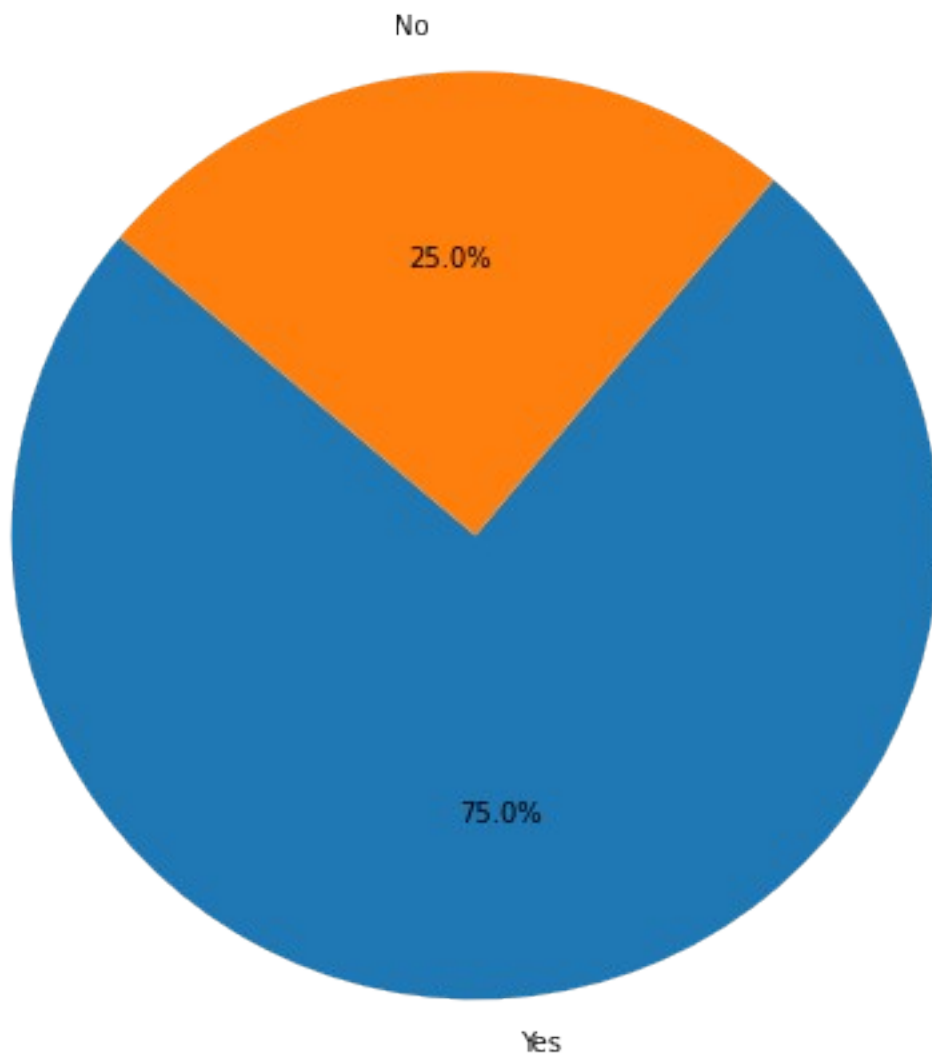
Due to some feedback contributors listing multiple advertisers, resulting in one or more unique values for the same contributor, it is necessary to extract and analyze these unique values

Splitting the values in those rows and counting each unique value

```
Advertisers_counter = {}
```

The code iterates through each row, splits the values in the 'Values' column using split(';'), and counts each unique value

```
for index, row in data.iterrows():
    values_in_row = row['Advertiser'].split(';')
```

```
    for value in values_in_row:
        if value not in Advertisers_counter:
            Advertisers_counter[value] = 1
        else:
            Advertisers_counter[value] += 1
```

Creating visualizations to illustrate the influence of the Advertiser on purchasing behavior

```
Advertisers_counter_data =
pd.DataFrame(list(Advertisers_counter.items()),
columns=['UniqueValue', 'Count'])
Advertisers_counter_data

                      UniqueValue  Count
0            Starbucks Website/Apps     34
1                     Social Media     85
2                           Emails     18
3  Deal sites (fave, iprice, etc...)      7
4                 In Store displays     21
5                        Billboards     10
6   Through friends and word of mouth     46
7                 Application offer      1

plt.figure(figsize=(8, 8))
plt.pie(Advertisers_counter_data['Count'],
labels=Advertisers_counter_data['UniqueValue'], autopct='%1.1f%%',
startangle=140)
plt.title('The percentage of Advertisers')
plt.show()
```

The percentage of Advertisers
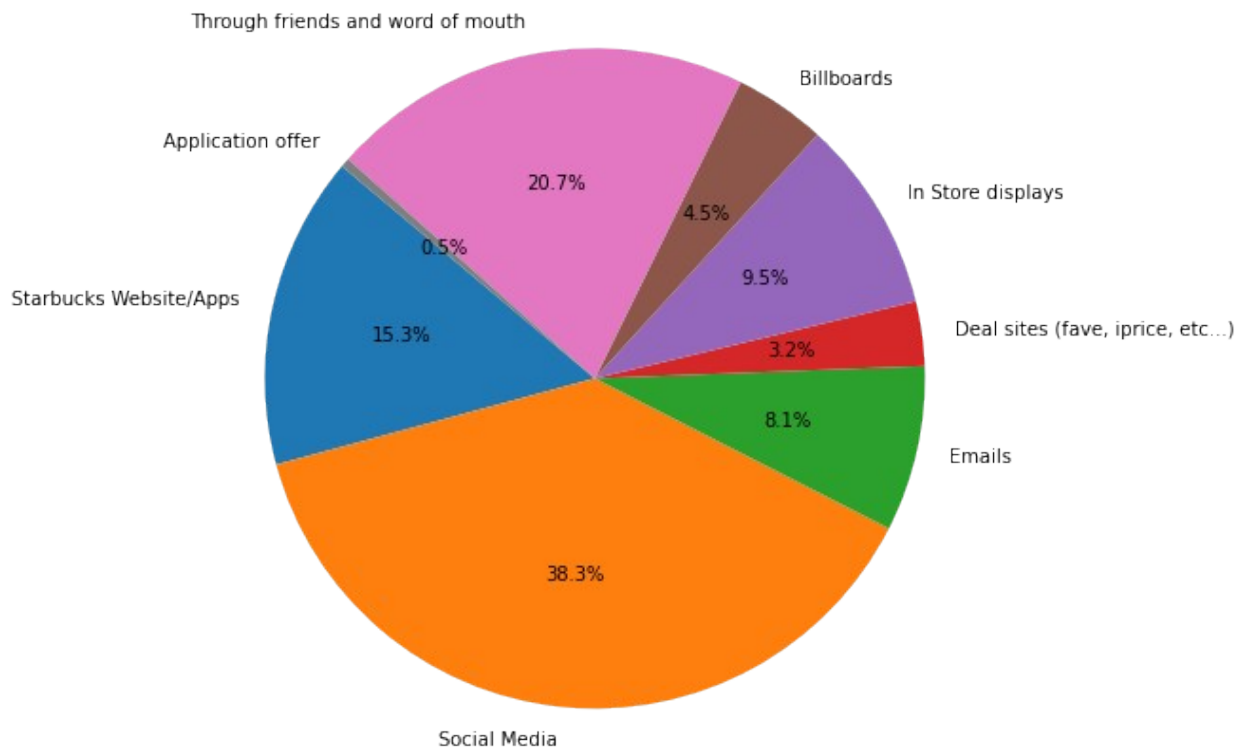

```
Advertisers_counter_notbuying = {}

for index, row in data_of_no_continue.iterrows():
    values_in_row = row['Advertiser'].split(';')
    for value in values_in_row:
        if value not in Advertisers_counter_notbuying:
            Advertisers_counter_notbuying[value] = 1
        else:
            Advertisers_counter_notbuying[value] += 1

Advertisers_counter_notbuying_data =
pd.DataFrame(list(Advertisers_counter_notbuying.items()),
columns=['UniqueValue', 'Count'])
Advertisers_counter_notbuying_data

                      UniqueValue  Count
0   Through friends and word of mouth      9
1               Starbucks Website/Apps      4
2                        Social Media     14
3                    In Store displays      5
4                               Emails      2
5                    Application offer      1
6   Deal sites (fave, iprice, etc...)      1
```

```
plt.figure(figsize=(8, 8))
plt.pie(Advertisers_counter_notbuying_data['Count'],
labels=Advertisers_counter_notbuying_data['UniqueValue'],
autopct='%1.1f%%', startangle=140)
plt.title('The percentage of Advertisers in the not buying group')
plt.show()
```

The percentage of Advertisers in the not buying group
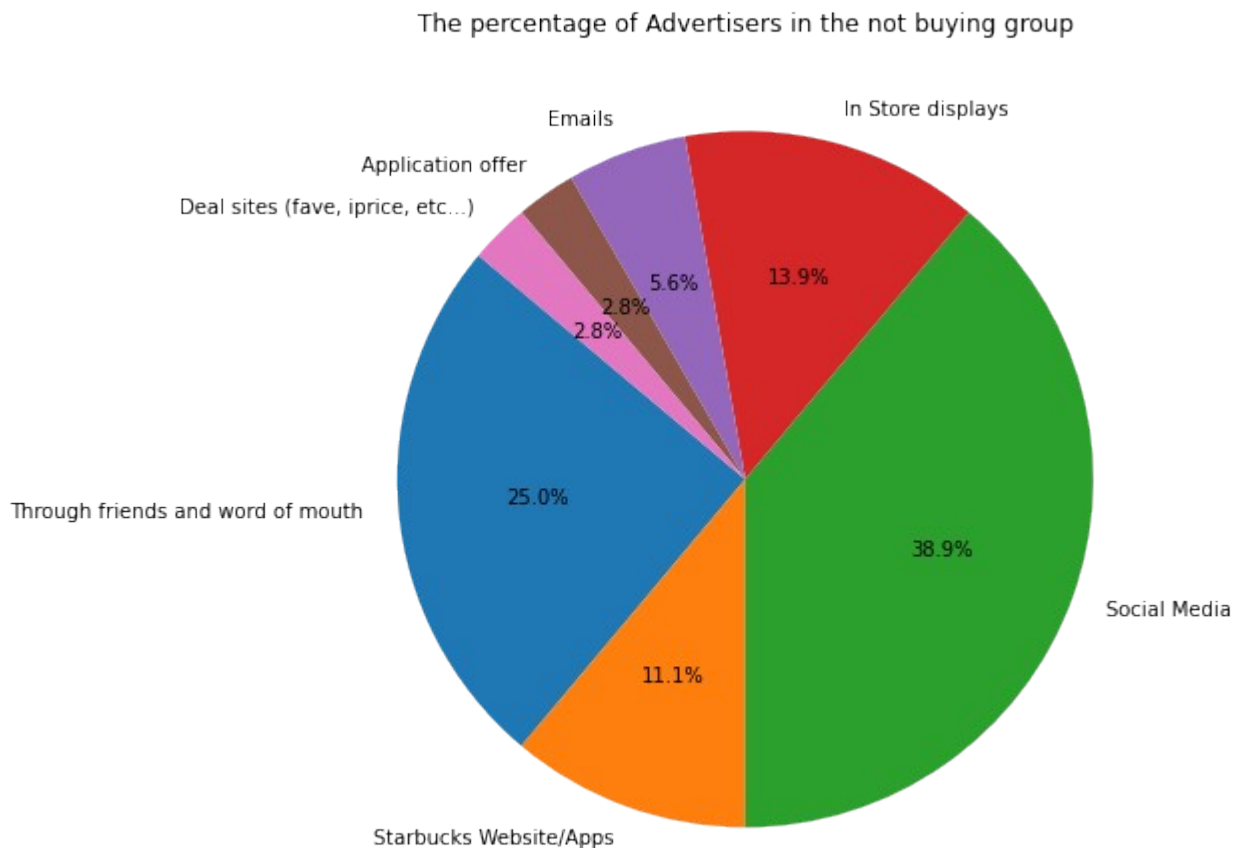
Creating visualizations to illustrate the rate on the importance of promotion on purchasing behavior

```
data_PromotionImportancecounts=data['PromotionImportance'].value_count
s()
data_PromotionImportancecounts

PromotionImportance
4    41
5    36
3    26
2     6
1     4
Name: count, dtype: int64
```

```
plt.figure(figsize=(8, 8))
plt.pie(data_PromotionImportancecounts,
labels=data_PromotionImportancecounts.index, autopct='%1.1f%%',
startangle=140)
plt.title('Percentage of the rates on the importance of promotion and
sales for the interviewed people')
plt.show()
```

