

NON-PARAMETRIC TESTS

Under prof. Mokeshrayalu G.

DIGITAL ASSIGNMENT 1

Team:

Chandreyi Chowdhury 19MIY0031

Joel Johnson 19MIY0033

CHOSEN TOPIC:

A study on checking consumer purchasing habits and brand loyalty of customers through the use of non – parametric tests.

ABSTRACT:

The purpose of this study is to investigate consumer purchasing habits and brand loyalty. Through a survey questionnaire, the research aims to understand how factors such as brand name, pricing, customer service, and online reviews influence purchasing decisions. Additionally, the study will explore the role of loyalty programs, social media recommendations, and environmental and ethical considerations in shaping consumer behaviour. The findings of this research will provide valuable insight for businesses looking to understand and appeal to their target market, as well as for policymakers seeking to promote sustainable consumption.

QUESTIONNAIRE:

Q1. Name.

Q2. E-mail.

Q3. Age.

Q4. Gender.

- *Male*
- *Female*
- *Prefer not to say*

Q5. What is your current occupation?

- *Student*
- *Professor/ Teacher*
- *IT Professional*
- *Engineer*
- *Doctor*
- *Businessman*

- *Banker/ Financer*
- *Others*

Q6. Choose your salary range.

- *< 5 lakhs yearly*
- *5-10 lakhs yearly*
- *10-15 lakhs yearly*
- *15-20 lakhs yearly*
- *> 20 lakhs yearly*

Q7. How often do you make purchases online?

- *Almost never*
- *Occasionally*
- *Frequently*
- *Almost always*

Q8. How important is the brand name to you when making a purchase?

- *Not important at all*
- *Somewhat important*
- *Very important*
- *Extremely important*

Q9. How do you typically research products before making a purchase?

- *Ask friends and family for recommendations*
- *Read online reviews*
- *Look at advertisements*
- *Visit the store and inspect the product*

Q10. How likely are you to switch brands if a better deal or promotion is offered?

- *Not likely at all*
- *Somewhat likely*
- *Very likely*
- *Extremely likely*

Q11. How often do you take advantage of loyalty programs or rewards?

- *Almost never*
- *Occasionally*
- *Frequently*
- *Almost always*

Q12. How much influence do social media recommendations have on your purchasing decisions?

- *No influence at all*
- *Some influence*
- *A lot of influence*
- *Almost all influence*

Q13. How do you feel about purchasing products that are environmentally friendly?

- *Unimportant*
- *Somewhat important*
- *Very important*
- *Extremely important*

Q14. How much importance do you place on the packaging design when making a purchase?

- *Not important at all*
- *Somewhat important*
- *Very important*
- *Extremely important*

Q15. How much weight do you give to the reputation of the company when purchasing a product?

- *Not important at all*
- *Somewhat important*
- *Very important*
- *Extremely important*

Q16. How often do you buy products on sale or clearance?

- *Almost never*
- *Occasionally*
- *Frequently*
- *Almost always*

Q17. How much do you consider price when making a purchase?

- *Not at all*
- *Somewhat*
- *A lot*
- *Extremely*

Q18. How do you feel about purchasing products that are made in an ethical and sustainable way?

- *Unimportant*
- *Somewhat important*
- *Very important*
- *Extremely important*

Q19. How much do you consider customer service when deciding to purchase from a brand?

- *Not at all*
- *Somewhat*
- *A lot*
- *Extremely*

Q20. How much do you rely on online customer reviews when making a purchase?

- *Not at all*
- *Somewhat*
- *A lot*

- *Extremely*

Q21. How much do you trust the product recommendations from online influencers?

- *Not at all*
 - *Somewhat*
 - *A lot*
 - *Extremely*
-
-

NON-PARAMETRIC TESTS

Under prof. Mokeshrayalu G.

DIGITAL ASSIGNMENT 2

Team:

Chandreyi Chowdhury 19MIY0031

Joel Johnson 19MIY0033

CHOSEN TOPIC:

A study on checking consumer purchasing habits and brand loyalty of customers through the use of non – parametric tests.

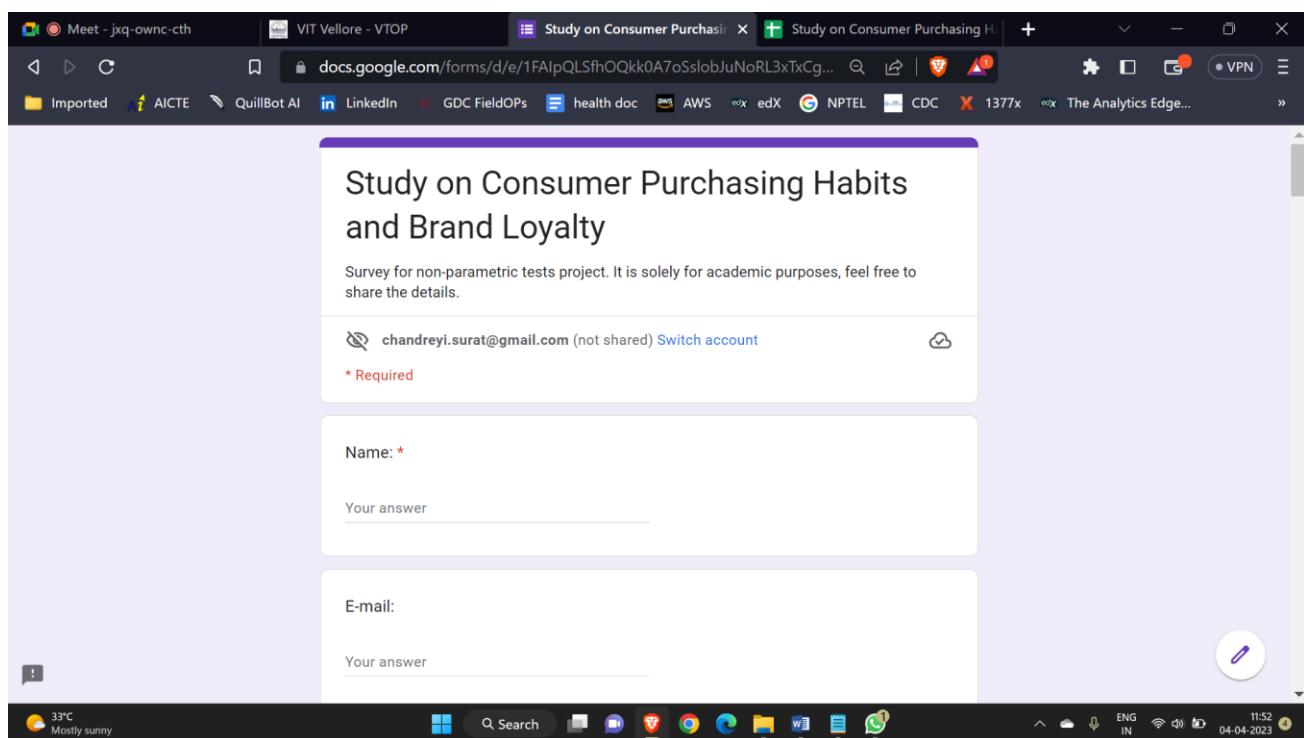
DATA COLLECTION BASED ON QUESTIONAIRRE:

MODE: Google Forms (Online)

LINK: <https://forms.gle/Qjhr7p5Tk1ait1mG8>

RESPONSE SHEET LINK: https://docs.google.com/spreadsheets/d/1GCCRPB-cye3Aqtd4ZRS-DEIAEXXj9qJjHs7U_VdFDrY/edit?usp=drivesdk

NUMBER OF RESPONSES COLLECTED: 161



How much do you trust the product recommendations from online influencers? *

A lot
 Extremely

Not at all
 Somewhat
 A lot
 Extremely

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Google Forms

	A	B	C	D	E	F	G
1	Name:	E-mail:	Age:	Gender:	What is your current occ? Choose your salary rang	How often do you make pur...	
2	3/25/2023 22:44:46 Ann Maria Moncy	annmariamoncy14@gmail.com	21	Female	Student	< 5 lakhs yearly	Occasionally
3	3/25/2023 22:45:32 Meghna	meghnakprasad2001@gmail.com	21	Female	Student	< 5 lakhs yearly	Occasionally
4	3/25/2023 22:47:28 Maria Cheryl biju	cherylbiju1229@gmail.com	21	Female	Student	< 5 lakhs yearly	Occasionally
5	3/25/2023 22:47:32 Sangeeth Promod	sangeethpromodkainikka	21	Male	IT professional	< 5 lakhs yearly	Occasionally
6	3/25/2023 22:47:46 Aravind S	aravindhakidi@gmail.com	21	Male	IT professional	5 - 10 lakhs yearly	Occasionally
7	3/25/2023 22:47:49 Devika Vinod	devikavinod4@gmail.com	21	Female	Student	> 20 lakhs yearly	Occasionally
8	3/25/2023 22:48:03 James Joseph	jbrothers8642@gmail.com	21	Male	Student	< 5 lakhs yearly	Frequently
9	3/25/2023 22:48:25 Reba		22	Female	Student	< 5 lakhs yearly	Frequently
10	3/25/2023 22:49:07 Chrysto George Mathew	chrystomathew25@gmail.com	25	Male	Professor/ Teacher	< 5 lakhs yearly	Occasionally
11	3/25/2023 22:49:50 Karthick		23	Male	Student	< 5 lakhs yearly	Frequently
12	3/25/2023 22:50:44 Ankita	pandaankita1404@gmail.com	23	Female	Student	< 5 lakhs yearly	Frequently
13	3/25/2023 22:52:10 19MIY0029	afrinnisha101@gmail.com	21	Female	Student	< 5 lakhs yearly	Frequently
14	3/25/2023 22:52:47 Justin Thomas	justinthomas071099@gmail.com	23	Male	Student	< 5 lakhs yearly	Occasionally
15	3/25/2023 22:52:48 Pooja	poojagupta220594@gmail.com	28	Female	Others	5 - 10 lakhs yearly	Frequently
16	3/25/2023 22:53:01 Thejas Thomas	thejabhai95@gmail.com	27	Male	Professor/ Teacher	5 - 10 lakhs yearly	Occasionally

Form Responses 1

Study on Consumer Purchasing Habits and Brand Loyalty (Responses)