Percentage of the rates on the importance of promotion and sales for the interviewed people
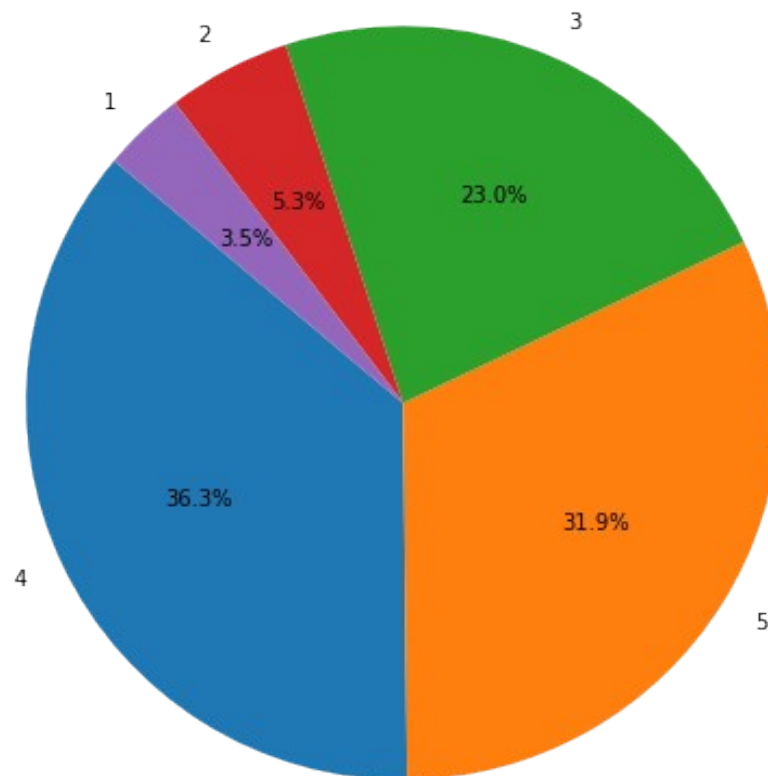


```
data_of_no_continue_PromotionImportancecounts=data_of_no_continue['Pro
motionImportance'].value_counts()
data_of_no_continue_PromotionImportancecounts

PromotionImportance
4    8
5    8
3    4
2    2
1    1
Name: count, dtype: int64
```

```
plt.figure(figsize=(8, 8))
plt.pie(data_of_no_continue_PromotionImportancecounts,
labels=data_of_no_continue_PromotionImportancecounts.index,
autopct='%1.1f%%', startangle=140)
plt.title('Percentage of the rates on the importance of promotion and
sales for the not continuing buying')
plt.show()
```

Percentage of the rates on the importance of promotion and sales for the not continuing buying
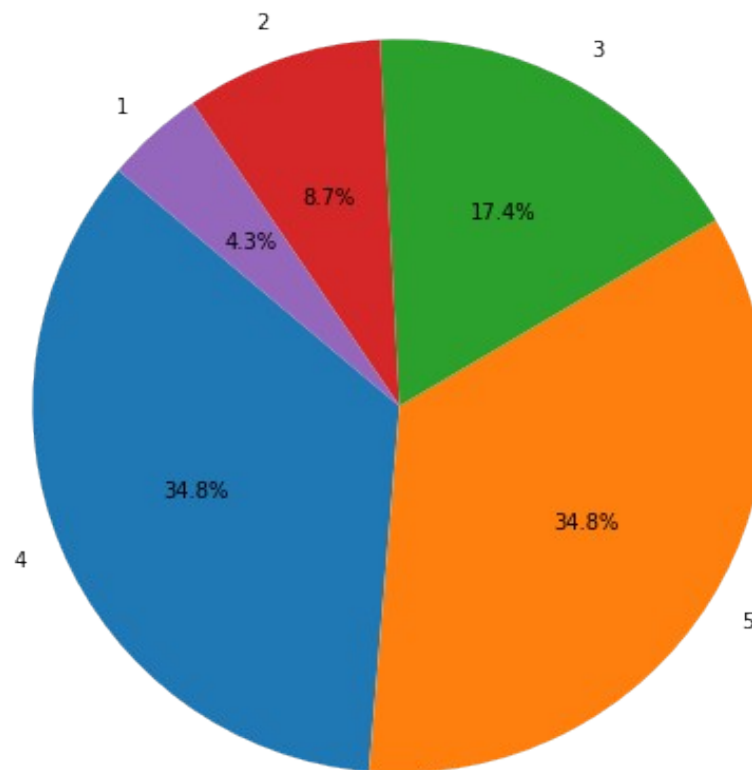
Creating visualizations to illustrate the different age groups influence on the purchasing behavior

```
data_of_no_continue_Agecounts=data_of_no_continue['Age'].value_counts(
)
data_of_no_continue_Agecounts

Age
From 20 to 29    17
Below 20          3
From 30 to 39     2
```
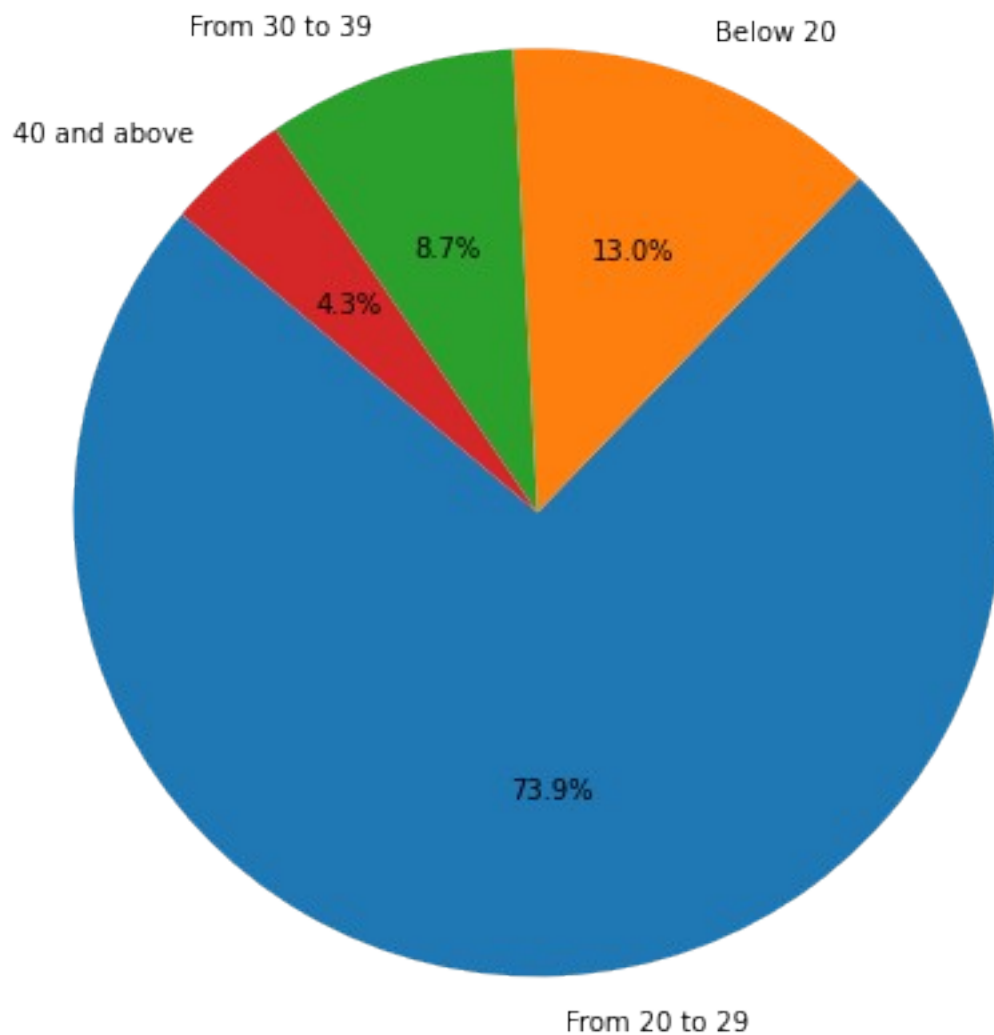
```
40 and above        1
Name: count, dtype: int64

plt.figure(figsize=(8, 8))
plt.pie(data_of_no_continue_Agecounts,
labels=data_of_no_continue_Agecounts.index, autopct='%1.1f%%',
startangle=140)
plt.title('Percentage of the age groups for people not continue
Buying')
plt.show()
```