	Name:	E-mail:	Age:	Gender:	What is your current occ? Choose your salary rangi How often do you make purchases online?
149	3/27/2023 4:27:39 Pothishrayan	Pothishrayan.k2019@vit	20	Male	Student < 5 lakhs yearly Frequently
150	3/27/2023 5:21:49 Sharmilee		28	Female	Banker/ Financer 5 - 10 lakhs yearly Occasionally
151	3/27/2023 11:25:39 Aleena Sera John	aleenaserajohn@gmail.c	21	Female	Student < 5 lakhs yearly Almost always
152	3/27/2023 11:32:11 Mousumi Pan	mousumipan68@gmail.c	54	Female	Others < 5 lakhs yearly Occasionally
153	3/27/2023 12:36:57 Irina Chakraborty	irina1969.1c@gmail.com	53 yrs	Female	Businessman 10 - 15 lakhs yearly Frequently
154	3/27/2023 16:16:52 Lipika Mukherjee Kar	lipikakar2008@gmail.co	41	Female	Others < 5 lakhs yearly Occasionally
155	3/27/2023 17:41:02 Ankita	palankita27@yahoo.in	25	Female	Others < 5 lakhs yearly Occasionally
156	3/27/2023 20:58:26 mahesh	maheswar.nevali@gmail.	21	Male	Student < 5 lakhs yearly Frequently
157	3/27/2023 21:06:25 Aleena	aleena_b190526ec@nitc	22	Female	Student < 5 lakhs yearly Occasionally
158	3/28/2023 6:38:38 Prasanna Venkatesh K	prasannakr18@gmail.co	21	Male	Student 10 - 15 lakhs yearly Almost always
159	3/28/2023 7:40:01 Linu Mariam Abraham	linumariyam967@gmail.c	22	Female	Student < 5 lakhs yearly Almost never
160	3/28/2023 11:54:49 Amal Varghese	amalvarghese456@gmail	21	Male	Others < 5 lakhs yearly Frequently
161	3/29/2023 19:55:10 Joel A Manoj	joelabrahamkurikilottil@	21	Male	Student < 5 lakhs yearly Occasionally
162	3/31/2023 12:41:08 Ann Sara Mathews		25	Female	Engineer 10 - 15 lakhs yearly Occasionally
163					

Form Responses 1

33°C Mostly sunny

Study on Consumer Purchasing Habits and Brand Loyalty (Responses)

	Name:	E-mail:	Age:	Gender:	What is your current occ? Choose your salary rangi How often do you make purchases online?	How important is the bra How do you typical
160	3/28/2023 11:54:49 Amal Varghese	amalvarghese456@gmail	21	Male	Others < 5 lakhs yearly Frequently	Very important Ask friends and fan
161	3/29/2023 19:55:10 Joel A Manoj	joelabrahamkurikilottil@	21	Male	Student < 5 lakhs yearly Occasionally	Somewhat important Read online review
162	3/31/2023 12:41:08 Ann Sara Mathews		25	Female	Engineer 10 - 15 lakhs yearly Occasionally	Somewhat important Visit the store and i
163						

Count of What is your current occupation?

Count of Gender:

Count of Choose your salary range:

Form Responses 1

33°C Mostly sunny

NON-PARAMETRIC TESTS

Under prof. Mokeshrayalu G.

DIGITAL ASSIGNMENT 3

Team:

Chandreyi Chowdhury 19MIY0031

Joel Johnson 19MIY0033

TOPIC:

A study on checking consumer purchasing habits and brand loyalty of customers through the use of non – parametric tests.

CODE FOR DATA MANIPULATION ON EXCEL: (Recorded using excel macros)

```

Sub Macro1()
'
'Macro1 Macro
'

'Columns("A:A").Select
Selection.ClearContents
Columns("B:V").Select
Selection.Cut
ActiveWindow.ScrollColumn = 11
ActiveWindow.ScrollColumn = 10
ActiveWindow.ScrollColumn = 9
ActiveWindow.ScrollColumn = 8
ActiveWindow.ScrollColumn = 6
ActiveWindow.ScrollColumn = 5
ActiveWindow.ScrollColumn = 4
ActiveWindow.ScrollColumn = 3
ActiveWindow.ScrollColumn = 2
ActiveWindow.ScrollColumn = 1
Range("A1").Select
ActiveSheet.Paste
Columns("A:A").Select

Columns("A:A").EntireColumn.AutoFit
Columns("B:B").Select

Columns("B:B").EntireColumn.AutoFit
Columns("C:C").Select

Columns("C:C").EntireColumn.AutoFit
Columns("D:D").Select

Columns("D:D").EntireColumn.AutoFit
Columns("E:E").Select

Columns("E:E").EntireColumn.AutoFit
Range("A1").Select
ActiveCell.FormulaR1C1 = "Name:"
Columns("F:F").Select

Columns("F:F").EntireColumn.AutoFit
Columns("G:G").Select
Columns("G:G").EntireColumn.AutoFit
Columns("H:H").Select

Columns("H:H").EntireColumn.AutoFit
ActiveWindow.ScrollColumn = 2
ActiveWindow.ScrollColumn = 3
ActiveWindow.ScrollColumn = 4
ActiveWindow.ScrollColumn = 5
ActiveWindow.ScrollColumn = 6
ActiveWindow.ScrollColumn = 7
ActiveWindow.ScrollColumn = 8
Columns("I:I").Select

Columns("I:I").EntireColumn.AutoFit
Columns("J:J").Select

Columns("J:J").EntireColumn.AutoFit
Columns("K:K").Select

Columns("K:K").EntireColumn.AutoFit
ActiveWindow.ScrollColumn = 9
ActiveWindow.ScrollColumn = 10
ActiveWindow.ScrollColumn = 11
Columns("L:L").Select

Columns("L:L").EntireColumn.AutoFit
Columns("M:M").Select

Columns("M:M").EntireColumn.AutoFit
ActiveWindow.ScrollColumn = 12
ActiveWindow.ScrollColumn = 13
Columns("N:N").Select

Columns("N:N").EntireColumn.AutoFit
Columns("O:O").Select

Columns("O:O").EntireColumn.AutoFit
ActiveWindow.ScrollColumn = 12
ActiveWindow.ScrollColumn = 11
ActiveWindow.ScrollColumn = 10
ActiveWindow.ScrollColumn = 9
ActiveWindow.ScrollColumn = 8
ActiveWindow.ScrollColumn = 7
ActiveWindow.ScrollColumn = 6

```

```

ActiveWindow.ScrollColumn = 5
ActiveWindow.ScrollColumn = 4
ActiveWindow.ScrollColumn = 3
ActiveWindow.ScrollColumn = 2
ActiveWindow.ScrollColumn = 1
Range("A1").Select
ActiveCell.FormulaR1C1 = "Name"
Range("B1").Select
ActiveCell.FormulaR1C1 = "Email"
Range("C1").Select
ActiveCell.FormulaR1C1 = "Age"
Range("D1").Select
ActiveCell.FormulaR1C1 = "Gender"
Range("E1").Select
ActiveCell.FormulaR1C1 =
"Occupation"
Range("F1").Select
ActiveCell.FormulaR1C1 = "Salary"
Range("G1").Select
ActiveCell.FormulaR1C1 =
"Purchase_freq"
Range("H1").Select
ActiveWindow.ScrollColumn = 2
Range("H1").Select
ActiveCell.FormulaR1C1 =
"Brand_name_imp"
Range("I1").Select
ActiveCell.FormulaR1C1 =
"Research"
Range("J1").Select
ActiveCell.FormulaR1C1 =
"Brand_switch_likeness"
Range("K1").Select
ActiveCell.FormulaR1C1 =
"Loyalty_prog_avail"
Range("L1").Select
ActiveWindow.ScrollColumn = 10
Range("L1").Select
ActiveCell.FormulaR1C1 =
"Social_media_influence"
Range("M1").Select
ActiveCell.FormulaR1C1 =
"Env_friendly"
Range("N1").Select
ActiveCell.FormulaR1C1 =
"Packaging_design_imp"
Range("M1").Select
ActiveCell.FormulaR1C1 =
"Env_friendly_imp"
Range("O1").Select
ActiveCell.FormulaR1C1 =
"Company_rep_imp"
Range("P1").Select
ActiveCell.FormulaR1C1 =
"Sale_purchase_freq"
Range("Q1").Select
ActiveCell.FormulaR1C1 =
"Price_imp"
Range("R1").Select
ActiveCell.FormulaR1C1 =
"sustainability_imp"
Range("S1").Select

```

```

ActiveCell.FormulaR1C1 =
"Customer_service_imp"
Range("T1").Select
ActiveCell.FormulaR1C1 =
"Reviews_reliance"
Range("U1").Select
ActiveCell.FormulaR1C1 =
"Product_rec_trust"
Range("R1").Select
ActiveCell.FormulaR1C1 =
"Sustainability_imp"
Columns("A:A").Select
Columns("A:A").EntireColumn.AutoFit
Columns("B:B").Select
Columns("B:B").EntireColumn.AutoFit
Range("C153").Select
ActiveCell.FormulaR1C1 = "53"
Range("C141").Select
ActiveCell.FormulaR1C1 = "50"
Range("C79").Select
ActiveCell.FormulaR1C1 = "54"
Columns("B:B").Select
Selection.ClearContents
Columns("C:U").Select
Selection.Cut
ActiveWindow.LargeScroll
ToRight:=5
Range("B1").Select
ActiveSheet.Paste
Columns("D:D").Select
Columns("D:D").EntireColumn.AutoFit
Columns("E:E").Select
Columns("E:E").EntireColumn.AutoFit
Columns("F:F").Select
Columns("F:F").EntireColumn.AutoFit
Columns("G:G").Select
Columns("G:G").EntireColumn.AutoFit
Columns("H:H").Select
Columns("H:H").EntireColumn.AutoFit
Columns("I:I").Select
Columns("I:I").EntireColumn.AutoFit
ActiveWindow.ScrollColumn = 2
ActiveWindow.ScrollColumn = 3
Columns("J:J").Select
Columns("J:J").EntireColumn.AutoFit
Columns("K:K").Select
ActiveWindow.ScrollColumn = 4
ActiveWindow.ScrollColumn = 5
ActiveWindow.ScrollColumn = 6
Columns("K:K").EntireColumn.AutoFit
Columns("L:L").Select
Columns("L:L").EntireColumn.AutoFit