Percentage of the age groups for people not continue Buying

```python
data_Agecounts=data['Age'].value_counts()
data_Agecounts
```
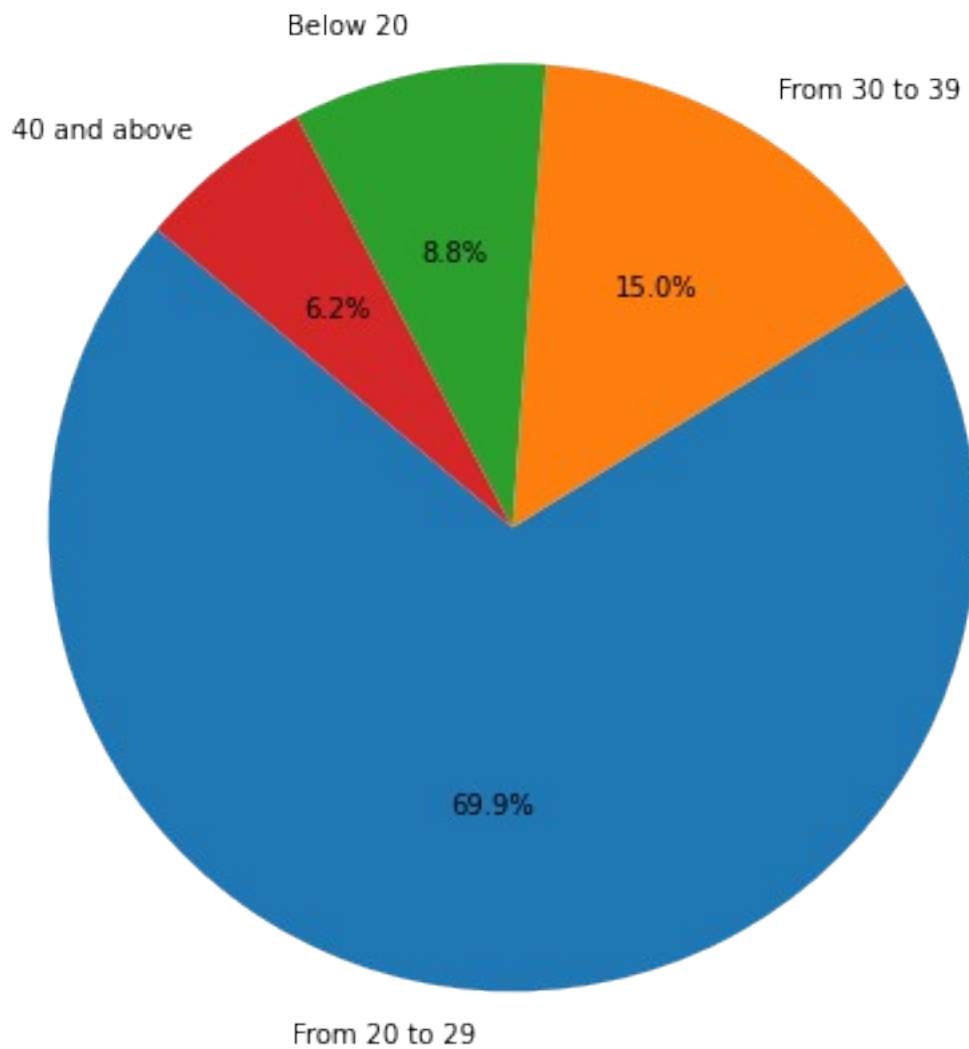
```
Age
From 20 to 29    79
From 30 to 39    17
Below 20         10
40 and above      7
Name: count, dtype: int64
```

```python
plt.figure(figsize=(8, 8))
plt.pie(data_Agecounts, labels=data_Agecounts.index, autopct='%1.1f%
%', startangle=140)
plt.title('Percentage of the age groups for all the interviewed')
plt.show()
```

Percentage of the age groups for all the interviewed

Creating visualizations to illustrate the influence of the current status on purchasing behavior

```
data_of_no_continue_Currentcounts=data_of_no_continue['Current'].value
_counts()
data_of_no_continue_Currentcounts

Current
Student          12
Employed         10
Self-employed     1
Name: count, dtype: int64
```

```
plt.figure(figsize=(8, 8))
plt.pie(data_of_no_continue_Currentcounts,
labels=data_of_no_continue_Currentcounts.index, autopct='%1.1f%%',
startangle=140)
plt.title('Percentage of the current status for people not continue
Buying')
plt.show()
```

Percentage of the current status for people not continue Buying
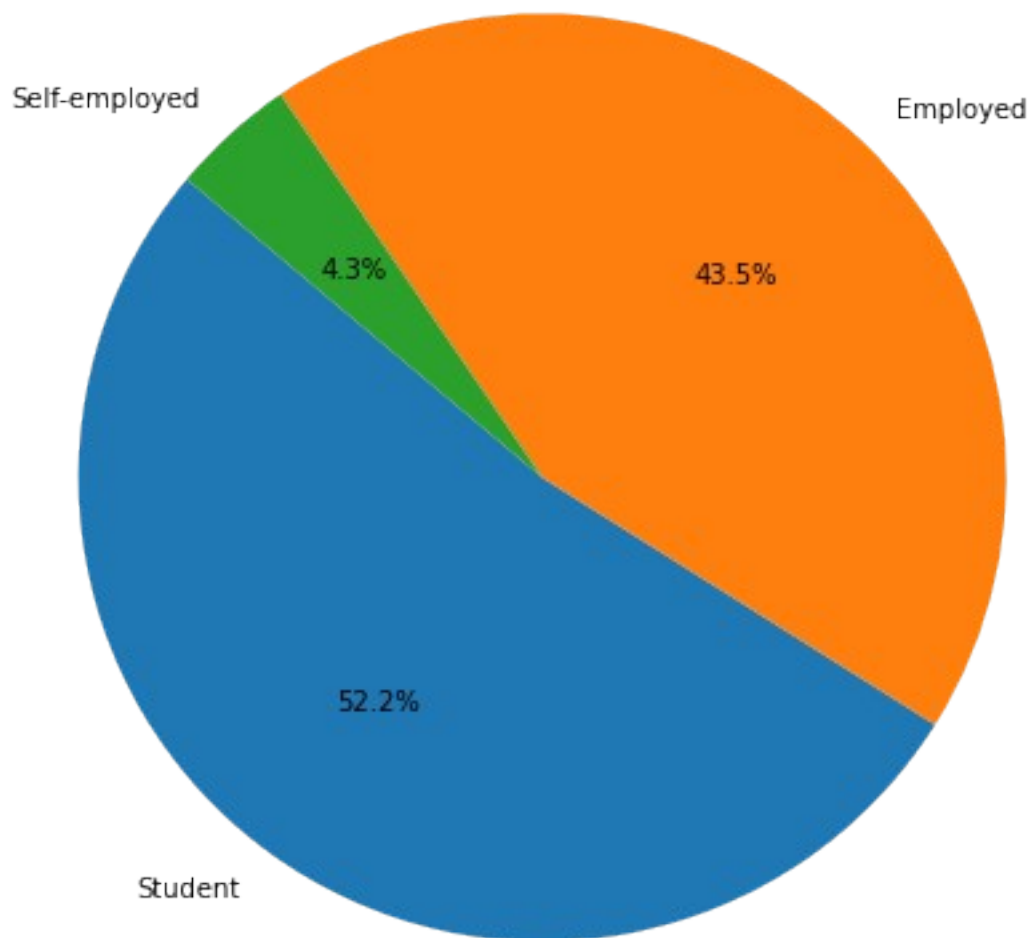

```
data_Currentcounts=data['Current'].value_counts()
data_Currentcounts
```

```
Current
Employed        58
Student         37
Self-employed   16
Housewife        2
Name: count, dtype: int64
```

```python
plt.figure(figsize=(8, 8))
plt.pie(data_Currentcounts, labels=data_Currentcounts.index,
autopct='%1.1f%%', startangle=140)
plt.title('Percentage of the current status for people interviewed')
plt.show()
```


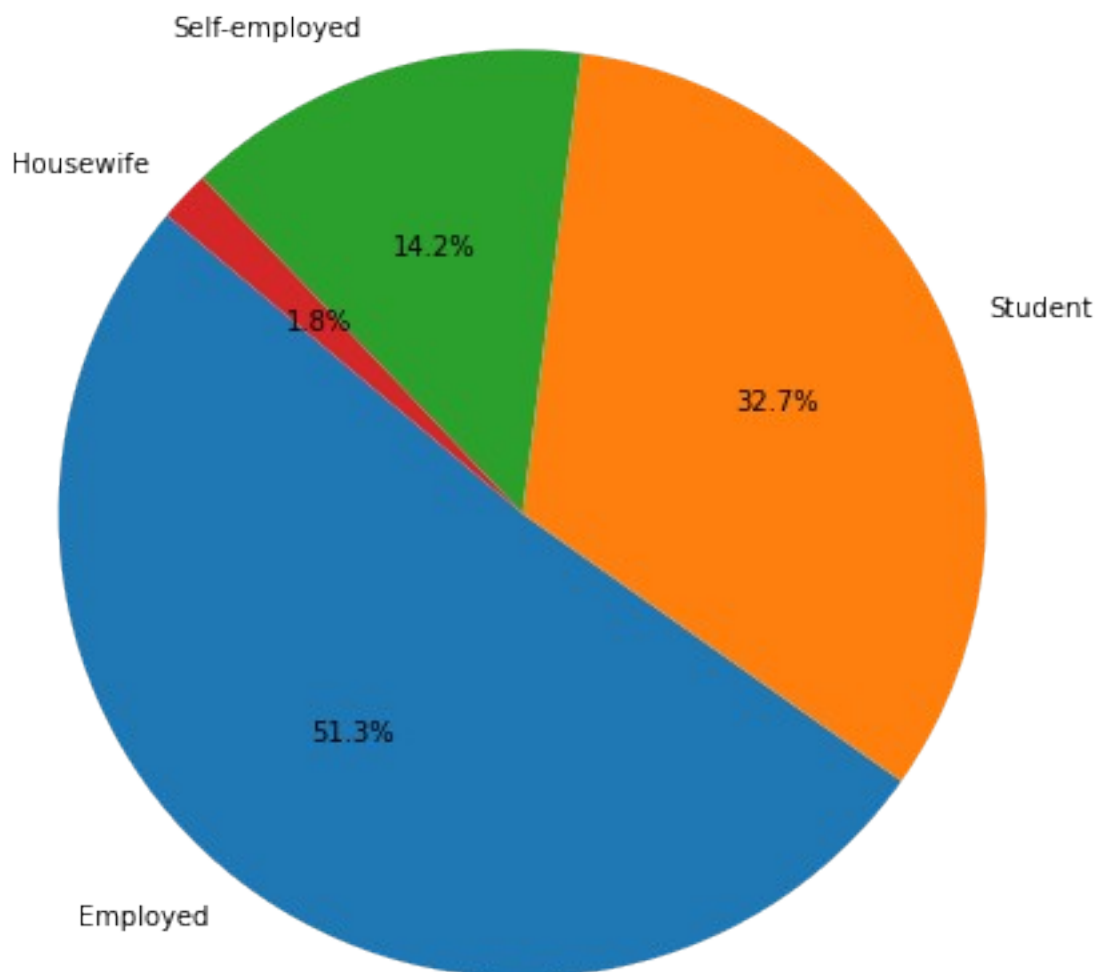Percentage of the current status for people interviewed