```

```

Columns("M:M").Select
ActiveWindow.ScrollColumn = 5
ActiveWindow.ScrollColumn = 6
ActiveWindow.ScrollColumn = 7
ActiveWindow.ScrollColumn = 8
ActiveWindow.ScrollColumn = 9
Columns("M:M").EntireColumn.AutoFit
Columns("N:N").Select
Columns("N:N").EntireColumn.AutoFit
Columns("O:O").Select
Columns("O:O").EntireColumn.AutoFit
Columns("P:P").Select
Columns("P:P").EntireColumn.AutoFit
Columns("Q:Q").Select
ActiveWindow.ScrollColumn = 8
ActiveWindow.ScrollColumn = 9
ActiveWindow.ScrollColumn = 10
ActiveWindow.ScrollColumn = 11
ActiveWindow.ScrollColumn = 12
Columns("Q:Q").EntireColumn.AutoFit
Columns("R:R").Select
Columns("R:R").EntireColumn.AutoFit
Columns("S:S").Select
Columns("S:S").EntireColumn.AutoFit
Columns("T:T").Select
Columns("T:T").EntireColumn.AutoFit
ActiveWindow.ScrollColumn = 11
ActiveWindow.ScrollColumn = 10
ActiveWindow.ScrollColumn = 9
ActiveWindow.ScrollColumn = 8
ActiveWindow.ScrollColumn = 7
ActiveWindow.ScrollColumn = 6
ActiveWindow.ScrollColumn = 5
ActiveWindow.ScrollColumn = 4
ActiveWindow.ScrollColumn = 3
ActiveWindow.ScrollColumn = 2
ActiveWindow.ScrollColumn = 1
ActiveWindow.ScrollColumn = 2
ActiveWindow.ScrollColumn = 4
ActiveWindow.ScrollColumn = 5
ActiveWindow.ScrollColumn = 6
ActiveWindow.ScrollColumn = 7
ActiveWindow.ScrollColumn = 8
ActiveWindow.ScrollColumn = 9
ActiveWindow.ScrollColumn = 10
ActiveWindow.ScrollColumn = 11
ActiveWindow.ScrollColumn = 10
ActiveWindow.ScrollColumn = 9
ActiveWindow.ScrollColumn = 8
ActiveWindow.ScrollColumn = 6
ActiveWindow.ScrollColumn = 4

```

```

ActiveWindow.ScrollColumn = 1
Rows("1:1").Select
With Selection.Interior
    .Pattern = xlSolid
    .PatternColorIndex = xlAutomatic
    .ThemeColor =
    xlThemeColorAccent1
    .TintAndShade =
    0.799981688894314
    .PatternTintAndShade = 0
End With

ActiveWindow.ScrollColumn = 2
ActiveWindow.ScrollColumn = 3
ActiveWindow.ScrollColumn = 4
ActiveWindow.ScrollColumn = 5
ActiveWindow.ScrollColumn = 6
ActiveWindow.ScrollColumn = 7
ActiveWindow.ScrollColumn = 8
ActiveWindow.ScrollColumn = 9
ActiveWindow.ScrollColumn = 10
ActiveWindow.ScrollColumn = 11
ActiveWindow.ScrollColumn = 10
ActiveWindow.ScrollColumn = 9
ActiveWindow.ScrollColumn = 8
ActiveWindow.ScrollColumn = 7
ActiveWindow.ScrollColumn = 6
ActiveWindow.ScrollColumn = 5
ActiveWindow.ScrollColumn = 4
ActiveWindow.ScrollColumn = 3
ActiveWindow.ScrollColumn = 2
ActiveWindow.ScrollColumn = 1
End Sub

```

	A	B	C	D	E	F	G	H	I	J	K	L
1	Name	Age	Gender	Occupation	Salary	Purchase_freq	Brand_name_imp	Research	Brand_switch_likeliness	Loyalty_prog_avail	Social_media_influence	Env_friendly_i
2	Ann Maria Moncy	21	Female	Student	< 5 lakhs yearly	Occasionally	Somewhat important	Read online reviews	Very likely	Occasionally	A lot of influence	Very important
3	Meghna	21	Female	Student	< 5 lakhs yearly	Occasionally	Somewhat important	Ask friends and family for recommendation	Somewhatlikely	Occasionally	Some influence	Very important
4	Marie Cheryl biju	21	Female	Student	< 5 lakhs yearly	Occasionally	Somewhat important	Read online reviews	Extremely likely	Almost always	A lot of influence	Very important
5	Sangeeth Promod	21	Male	IT professional	< 5 lakhs yearly	Occasionally	Somewhat important	Read online reviews	Very likely	Occasionally	Some influence	Unimportant
6	Aravind S	21	Male	IT professional	5 - 10 lakhs yearly	Occasionally	Somewhat important	Read online reviews	Somewhatlikely	Almost always	A lot of influence	Very important
7	Devika Vind	21	Female	Student	> 20 lakhs yearly	Occasionally	Somewhat important	Read online reviews	Somewhatlikely	Almost always	A lot of influence	Very important
8	James Joseph	21	Male	Student	< 5 lakhs yearly	Frequently	Very important	Read online reviews	Somewhatlikely	Almost never	Some influence	Very important
9	Reba	22	Female	Student	< 5 lakhs yearly	Frequently	Somewhat important	Read online reviews	Very likely	Frequently	A lot of influence	Unimportant
10	Chrysto George Mathew	25	Male	Professor/ Teacher	< 5 lakhs yearly	Occasionally	Somewhat important	Visit the store and inspect the product	Not likely at all	Occasionally	A lot of influence	Extremely imp
11	Karthick	23	Male	Student	< 5 lakhs yearly	Frequently	Very important	Read online reviews	Very likely	Occasionally	No influence at all	Unimportant
12	Ankita	23	Female	Student	< 5 lakhs yearly	Frequently	Very important	Ask friends and family for recommendation	Not likely at all	Occasionally	Some influence	Very important
13	19MIY0029	21	Female	Student	< 5 lakhs yearly	Frequently	Somewhat important	Read online reviews	Extremely likely	Almost never	A lot of influence	Very important
14	Justin Thomas	23	Male	Student	< 5 lakhs yearly	Occasionally	Very important	Read online reviews	Somewhatlikely	Almost never	No influence at all	Extremely imp
15	Pooja	28	Female	Others	5 - 10 lakhs yearly	Frequently	Not important at all	Read online reviews	Very likely	Almost always	No influence at all	Unimportant
16	Thejas Thomas	27	Male	Professor/ Teacher	5 - 10 lakhs yearly	Occasionally	Somewhat important	Read online reviews	Very likely	Occasionally	A lot of influence	Very important
17	Kanishka	21	Female	Student	< 5 lakhs yearly	Occasionally	Somewhat important	Read online reviews	Very likely	Almost never	Some influence	Very important
18	Priya Sri	21	Female	Student	< 5 lakhs yearly	Occasionally	Somewhat important	Read online reviews	Not likely at all	Almost never	Some influence	Extremely imp
19	George T M	21	Male	Student	< 5 lakhs yearly	Occasionally	Somewhat important	Read online reviews	Somewhatlikely	Almost never	No influence at all	Unimportant
20	Alan	21	Male	Student	< 5 lakhs yearly	Occasionally	Very important	Look at advertisements	Very likely	Frequently	Almost all influence	Unimportant
21	Deva Priya S	21	Female	Student	< 5 lakhs yearly	Frequently	Somewhat important	Read online reviews	Very likely	Almost always	Some influence	Very important
22	Prashanth	21	Male	Student	< 5 lakhs yearly	Occasionally	Somewhat important	Ask friends and family for recommendation	Somewhatlikely	Occasionally	No influence at all	Very important
23	Noel Sam Zachariah	21	Male	Student	< 5 lakhs yearly	Occasionally	Not important at all	Ask friends and family for recommendation	Extremely likely	Occasionally	A lot of influence	Unimportant
24	Subhaditya Tripathy	22	Male	Student	10 - 15 lakhs yearly	Almost never	Very important	Read online reviews	Very likely	Almost never	Some influence	Unimportant
25	Sahithi	19	Female	Student	< 5 lakhs yearly	Frequently	Somewhat important	Read online reviews	Very likely	Almost never	No influence at all	Very important
26	Angela	27	Female	Others	5 - 10 lakhs yearly	Occasionally	Somewhat important	Read online reviews	Somewhatlikely	Frequently	Some influence	Very important
27	Alan Johnson	23	Male	Student	10 - 15 lakhs yearly	Frequently	Somewhat important	Read online reviews	Extremely likely	Frequently	Some influence	Very important

PYTHON CODE:

The pdf version of the jupyter notebook used is attached below:

```
In [97]: import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline
```

```
In [98]: df = pd.read_csv('data.csv')
df.head()
```

Out[98]:

	Name	Age	Gender	Occupation	Salary	Purchase_freq	Brand_name_imp	Research
0	Ann Maria Moncy	21	Female	Student	< 5 lakhs yearly	Occasionally	Somewhat important	Read online reviews
1	Meghna	21	Female	Student	< 5 lakhs yearly	Occasionally	Somewhat important	Ask friends and family for recommendation
2	Marie Cheryl biju	21	Female	Student	< 5 lakhs yearly	Occasionally	Somewhat important	Read online reviews
3	Sangeeth Promod	21	Male	IT professional	< 5 lakhs yearly	Occasionally	Somewhat important	Read online reviews
4	Aravind S	21	Male	IT professional	5 - 10 lakhs yearly	Occasionally	Somewhat important	Read online reviews

In [99]: df.describe()

Out[99]:

Age
count 161.000000
mean 25.385093
std 9.985654
min 15.000000
25% 21.000000
50% 21.000000
75% 23.000000
max 54.000000

In [100...]: df.dtypes

```
Out[100]: Name          object
Age           int64
Gender        object
Occupation    object
Salary         object
Purchase_freq object
Brand_name_imp object
Research       object
Brand_switch_likeliness object
Loyalty_prog_avail object
Social_media_influence object
Env_friendly_imp object
Packaging_design_imp object
Company_rep_imp object
Sale_purchase_freq object
Price_imp      object
Sustainability_imp object
Customer_service_imp object
Reviews_reliance object
Product_rec_trust object
dtype: object
```

```
In [101... # Name will stay object
# Manipulating age: dividing into 4 categories:
maxx = max(df.Age) # 54
minn = min(df.Age) # 15
print(maxx, minn)
```