There are two big groups the Employed and the student

Creating visualizations to illustrate the influence of being a student on purchasing behavior

```
studentsData= data[data['Current'] == 'Student']
studentsData
```

```
                          Timestamp  Gender             Age  Current  \
0      2019/10/01 12:38:43 PM GMT+8  Female  From 20 to 29  Student
1      2019/10/01 12:38:54 PM GMT+8  Female  From 20 to 29  Student
3      2019/10/01 12:39:08 PM GMT+8  Female  From 20 to 29  Student
4      2019/10/01 12:39:20 PM GMT+8    Male  From 20 to 29  Student
5      2019/10/01 12:39:39 PM GMT+8  Female  From 20 to 29  Student
6      2019/10/01 12:39:42 PM GMT+8  Female  From 20 to 29  Student
8      2019/10/01 12:42:27 PM GMT+8  Female  From 20 to 29  Student
10     2019/10/01 12:47:00 PM GMT+8  Female  From 20 to 29  Student
11     2019/10/01 12:48:26 PM GMT+8  Female  From 20 to 29  Student
12     2019/10/01 12:49:25 PM GMT+8  Female  From 20 to 29  Student
13     2019/10/01 12:53:09 PM GMT+8  Female  From 20 to 29  Student
14     2019/10/01 12:53:16 PM GMT+8  Female  From 20 to 29  Student
23      2019/10/01 1:24:04 PM GMT+8  Female  From 20 to 29  Student
35      2019/10/01 1:51:56 PM GMT+8  Female  From 20 to 29  Student
37      2019/10/01 1:55:52 PM GMT+8    Male       Below 20  Student
45      2019/10/01 2:41:31 PM GMT+8  Female  From 30 to 39  Student
49      2019/10/01 3:08:53 PM GMT+8    Male       Below 20  Student
51      2019/10/01 3:16:32 PM GMT+8  Female       Below 20  Student
53      2019/10/01 3:21:16 PM GMT+8  Female       Below 20  Student
57      2019/10/01 4:03:57 PM GMT+8    Male       Below 20  Student
58      2019/10/01 4:05:59 PM GMT+8    Male       Below 20  Student
59      2019/10/01 6:19:46 PM GMT+8  Female  From 20 to 29  Student
60      2019/10/01 8:32:12 PM GMT+8    Male  From 20 to 29  Student
62      2019/10/02 9:29:28 AM GMT+8    Male  From 30 to 39  Student
65      2019/10/02 7:15:27 PM GMT+8  Female  From 20 to 29  Student
78      2019/10/03 7:19:36 AM GMT+8  Female  From 20 to 29  Student
79      2019/10/03 7:21:08 AM GMT+8  Female       Below 20  Student
100     2019/10/03 6:24:46 PM GMT+8    Male  From 20 to 29  Student
101     2019/10/03 6:31:44 PM GMT+8    Male  From 20 to 29  Student
104     2019/10/03 6:44:10 PM GMT+8    Male       Below 20  Student
106     2019/10/03 6:46:53 PM GMT+8    Male  From 20 to 29  Student
109     2019/10/03 7:40:31 PM GMT+8    Male  From 20 to 29  Student
110     2019/10/03 7:43:00 PM GMT+8    Male  From 20 to 29  Student
113     2019/10/03 8:58:26 PM GMT+8  Female       Below 20  Student
115    2019/10/03 10:38:42 PM GMT+8    Male       Below 20  Student
116    2019/10/03 11:24:55 PM GMT+8    Male  From 30 to 39  Student
119     2019/10/04 1:46:07 PM GMT+8    Male  From 20 to 29  Student

                  Income    Visits    Enjoyment
Duration  \
0      Less than RM25,000    Rarely      Dine in  Between 30 minutes to
1 hour
```

1	Less than RM25,000	Rarely	Take away		Below 30 minutes
3	Less than RM25,000	Rarely	Take away		Below 30 minutes
4	Less than RM25,000	Monthly	Take away	Between 30 minutes to 1 hour	
5	Less than RM25,000	Rarely	Dine in	Between 30 minutes to 1 hour	
6	Less than RM25,000	Rarely	Dine in		Below 30 minutes
8	Less than RM25,000	Rarely	Drive-thru		Below 30 minutes
10	Less than RM25,000	Rarely	Dine in		Below 30 minutes
11	Less than RM25,000	Rarely	Dine in	Between 30 minutes to 1 hour	
12	Less than RM25,000	Weekly	Take away		Below 30 minutes
13	Less than RM25,000	Rarely	Take away		Below 30 minutes
14	Less than RM25,000	Rarely	Take away		Below 30 minutes
23	Less than RM25,000	Monthly	Drive-thru	Between 1 hour to 2 hours	
35	Less than RM25,000	Rarely	Take away		Below 30 minutes
37	Less than RM25,000	Rarely	Dine in	Between 1 hour to 2 hours	
45	RM50,000 - RM100,000	Rarely	Take away		Below 30 minutes
49	Less than RM25,000	Rarely	Drive-thru		Below 30 minutes
51	Less than RM25,000	Rarely	Dine in		Below 30 minutes
53	Less than RM25,000	Rarely	Drive-thru		Below 30 minutes
57	Less than RM25,000	Monthly	Dine in	Between 30 minutes to 1 hour	
58	Less than RM25,000	Monthly	Dine in		Below 30 minutes
59	Less than RM25,000	Rarely	Drive-thru		Below 30 minutes
60	Less than RM25,000	Rarely	Dine in	Between 1 hour to 2 hours	
62	Less than RM25,000	Rarely	Dine in	Between 30 minutes to 1 hour	
65	Less than RM25,000	Rarely	Dine in	Between 30 minutes to 1 hour	
78	Less than RM25,000	Rarely	Take away		Below 30

```
minutes
79     Less than RM25,000    Rarely    Take away                 Below 30
minutes
100    Less than RM25,000    Rarely  Drive-thru  Between 30 minutes to
1 hour
101    Less than RM25,000    Rarely     Dine in  Between 30 minutes to
1 hour
104    Less than RM25,000    Rarely  Drive-thru  Between 30 minutes to
1 hour
106    Less than RM25,000    Rarely    Take away                 Below 30
minutes
109    Less than RM25,000    Rarely     Dine in                 Below 30
minutes
110    Less than RM25,000    Rarely    Take away                 Below 30
minutes
113    Less than RM25,000    Rarely    Take away                 Below 30
minutes
115    Less than RM25,000     Daily    Take away                 Below 30
minutes
116    Less than RM25,000   Monthly     Dine in     Between 1 hour to 2
hours
119    Less than RM25,000    Rarely     Dine in  Between 30 minutes to
1 hour
```

	Distance	MembershipCard	...	SpendingLimit	Quality
0	within 1km	Yes	...	Less than RM20	4
1	1km - 3km	Yes	...	Less than RM20	4
3	more than 3km	No	...	Less than RM20	2
4	1km - 3km	No	...	Around RM20 - RM40	3
5	more than 3km	No	...	Less than RM20	4
6	within 1km	Yes	...	Around RM20 - RM40	5
8	more than 3km	Yes	...	More than RM40	5
10	more than 3km	No	...	Less than RM20	4
11	more than 3km	No	...	Less than RM20	3
12	1km - 3km	Yes	...	Around RM20 - RM40	4
13	1km - 3km	Yes	...	Less than RM20	4
14	within 1km	Yes	...	Less than RM20	5
23	1km - 3km	Yes	...	Less than RM20	5
35	more than 3km	No	...	Less than RM20	4
37	more than 3km	No	...	Less than RM20	5
45	1km - 3km	Yes	...	Around RM20 - RM40	5
49	within 1km	Yes	...	Less than RM20	3
51	more than 3km	No	...	Less than RM20	3
53	more than 3km	No	...	Around RM20 - RM40	3
57	more than 3km	Yes	...	Less than RM20	5
58	1km - 3km	No	...	Less than RM20	3
59	more than 3km	No	...	Less than RM20	4
60	1km - 3km	Yes	...	More than RM40	2
62	more than 3km	No	...	Around RM20 - RM40	3

```
65        1km - 3km              No   ...      Less than RM20      4
78   more than 3km              No   ...      Less than RM20      2
79   more than 3km              No   ...      Less than RM20      2
100  more than 3km              No   ...  Around RM20 - RM40      3
101  more than 3km              No   ...      Less than RM20      3
104  more than 3km              No   ...      Less than RM20      4
106  more than 3km              No   ...  Around RM20 - RM40      3
109  more than 3km              No   ...      Less than RM20      3
110  more than 3km              No   ...                 Zero     4
113  more than 3km              No   ...      Less than RM20      3
115  more than 3km              No   ...  Around RM20 - RM40      5
116  more than 3km              No   ...      Less than RM20      4
119       1km - 3km              No   ...      Less than RM20      3
```

	PriceRange	PromotionImportance	Ambiance	WifiQuality	Service
0	3	5	5	4	4
1	3	4	4	4	5
3	1	4	3	3	3
4	3	4	2	2	3
5	3	5	5	4	5
6	5	5	5	3	5
8	4	4	4	4	4
10	1	4	5	3	3
11	2	4	4	3	4
12	3	2	4	4	3
13	3	4	4	4	4
14	2	5	5	5	5
23	4	4	5	4	4
35	2	4	4	3	4
37	2	3	4	4	3
45	3	4	3	4	4
49	3	3	3	3	3
51	3	2	2	2	4

53	3	2	3	3	3
57	5	5	5	5	5
58	3	3	3	4	3
59	3	4	4	3	4
60	1	5	1	4	3
62	3	4	3	3	3
65	3	2	4	3	4
78	1	5	2	2	2
79	2	3	2	2	2
100	2	3	3	3	3
101	4	3	3	1	2
104	4	4	4	4	4
106	3	3	3	3	3
109	3	3	3	3	3
110	2	3	5	4	4
113	4	5	5	5	4
115	5	5	5	5	5
116	4	5	4	2	3
119	2	4	3	3	3

```
     BussinessMeetings   
Advertiser  \
0                       3  Starbucks Website/Apps;Social
Media;Emails;Dea...
1                       2                      Social Media;In Store
displays
3                       3                      Through friends and word of
mouth
4                       3                 Starbucks Website/Apps;Social
Media
5                       4                                        Social
```

6	5	Starbucks Website/Apps;Social Media
8	4	Starbucks Website/Apps;Social Media;Through fr...
10	4	Social Media
11	4	Starbucks Website/Apps;Social Media;Through fr...
12	4	Social Media
13	3	Social Media
14	2	Social Media;Through friends and word of mouth...
23	3	Social Media;Through friends and word of mouth
35	1	Social Media
37	5	Starbucks Website/Apps;Social Media
45	4	Social Media
49	3	Social Media
51	3	Social Media;Through friends and word of mouth
53	3	Social Media
57	5	Through friends and word of mouth
58	3	Social Media
59	3	Starbucks Website/Apps;Social Media
60	3	Social Media
62	3	Social Media
65	4	Through friends and word of mouth
78	2	Social Media;Through friends and word of mouth
79	2	Social Media;Deal sites (fave, iprice, etc...)
100	3	Through friends and word of mouth
101	3	Through friends and word of mouth

104	4	Social Media;Emails
106	3	Starbucks Website/Apps;Social Media
109	2	Social Media
110	2	Social Media
113	4	Social Media
115	5	Social Media;Through friends and word of mouth
116	4	Social Media
119	4	Social Media;Through friends and word of mouth...

	ContinueBuying
0	Yes
1	Yes
3	No
4	Yes
5	Yes
6	Yes
8	Yes
10	Yes
11	No
12	Yes
13	Yes
14	No
23	Yes
35	No
37	Yes
45	Yes
49	Yes
51	No
53	Yes
57	Yes
58	Yes
59	Yes
60	Yes
62	Yes
65	No
78	No
79	No
100	Yes
101	Yes
104	No
106	Yes

```
109            No
110            No
113           Yes
115           Yes
116           Yes
119            No

[37 rows x 21 columns]

studentsData_Continuecounts =
studentsData['ContinueBuying'].value_counts()
studentsData_Continuecounts

ContinueBuying
Yes    25
No     12
Name: count, dtype: int64

plt.figure(figsize=(8, 8))
plt.pie(studentsData_Continuecounts,
labels=studentsData_Continuecounts.index, autopct='%1.1f%%',
startangle=140)
plt.title('Percentage of the Students group in the continue buying')
plt.show()
```

Percentage of the Students group in the continue buying

No

32.4%

67.6%

Yes
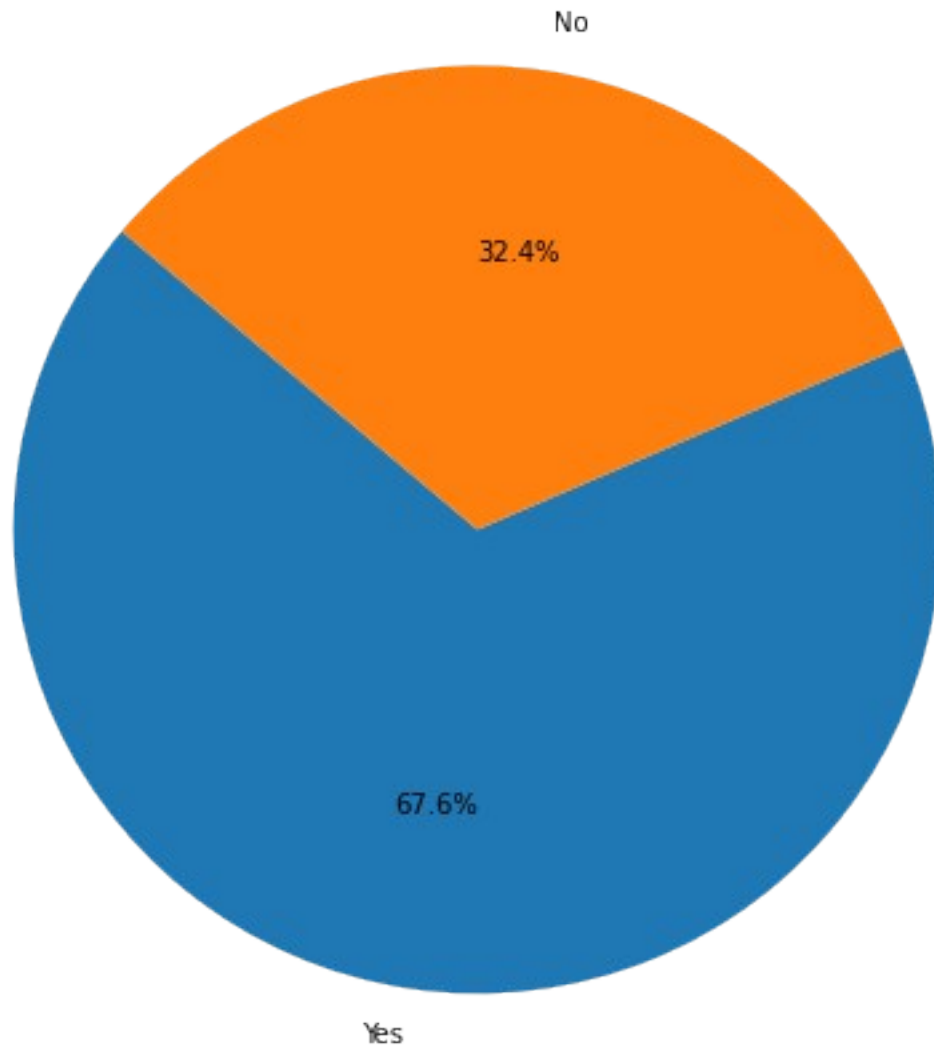
Creating visualizations to illustrate the influence of being an employed on purchasing behavior

```
employedData= data[data['Current'] == 'Employed']
employedData
```

```
                      Timestamp  Gender           Age   Current  \
2    2019/10/01 12:38:56 PM GMT+8    Male  From 20 to 29  Employed
7    2019/10/01 12:40:58 PM GMT+8    Male  From 20 to 29  Employed
9    2019/10/01 12:43:36 PM GMT+8    Male  From 20 to 29  Employed
15   2019/10/01 12:57:31 PM GMT+8  Female  From 20 to 29  Employed
16   2019/10/01 12:59:11 PM GMT+8    Male  From 30 to 39  Employed
17    2019/10/01 1:08:15 PM GMT+8    Male  From 20 to 29  Employed
18    2019/10/01 1:09:12 PM GMT+8    Male  From 20 to 29  Employed
```

20	2019/10/01 1:13:45 PM GMT+8	Male	From 30 to 39	Employed
21	2019/10/01 1:14:43 PM GMT+8	Female	From 20 to 29	Employed
22	2019/10/01 1:21:50 PM GMT+8	Male	From 20 to 29	Employed
25	2019/10/01 1:25:56 PM GMT+8	Male	From 30 to 39	Employed
26	2019/10/01 1:29:11 PM GMT+8	Male	From 30 to 39	Employed
29	2019/10/01 1:37:27 PM GMT+8	Female	From 20 to 29	Employed
30	2019/10/01 1:39:16 PM GMT+8	Female	From 20 to 29	Employed
31	2019/10/01 1:40:23 PM GMT+8	Female	From 20 to 29	Employed
32	2019/10/01 1:45:12 PM GMT+8	Female	From 30 to 39	Employed
33	2019/10/01 1:45:43 PM GMT+8	Female	From 20 to 29	Employed
34	2019/10/01 1:51:47 PM GMT+8	Female	From 20 to 29	Employed
38	2019/10/01 1:57:01 PM GMT+8	Male	From 20 to 29	Employed
39	2019/10/01 2:00:32 PM GMT+8	Male	From 30 to 39	Employed
41	2019/10/01 2:06:24 PM GMT+8	Male	From 20 to 29	Employed
42	2019/10/01 2:27:41 PM GMT+8	Female	From 20 to 29	Employed
43	2019/10/01 2:35:40 PM GMT+8	Female	From 20 to 29	Employed
48	2019/10/01 2:45:52 PM GMT+8	Female	From 20 to 29	Employed
50	2019/10/01 3:12:11 PM GMT+8	Male	40 and above	Employed
54	2019/10/01 3:57:29 PM GMT+8	Female	From 20 to 29	Employed
55	2019/10/01 4:02:35 PM GMT+8	Female	From 20 to 29	Employed
56	2019/10/01 4:03:17 PM GMT+8	Female	From 20 to 29	Employed
61	2019/10/02 12:13:06 AM GMT+8	Female	From 20 to 29	Employed
63	2019/10/02 7:14:30 PM GMT+8	Male	From 20 to 29	Employed
64	2019/10/02 7:15:13 PM GMT+8	Female	From 20 to 29	Employed
68	2019/10/02 7:29:53 PM GMT+8	Female	From 20 to 29	Employed
69	2019/10/02 7:31:32 PM GMT+8	Female	From 20 to 29	Employed
70	2019/10/02 7:33:51 PM GMT+8	Female	From 20 to 29	Employed
71	2019/10/02 8:04:41 PM GMT+8	Male	From 20 to 29	Employed
72	2019/10/02 8:08:37 PM GMT+8	Female	From 20 to 29	Employed
73	2019/10/02 8:29:35 PM GMT+8	Male	From 30 to 39	Employed
75	2019/10/02 8:35:08 PM GMT+8	Male	From 20 to 29	Employed
76	2019/10/02 8:52:13 PM GMT+8	Male	From 20 to 29	Employed
77	2019/10/02 9:19:50 PM GMT+8	Male	From 20 to 29	Employed
80	2019/10/03 8:46:25 AM GMT+8	Female	From 20 to 29	Employed
84	2019/10/03 11:15:13 AM GMT+8	Male	From 20 to 29	Employed
87	2019/10/03 11:22:03 AM GMT+8	Female	From 20 to 29	Employed
88	2019/10/03 11:25:13 AM GMT+8	Female	From 20 to 29	Employed
90	2019/10/03 12:12:22 PM GMT+8	Female	From 30 to 39	Employed
91	2019/10/03 12:13:56 PM GMT+8	Female	From 30 to 39	Employed
93	2019/10/03 2:13:11 PM GMT+8	Female	From 20 to 29	Employed
94	2019/10/03 2:34:09 PM GMT+8	Male	From 20 to 29	Employed
95	2019/10/03 3:11:13 PM GMT+8	Female	From 20 to 29	Employed
97	2019/10/03 4:25:38 PM GMT+8	Female	From 30 to 39	Employed
98	2019/10/03 4:41:10 PM GMT+8	Female	From 20 to 29	Employed
99	2019/10/03 5:19:31 PM GMT+8	Male	From 30 to 39	Employed
103	2019/10/03 6:41:20 PM GMT+8	Male	From 30 to 39	Employed
105	2019/10/03 6:45:28 PM GMT+8	Male	40 and above	Employed
111	2019/10/03 7:47:00 PM GMT+8	Female	From 20 to 29	Employed
118	2019/10/04 9:30:09 AM GMT+8	Male	From 20 to 29	Employed

```
120    2019/10/05 11:01:14 AM GMT+8   Female   From 20 to 29   Employed
121     2019/10/05 4:57:22 PM GMT+8     Male   From 20 to 29   Employed

                        Income     Visits          Enjoyment  \
2         Less than RM25,000   Monthly           Dine in
7        RM50,000 - RM100,000   Rarely           Dine in
9         Less than RM25,000   Monthly          Take away
15        Less than RM25,000    Rarely          Take away
16       RM50,000 - RM100,000   Monthly         Drive-thru
17        Less than RM25,000    Rarely           Dine in
18        RM25,000 - RM50,000   Weekly          Take away
20       RM100,000 - RM150,000   Rarely          Take away
21        Less than RM25,000    Rarely           Dine in
22        RM25,000 - RM50,000   Rarely           Dine in
25        More than RM150,000   Monthly          Dine in
26        More than RM150,000    Rarely         Drive-thru
29       RM50,000 - RM100,000    Rarely           Dine in
30        RM25,000 - RM50,000   Monthly         Take away
31       RM50,000 - RM100,000   Weekly          Drive-thru
32        RM25,000 - RM50,000   Rarely          Take away
33        RM25,000 - RM50,000   Rarely           Dine in
34        RM25,000 - RM50,000   Rarely          Take away
38        Less than RM25,000    Rarely          Take away
39       RM50,000 - RM100,000   Rarely          Take away
41        Less than RM25,000   Monthly           Dine in
42        RM25,000 - RM50,000   Weekly           Dine in
43        Less than RM25,000   Monthly          Take away
48        RM25,000 - RM50,000   Rarely          Take away
50       RM100,000 - RM150,000   Rarely           Dine in
54        RM25,000 - RM50,000   Rarely          Take away
55        RM25,000 - RM50,000   Monthly         Take away
56        Less than RM25,000    Rarely          Drive-thru
61        Less than RM25,000    Rarely          Drive-thru
63        Less than RM25,000    Rarely          Take away
64        Less than RM25,000    Rarely          Take away
68        Less than RM25,000    Rarely           Dine in
69        RM25,000 - RM50,000   Rarely           Dine in
70        Less than RM25,000    Rarely          Take away
71        RM25,000 - RM50,000   Weekly          Take away
72        Less than RM25,000   Monthly          Take away
73        Less than RM25,000    Rarely          Take away
75        RM25,000 - RM50,000   Rarely          Take away
76        Less than RM25,000    Rarely          Take away
77       RM50,000 - RM100,000   Monthly          Dine in
80       RM50,000 - RM100,000   Monthly         Drive-thru
84        RM25,000 - RM50,000   Rarely           Dine in
87        Less than RM25,000    Rarely           Dine in
88        RM25,000 - RM50,000   Rarely          Take away
90       RM50,000 - RM100,000   Weekly           Dine in
```

```
91    RM25,000 - RM50,000   Monthly                Take away
93      Less than RM25,000   Rarely                Take away
94   RM50,000 - RM100,000   Monthly                Take away
95    RM25,000 - RM50,000   Rarely                  Dine in
97      Less than RM25,000   Rarely   I dont like coffee
98    RM25,000 - RM50,000   Rarely               Drive-thru
99      Less than RM25,000   Rarely               Drive-thru
103   RM25,000 - RM50,000   Weekly                  Dine in
105  RM50,000 - RM100,000   Monthly               Drive-thru
111     Less than RM25,000   Monthly                Take away
118     Less than RM25,000   Monthly                  Dine in
120     Less than RM25,000   Rarely                Take away
121  RM50,000 - RM100,000   Rarely                  Dine in

                           Duration            Distance
MembershipCard   ...  \
2     Between 30 minutes to 1 hour   more than 3km                  Yes  ...

7     Between 30 minutes to 1 hour   more than 3km                  Yes  ...

9                Below 30 minutes   more than 3km                   No  ...

15    Between 30 minutes to 1 hour   more than 3km                  Yes  ...

16               Below 30 minutes      within 1km                  Yes  ...

17               Below 30 minutes      within 1km                  Yes  ...

18               Below 30 minutes       1km - 3km                  Yes  ...

20               Below 30 minutes      within 1km                  Yes  ...

21               Below 30 minutes      within 1km                   No  ...

22               More than 3 hours      within 1km                   No  ...

25    Between 30 minutes to 1 hour       1km - 3km                  Yes  ...

26               Below 30 minutes       1km - 3km                   No  ...

29    Between 30 minutes to 1 hour       1km - 3km                  Yes  ...

30    Between 30 minutes to 1 hour   more than 3km                  Yes  ...

31               Below 30 minutes      within 1km                  Yes  ...

32               Below 30 minutes   more than 3km                   No  ...

33    Between 30 minutes to 1 hour       1km - 3km                  Yes  ...

34               Below 30 minutes      within 1km                   No  ...
```