54 15

```
In [102... (54-15) #range of age
```

Out[102]: 39

```
In [103... # categories:
# < 18
# 20 - 30
# 30 - 40
# 40 - 50
# > 50

#df["Age"] = if x in df.Age for x < 18: df["Age"]
df.loc[df['Age'] < 18, 'Age_range'] = '< 18'
df.loc[(df['Age'] >= 18) & (df['Age'] < 25), 'Age_range'] = '18 - 25'
df.loc[(df['Age'] >= 25) & (df['Age'] < 30), 'Age_range'] = '25 - 30'
df.loc[(df['Age'] >= 30) & (df['Age'] < 40), 'Age_range'] = '30 - 40'
df.loc[(df['Age'] >= 40) & (df['Age'] < 50), 'Age_range'] = '40 - 50'
df.loc[df['Age'] >= 50, 'Age_range'] = '> 50'

df.Age_range
```

```
Out[103]: 0     18 - 25
1     18 - 25
2     18 - 25
3     18 - 25
4     18 - 25
...
156    18 - 25
157    18 - 25
158    18 - 25
159    18 - 25
160    25 - 30
Name: Age_range, Length: 161, dtype: object
```

In [104...]

```
# Age_order variable possible as its ordinal
# 6 divisions: 1 < 2... 6

df.loc[df['Age'] < 18, 'Age_order'] = 1
df.loc[(df['Age'] >= 18) & (df['Age'] < 25), 'Age_order'] = 2
df.loc[(df['Age'] >= 25) & (df['Age'] < 30), 'Age_order'] = 3
df.loc[(df['Age'] >= 30) & (df['Age'] < 40), 'Age_order'] = 4
df.loc[(df['Age'] >= 40) & (df['Age'] < 50), 'Age_order'] = 5
df.loc[df['Age'] >= 50, 'Age_order'] = 6
```

df.Age_order

```
Out[104]: 0    2.0
1    2.0
2    2.0
3    2.0
4    2.0
...
156   2.0
157   2.0
158   2.0
159   2.0
160   3.0
Name: Age_order, Length: 161, dtype: float64
```

In [105...]

```
# Gender is nominal - not order-able
# occupation not orderable
# salary range orderable:

df.loc[df['Salary'] == "< 5 lakhs yearly", 'Salary_order'] = 1
df.loc[df['Salary'] == "5 - 10 lakhs yearly", 'Salary_order'] = 2
df.loc[df['Salary'] == "10 - 15 lakhs yearly", 'Salary_order'] = 3
df.loc[df['Salary'] == "15 - 20 lakhs yearly", 'Salary_order'] = 4
df.loc[df['Salary'] == "> 20 lakhs yearly", 'Salary_order'] = 5
```

df.Salary_order

```
Out[105]: 0    1.0
1    1.0
2    1.0
3    1.0
4    2.0
...
156   3.0
157   1.0
158   1.0
159   1.0
160   3.0
Name: Salary_order, Length: 161, dtype: float64
```

In [106...]

```
# switch brands: orderable - yes to no
# Brand switching is a reverse factor to brand Loyalty hence we order it yes to no

df.loc[df['Brand_switch_likeness'] == "Not likely at all", 'Brand_switch_likeness_order'] = 1
df.loc[df['Brand_switch_likeness'] == "Somewhat Likely", 'Brand_switch_likeness_order'] = 2
df.loc[df['Brand_switch_likeness'] == "Very likely", 'Brand_switch_likeness_order'] = 3
df.loc[df['Brand_switch_likeness'] == "Extremely likely", 'Brand_switch_likeness_order'] = 4
```

df.Brand_switch_likeness_order

```
Out[106]: 0      2.0
          1      3.0
          2      3.0
          3      1.0
          4      2.0
          ...
         156     1.0
         157     3.0
         158     3.0
         159     1.0
         160     3.0
Name: Brand_switch_likeliness_order, Length: 161, dtype: float64
```

In [107...]

```
# social media inf orderable: no to yes

df.loc[df['Social_media_influence'] == "No influence at all", 'Social_media_influence_order'] = 1
df.loc[df['Social_media_influence'] == "Some influence", 'Social_media_influence_order'] = 2
df.loc[df['Social_media_influence'] == "Almost all influence", 'Social_media_influence_order'] = 3
df.loc[df['Social_media_influence'] == "A lot of influence", 'Social_media_influence_order'] = 4

df.Social_media_influence_order
```

```
Out[107]: 0      4.0
          1      2.0
          2      4.0
          3      2.0
          4      4.0
          ...
         156     2.0
         157     2.0
         158     2.0
         159     2.0
         160     2.0
Name: Social_media_influence_order, Length: 161, dtype: float64
```

In [108...]

```
# Loyalty progs avail can be ordered: no to yes

df.loc[df['Loyalty_prog_avail'] == "Almost never", 'Loyalty_prog_avail_order'] = 1
df.loc[df['Loyalty_prog_avail'] == "Occasionally", 'Loyalty_prog_avail_order'] = 2
df.loc[df['Loyalty_prog_avail'] == "Frequently", 'Loyalty_prog_avail_order'] = 3
df.loc[df['Loyalty_prog_avail'] == "Almost always", 'Loyalty_prog_avail_order'] = 4

df.Loyalty_prog_avail_order
```

```
Out[108]: 0      2.0
          1      2.0
          2      2.0
          3      4.0
          4      2.0
          ...
         156     3.0
         157     1.0
         158     3.0
         159     3.0
         160     3.0
Name: Loyalty_prog_avail_order, Length: 161, dtype: float64
```