38	Below 30 minutes	more than 3km	Yes	...
39	Below 30 minutes	within 1km	Yes	...
41	Between 30 minutes to 1 hour	within 1km	Yes	...
42	Between 30 minutes to 1 hour	within 1km	Yes	...
43	Below 30 minutes	more than 3km	No	...
48	Below 30 minutes	within 1km	No	...
50	Below 30 minutes	more than 3km	Yes	...
54	Between 30 minutes to 1 hour	within 1km	Yes	...
55	Between 30 minutes to 1 hour	1km - 3km	Yes	...
56	Below 30 minutes	1km - 3km	No	...
61	Below 30 minutes	1km - 3km	No	...
63	Between 30 minutes to 1 hour	within 1km	Yes	...
64	Below 30 minutes	more than 3km	No	...
68	Below 30 minutes	more than 3km	No	...
69	Between 30 minutes to 1 hour	1km - 3km	Yes	...
70	Below 30 minutes	within 1km	No	...
71	Between 1 hour to 2 hours	within 1km	Yes	...
72	Below 30 minutes	more than 3km	Yes	...
73	Below 30 minutes	1km - 3km	Yes	...
75	Below 30 minutes	more than 3km	Yes	...
76	Below 30 minutes	1km - 3km	No	...
77	Between 30 minutes to 1 hour	more than 3km	Yes	...
80	More than 3 hours	1km - 3km	Yes	...
84	Between 1 hour to 2 hours	more than 3km	No	...
87	Below 30 minutes	1km - 3km	Yes	...
88	Below 30 minutes	within 1km	Yes	...

90	Between 1 hour to 2 hours	more than 3km	Yes	...
91	Between 30 minutes to 1 hour	within 1km	Yes	...
93	Below 30 minutes	more than 3km	Yes	...
94	Below 30 minutes	more than 3km	Yes	...
95	Between 30 minutes to 1 hour	1km - 3km	Yes	...
97	Below 30 minutes	within 1km	No	...
98	Below 30 minutes	1km - 3km	Yes	...
99	Between 30 minutes to 1 hour	more than 3km	Yes	...
103	Between 1 hour to 2 hours	more than 3km	No	...
105	Between 30 minutes to 1 hour	more than 3km	No	...
111	Below 30 minutes	more than 3km	No	...
118	Between 1 hour to 2 hours	1km - 3km	Yes	...
120	Below 30 minutes	within 1km	No	...
121	Between 30 minutes to 1 hour	1km - 3km	No	...

	SpendingLimit	Quality	PriceRange	PromotionImportance	Ambiance
2	Less than RM20	4	3	4	4
7	Less than RM20	4	2	3	3
9	Around RM20 - RM40	4	3	3	4
15	Less than RM20	4	1	5	4
16	Around RM20 - RM40	4	3	3	4
17	Less than RM20	4	4	4	4
18	Around RM20 - RM40	4	3	4	5
20	Around RM20 - RM40	2	2	5	3
21	Around RM20 - RM40	5	3	4	3
22	Less than RM20	5	2	5	

					5
25	Around RM20 - RM40	4	3	1	4
26	Less than RM20	4	2	4	4
29	Less than RM20	5	5	5	5
30	Around RM20 - RM40	3	1	4	4
31	Around RM20 - RM40	4	3	3	3
32	Around RM20 - RM40	2	3	5	5
33	Less than RM20	3	2	3	3
34	Less than RM20	3	4	4	3
38	Around RM20 - RM40	4	4	4	4
39	Less than RM20	3	2	5	3
41	Around RM20 - RM40	5	4	5	5
42	Around RM20 - RM40	5	4	5	5
43	Around RM20 - RM40	4	4	5	4
48	Less than RM20	3	4	5	4
50	Around RM20 - RM40	4	4	4	4
54	Around RM20 - RM40	4	3	5	4
55	Less than RM20	4	3	4	3
56	Around RM20 - RM40	5	4	3	4
61	Around RM20 - RM40	5	4	3	4
63	Less than RM20	4	2	3	5
64	Zero	3	1	5	3
68	Zero	2	1	5	4
69	Less than RM20	3	3	5	4
70	Less than RM20	4	3	4	5

71	Around RM20 - RM40	5	1	3	3
72	Less than RM20	4	2	4	4
73	Less than RM20	3	2	4	4
75	Less than RM20	3	3	4	5
76	Less than RM20	4	2	5	3
77	Around RM20 - RM40	4	2	1	4
80	Around RM20 - RM40	3	2	4	3
84	Around RM20 - RM40	4	2	4	3
87	Around RM20 - RM40	3	3	3	4
88	Around RM20 - RM40	4	4	4	4
90	Around RM20 - RM40	4	4	5	4
91	Around RM20 - RM40	4	3	4	5
93	Less than RM20	5	3	5	5
94	Around RM20 - RM40	3	1	3	3
95	Less than RM20	3	3	5	4
97	Around RM20 - RM40	3	3	3	3
98	Around RM20 - RM40	4	3	4	3
99	Less than RM20	4	2	3	4
103	More than RM40	4	5	5	4
105	Around RM20 - RM40	4	3	5	4
111	Less than RM20	5	4	4	4
118	More than RM40	5	5	5	5
120	Less than RM20	4	4	4	4
121	Less than RM20	1	1	5	4

	WifiQuality	Service	BussinessMeetings	\
2	4	4	3	
7	3	3	3	
9	3	3	4	
15	3	4	4	
16	3	3	3	
17	4	4	4	
18	5	5	5	
20	3	4	3	
21	3	4	5	
22	2	4	3	
25	4	5	4	
26	4	4	2	
29	3	5	5	
30	3	4	4	
31	2	3	4	
32	3	5	5	
33	3	4	3	
34	4	4	3	
38	4	4	4	
39	3	5	3	
41	3	5	5	
42	1	4	4	
43	4	5	5	
48	3	4	2	
50	2	3	4	
54	4	5	5	
55	2	3	4	
56	3	3	3	
61	3	3	3	
63	4	4	5	
64	4	4	5	
68	4	4	1	
69	3	3	4	
70	5	5	3	
71	2	3	3	
72	3	4	3	
73	4	5	4	
75	4	4	4	
76	2	4	4	
77	1	4	4	
80	1	3	3	
84	4	4	4	
87	3	3	3	
88	4	4	4	
90	4	5	4	
91	5	4	5	
93	4	4	1	
94	1	3	2	

95	3	3	4
97	3	3	3
98	3	4	4
99	4	4	4
103	4	3	3
105	4	4	4
111	4	4	4
118	5	5	5
120	4	4	4
121	3	3	2

	Advertiser	ContinueBuying
2	In Store displays;Billboards	Yes
7	Starbucks Website/Apps;Social Media;Emails;Thr...	Yes
9	Social Media;Through friends and word of mouth	Yes
15	Starbucks Website/Apps	No
16	Social Media	Yes
17	Social Media;Through friends and word of mouth	Yes
18	Starbucks Website/Apps;Social Media;Emails;Thr...	Yes
20	Social Media;Emails	No
21	Social Media	Yes
22	Through friends and word of mouth	No
25	Social Media;In Store displays;Billboards	Yes
26	Application offer	No
29	Starbucks Website/Apps;Social Media;Emails;Thr...	Yes
30	Starbucks Website/Apps;Social Media;Emails;Thr...	Yes
31	In Store displays	Yes
32	Social Media	Yes
33	Social Media	No
34	Social Media;Through friends and word of mouth...	Yes
38	In Store displays	Yes

39	Starbucks Website/Apps;Social Media	Yes
41	Starbucks Website/Apps;Social Media	Yes
42	Social Media	Yes
43	Starbucks Website/Apps;Social Media;Emails;Bil...	Yes
48	Social Media;Through friends and word of mouth	Yes
50	Social Media;In Store displays	Yes
54	Social Media;Through friends and word of mouth	Yes
55	Starbucks Website/Apps	Yes
56	In Store displays	Yes
61	In Store displays	Yes
63	Social Media;Through friends and word of mouth	Yes
64	Social Media	No
68	Starbucks Website/Apps;Social Media;Through fr...	No
69	Social Media;Through friends and word of mouth...	Yes
70	Social Media;Through friends and word of mouth	Yes
71	Starbucks Website/Apps;Deal sites (fave, ipric...	Yes
72	Through friends and word of mouth	Yes
73	Starbucks Website/Apps;Social Media	Yes
75	Social Media;Deal sites (fave, iprice, etc...)...	Yes
76	Social Media;Emails;Through friends and word o...	Yes
77	Social Media	Yes
80	Starbucks Website/Apps	No
84	In Store displays	No
87	Social Media;Through friends and word of mouth	Yes
88	Starbucks Website/Apps;Social Media;Through fr...	Yes
90	Emails	Yes

91	Starbucks Website/Apps;Social Media;Emails;Thr...	Yes
93	Social Media;In Store displays	Yes
94	Social Media;Through friends and word of mouth	Yes
95	Social Media;Through friends and word of mouth...	Yes
97	Social Media	Yes
98	Starbucks Website/Apps;Emails	Yes
99	Social Media	Yes
103	Starbucks Website/Apps;Social Media;Through fr...	Yes
105	Starbucks Website/Apps	Yes
111	Social Media;Through friends and word of mouth...	Yes
118	Starbucks Website/Apps;Social Media;Emails;Dea...	Yes
120	Social Media;Through friends and word of mouth...	Yes
121	In Store displays	No

```
[58 rows x 21 columns]
```

```python
employedData_Continuecounts =
employedData['ContinueBuying'].value_counts()
employedData_Continuecounts
```
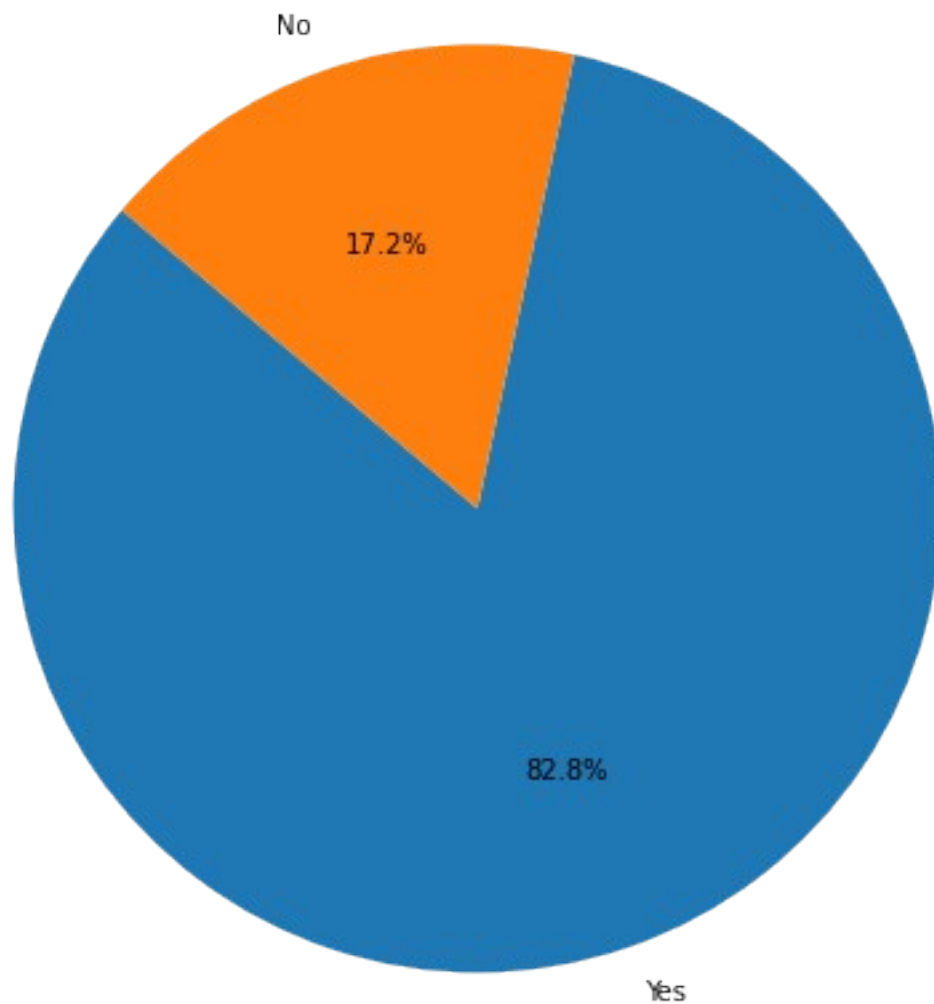
```
ContinueBuying
Yes    48
No     10
Name: count, dtype: int64
```

```python
plt.figure(figsize=(8, 8))
plt.pie(employedData_Continuecounts,
labels=employedData_Continuecounts.index, autopct='%1.1f%%',
startangle=140)
plt.title('Percentage of the employed group in continue Buying')
plt.show()
```

Percentage of the employed group in continue Buying

Creating visualizations to illustrate the influence of being a self-employed on purchasing behavior

```
selfempData= data[data['Current'] == 'Self-employed']
selfempData

                     Timestamp  Gender              Age
Current  \
19    2019/10/01 1:13:03 PM GMT+8  Female  From 20 to 29  Self-
employed
24    2019/10/01 1:24:21 PM GMT+8    Male    40 and above  Self-
employed
27    2019/10/01 1:33:54 PM GMT+8    Male  From 20 to 29  Self-
```

```
employed
28      2019/10/01 1:34:30 PM GMT+8      Male    40 and above  Self-
employed
36      2019/10/01 1:53:05 PM GMT+8  Female   From 20 to 29   Self-
employed
47      2019/10/01 2:42:02 PM GMT+8  Female   From 20 to 29   Self-
employed
66      2019/10/02 7:23:55 PM GMT+8  Female   From 20 to 29   Self-
employed
82    2019/10/03 11:14:37 AM GMT+8      Male   From 20 to 29   Self-
employed
83    2019/10/03 11:14:44 AM GMT+8      Male   From 30 to 39   Self-
employed
85    2019/10/03 11:17:27 AM GMT+8      Male   From 30 to 39   Self-
employed
86    2019/10/03 11:18:48 AM GMT+8      Male   From 20 to 29   Self-
employed
89    2019/10/03 11:32:03 AM GMT+8      Male   From 20 to 29   Self-
employed
96      2019/10/03 3:44:13 PM GMT+8  Female   From 20 to 29   Self-
employed
102    2019/10/03 6:35:21 PM GMT+8      Male   From 20 to 29   Self-
employed
114    2019/10/03 9:25:36 PM GMT+8      Male    40 and above  Self-
employed
117  2019/10/04 12:24:26 AM GMT+8      Male    40 and above  Self-
employed

                       Income    Visits    Enjoyment
Duration  \
19     RM50,000 - RM100,000    Rarely   Take away                Below 30
minutes
24    RM100,000 - RM150,000    Rarely     Dine in     Between 1 hour to
2 hours
27      Less than RM25,000   Monthly    Take away                Below 30
minutes
28     More than RM150,000    Weekly   Drive-thru                Below 30
minutes
36      Less than RM25,000    Rarely   Take away                Below 30
minutes
47      Less than RM25,000    Rarely   Take away   Between 30 minutes to
1 hour
66      RM25,000 - RM50,000   Monthly     Dine in                Below 30
minutes
82     RM50,000 - RM100,000    Rarely     Dine in     Between 1 hour to
2 hours
83     RM50,000 - RM100,000    Weekly   Take away   Between 30 minutes to
1 hour
85      More than RM150,000   Monthly     Dine in     Between 2 hours to
```

```
3 hours
86      More than RM150,000    Rarely  Drive-thru  Between 30 minutes to
1 hour
89      RM25,000 - RM50,000    Rarely    Dine in             Below 30
minutes
96       Less than RM25,000    Rarely   Take away            Below 30
minutes
102   RM50,000 - RM100,000    Daily  Drive-thru             Below 30
minutes
114     RM25,000 - RM50,000    Rarely     Dine in  Between 30 minutes to
1 hour
117     RM25,000 - RM50,000   Monthly     Dine in     Between 1 hour to
2 hours

          Distance MembershipCard  ...      SpendingLimit Quality  \
19       1km - 3km           Yes  ...     Less than RM20      3
24   more than 3km            No  ...  Around RM20 - RM40      4
27   more than 3km            No  ...  Around RM20 - RM40      5
28       1km - 3km           Yes  ...      More than RM40      4
36      within 1km            No  ...     Less than RM20      3
47   more than 3km            No  ...               Zero      3
66      within 1km           Yes  ...  Around RM20 - RM40      4
82   more than 3km           Yes  ...     Less than RM20      5
83       1km - 3km           Yes  ...     Less than RM20      4
85   more than 3km           Yes  ...  Around RM20 - RM40      4
86   more than 3km           Yes  ...      More than RM40      4
89       1km - 3km           Yes  ...               Zero      5
96   more than 3km            No  ...     Less than RM20      3
102  more than 3km           Yes  ...  Around RM20 - RM40      4
114  more than 3km            No  ...     Less than RM20      2
117      1km - 3km           Yes  ...  Around RM20 - RM40      3

     PriceRange  PromotionImportance  Ambiance  WifiQuality
Service  \
19           4                    3         4            3         4

24           3                    4         4            3         3

27           3                    4         4            3         4

28           5                    3         3            3         4

36           3                    4         4            5         5

47           1                    5         4            3         3

66           3                    4         5            4         4

82           5                    5         5            5         5
```

83	4	2	4	3	4
85	3	4	4	3	4
86	3	2	3	1	2
89	5	5	5	4	5
96	3	1	4	3	4
102	2	4	4	3	3
114	2	1	2	2	3
117	3	5	3	2	4

```
         BussinessMeetings  \
Advertiser
19                       2
Emails
24                       5   Through friends and word of mouth;In Store
dis...
27                       3                                     Social
Media
28                       5   Starbucks Website/Apps;Social Media;Through
fr...
36                       2                                     Social
Media
47                       2   Social Media;Emails;Deal sites (fave,
iprice, ...
66                       4   Starbucks Website/Apps;Social
Media;Emails;Thr...
82                       5                           Starbucks
Website/Apps
83                       5                                     Social
Media
85                       4                    Starbucks
Website/Apps;Emails
86                       2    Social Media;Through friends and word of
mouth
89                       5                           Starbucks
Website/Apps
96                       4    Social Media;Through friends and word of
mouth
102                      3                             Social
Media;Emails
114                      2                                   In Store
displays
117                      4               Starbucks Website/Apps;Social
```

```
Media

     ContinueBuying
19               Yes
24               Yes
27               Yes
28               Yes
36               Yes
47               Yes
66               Yes
82               Yes
83               Yes
85               Yes
86               Yes
89               Yes
96               Yes
102              Yes
114               No
117              Yes

[16 rows x 21 columns]

selfempData_Continuecounts =
selfempData['ContinueBuying'].value_counts()
selfempData_Continuecounts

ContinueBuying
Yes    15
No      1
Name: count, dtype: int64

plt.figure(figsize=(8, 8))
plt.pie(selfempData_Continuecounts,
labels=selfempData_Continuecounts.index, autopct='%1.1f%%',
startangle=140)
plt.title('Percentage of the Self-employed group in continue Buying')
plt.show()
```
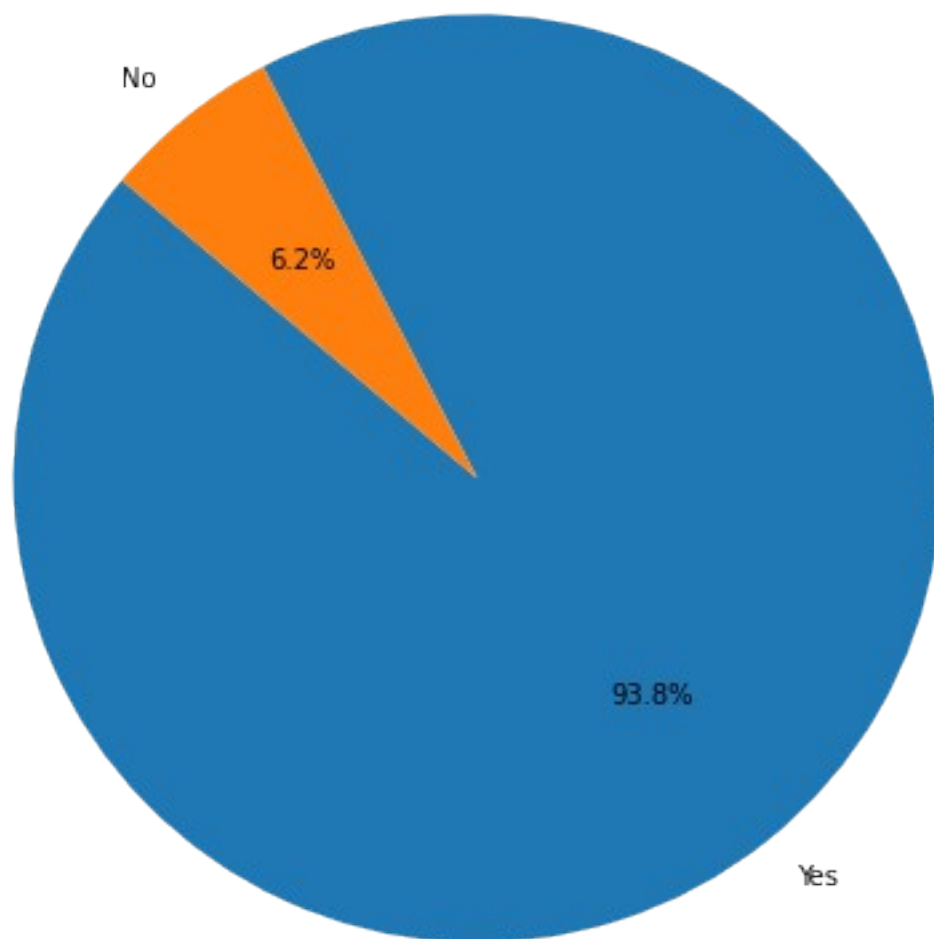
## Percentage of the Self-employed group in continue Buying

Creating visualizations to illustrate the influence of income on purchasing behavior

```
data_of_no_continue_Incomecounts=data_of_no_continue['Income'].value_c
ounts()
data_of_no_continue_Incomecounts

Income
Less than RM25,000      15
RM25,000 - RM50,000       4
RM50,000 - RM100,000      2
RM100,000 - RM150,000     1
More than RM150,000       1
Name: count, dtype: int64
```

```
plt.figure(figsize=(8, 8))
plt.pie(data_of_no_continue_Incomecounts,
labels=data_of_no_continue_Incomecounts.index, autopct='%1.1f%%',
startangle=140)
plt.title('Percentage of the income group for people not continue
Buying')
plt.show()
```

Percentage of the income group for people not continue Buying
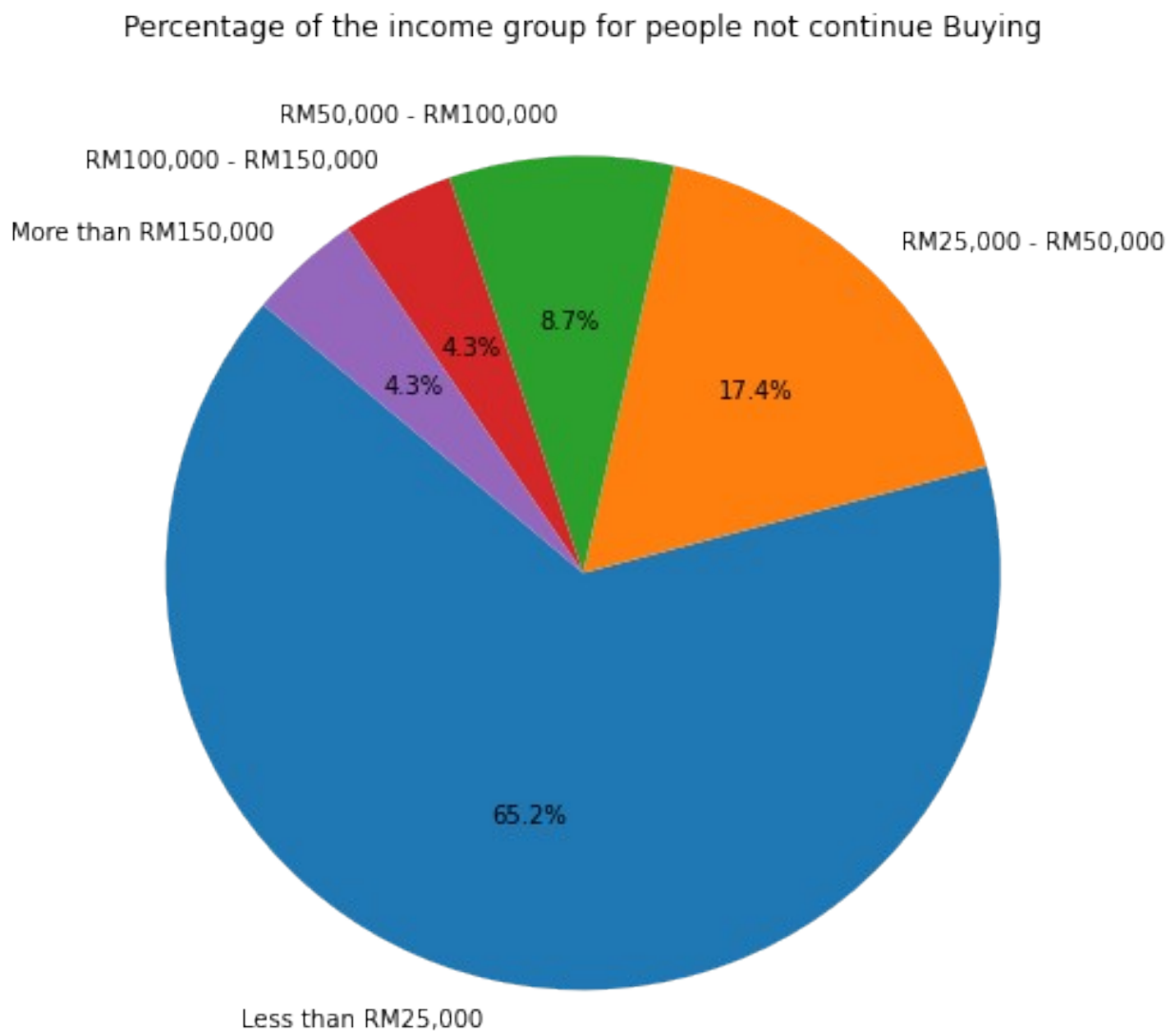

```
LowmidincomeData = data[(data['Income'] == 'RM25,000 - RM50,000') |
(data['Income'] == 'Less than RM25,000')]
LowmidincomeData
```

```
                            Timestamp  Gender                Age
Current  \
```

```
0      2019/10/01 12:38:43 PM GMT+8   Female   From 20 to 29
Student
1      2019/10/01 12:38:54 PM GMT+8   Female   From 20 to 29
Student
2      2019/10/01 12:38:56 PM GMT+8     Male   From 20 to 29
Employed
3      2019/10/01 12:39:08 PM GMT+8   Female   From 20 to 29
Student
4      2019/10/01 12:39:20 PM GMT+8     Male   From 20 to 29
Student
..                              ...     ...            ...           ..
.
116  2019/10/03 11:24:55 PM GMT+8     Male   From 30 to 39
Student
117  2019/10/04 12:24:26 AM GMT+8     Male    40 and above   Self-
employed
118   2019/10/04 9:30:09 AM GMT+8     Male   From 20 to 29
Employed
119   2019/10/04 1:46:07 PM GMT+8     Male   From 20 to 29
Student
120  2019/10/05 11:01:14 AM GMT+8   Female   From 20 to 29
Employed

                      Income    Visits   Enjoyment
Duration  \
0     Less than RM25,000    Rarely    Dine in   Between 30 minutes to 1
hour
1     Less than RM25,000    Rarely   Take away                Below 30
minutes
2     Less than RM25,000   Monthly    Dine in   Between 30 minutes to 1
hour
3     Less than RM25,000    Rarely   Take away                Below 30
minutes
4     Less than RM25,000   Monthly   Take away   Between 30 minutes to 1
hour
..                     ...       ...        ...
...
116   Less than RM25,000   Monthly    Dine in     Between 1 hour to 2
hours
117  RM25,000 - RM50,000   Monthly    Dine in     Between 1 hour to 2
hours
118   Less than RM25,000   Monthly    Dine in     Between 1 hour to 2
hours
119   Less than RM25,000    Rarely    Dine in   Between 30 minutes to 1
hour
120   Less than RM25,000    Rarely   Take away                Below 30
minutes

             Distance MembershipCard   ...      SpendingLimit Quality  \
```

```
0       within 1km              Yes  ...      Less than RM20      4
1        1km - 3km              Yes  ...      Less than RM20      4
2     more than 3km             Yes  ...      Less than RM20      4
3     more than 3km              No  ...      Less than RM20      2
4        1km - 3km               No  ...  Around RM20 - RM40      3
..            ...               ...  ...                 ...    ...
116   more than 3km              No  ...      Less than RM20      4
117      1km - 3km              Yes  ...  Around RM20 - RM40      3
118      1km - 3km              Yes  ...      More than RM40      5
119      1km - 3km               No  ...      Less than RM20      3
120      within 1km              No  ...      Less than RM20      4
```

```
     PriceRange  PromotionImportance  Ambiance  WifiQuality
Service  \
0             3                    5         5            4         4

1             3                    4         4            4         5

2             3                    4         4            4         4

3             1                    4         3            3         3

4             3                    4         2            2         3

..          ...                  ...       ...          ...       ...

116           4                    5         4            2         3

117           3                    5         3            2         4

118           5                    5         5            5         5

119           2                    4         3            3         3

120           4                    4         4            4         4
```

```
     BussinessMeetings
Advertiser  \
0                    3  Starbucks Website/Apps;Social
Media;Emails;Dea...
1                    2                 Social Media;In Store
displays
2                    3                              In Store
displays;Billboards
3                    3             Through friends and word of
mouth
4                    3             Starbucks Website/Apps;Social
Media
..                 ...
```

```
...
116                      4                                          Social
Media
117                      4                  Starbucks Website/Apps;Social
Media
118                      5  Starbucks Website/Apps;Social
Media;Emails;Dea...
119                      4  Social Media;Through friends and word of
mouth...
120                      4  Social Media;Through friends and word of
mouth...

    ContinueBuying
0              Yes
1              Yes
2              Yes
3               No
4              Yes
..             ...
116            Yes
117            Yes
118            Yes
119             No
120            Yes

[88 rows x 21 columns]

LowmidincomeData_Continuecounts =
LowmidincomeData['ContinueBuying'].value_counts()
LowmidincomeData_Continuecounts

ContinueBuying
Yes    69
No     19
Name: count, dtype: int64

plt.figure(figsize=(8, 8))
plt.pie(LowmidincomeData_Continuecounts,
labels=LowmidincomeData_Continuecounts.index, autopct='%1.1f%%',
startangle=140)
plt.title('Percentage of the low-middle income group for people not
continue Buying')
plt.show()
```

Percentage of the low-middle income group for people not continue Buying

No

21.6%

78.4%

Yes