In [109...]

```
# reliance on online reviews can be ordered no to yes

df.loc[df['Reviews_reliance'] == "Not at all", 'Reviews_reliance_order'] = 1
df.loc[df['Reviews_reliance'] == "Somewhat", 'Reviews_reliance_order'] = 2
df.loc[df['Reviews_reliance'] == "A lot", 'Reviews_reliance_order'] = 3
df.loc[df['Reviews_reliance'] == "Extremely", 'Reviews_reliance_order'] = 4

df.Reviews_reliance_order
```

```
Out[109]: 0    3.0
          1    2.0
          2    1.0
          3    3.0
          4    3.0
          ...
         156   3.0
         157   2.0
         158   4.0
         159   3.0
         160   4.0
Name: Reviews_reliance_order, Length: 161, dtype: float64
```

```
In [110...]: # trust on product recommendations can be ordered no to yes
```

```
df.loc[df['Product_rec_trust'] == "Not at all", 'Product_rec_trust_order'] = 1
df.loc[df['Product_rec_trust'] == "Somewhat", 'Product_rec_trust_order'] = 2
df.loc[df['Product_rec_trust'] == "A lot", 'Product_rec_trust_order'] = 3
df.loc[df['Product_rec_trust'] == "Extremely", 'Product_rec_trust_order'] = 4

df.Product_rec_trust_order
```

```
Out[110]: 0    2.0
          1    2.0
          2    1.0
          3    1.0
          4    2.0
          ...
         156   2.0
         157   1.0
         158   1.0
         159   1.0
         160   2.0
Name: Product_rec_trust_order, Length: 161, dtype: float64
```

```
In [111...]: # sale dependency can be ordered no to yes
```

```
df.loc[df['Sale_purchase_freq'] == "Not at all", 'Sale_purchase_freq_order'] = 1
df.loc[df['Sale_purchase_freq'] == "Somewhat", 'Sale_purchase_freq_order'] = 2
df.loc[df['Sale_purchase_freq'] == "A lot", 'Sale_purchase_freq_order'] = 3
df.loc[df['Sale_purchase_freq'] == "Extremely", 'Sale_purchase_freq_order'] = 4

df.Sale_purchase_freq_order
```

```
Out[111]: 0    3.0
          1    2.0
          2    3.0
          3    2.0
          4    2.0
          ...
         156   3.0
         157   2.0
         158   3.0
         159   2.0
         160   3.0
Name: Sale_purchase_freq_order, Length: 161, dtype: float64
```

```
In [112...]: #.
```

```
#.
#.
#.
#.
#.
```

In [113...]

```
# purchase freq can be ordered: no to yes

df.loc[df['Purchase_freq'] == "Almost never", 'Purchase_freq_order'] = 1
df.loc[df['Purchase_freq'] == "Occasionally", 'Purchase_freq_order'] = 2
df.loc[df['Purchase_freq'] == "Frequently", 'Purchase_freq_order'] = 3
df.loc[df['Purchase_freq'] == "Almost always", 'Purchase_freq_order'] = 4

df.Purchase_freq_order
```

Out[113]:

```
0      2.0
1      2.0
2      2.0
3      2.0
4      2.0
...
156    4.0
157    1.0
158    3.0
159    2.0
160    2.0
Name: Purchase_freq_order, Length: 161, dtype: float64
```

In [114...]

```
# brand name importance can be ordered: no to yes

df.loc[df['Brand_name_imp'] == "Not important at all", 'Brand_name_imp_order'] = 1
df.loc[df['Brand_name_imp'] == "Somewhat important", 'Brand_name_imp_order'] = 2
df.loc[df['Brand_name_imp'] == "Very important", 'Brand_name_imp_order'] = 3
df.loc[df['Brand_name_imp'] == "Extremely important", 'Brand_name_imp_order'] = 4

df.Brand_name_imp_order
```

Out[114]:

```
0      2.0
1      2.0
2      2.0
3      2.0
4      2.0
...
156    4.0
157    3.0
158    3.0
159    2.0
160    2.0
Name: Brand_name_imp_order, Length: 161, dtype: float64
```

In [115...]

```
# Research type is not ordinal
# Brand switching is skipped here as already added in customer
# env friendly: no to yes: DONT KNOW IF RELEVANT

df.loc[df['Env_friendly_imp'] == "Unimportant", 'Env_friendly_imp_order'] = 1
df.loc[df['Env_friendly_imp'] == "Somewhat important", 'Env_friendly_imp_order'] =
df.loc[df['Env_friendly_imp'] == "Very important", 'Env_friendly_imp_order'] = 3
df.loc[df['Env_friendly_imp'] == "Extremely important", 'Env_friendly_imp_order'] =

df.Env_friendly_imp_order
```

```
Out[115]: 0      3.0
          1      3.0
          2      3.0
          3      1.0
          4      3.0
          ...
         156     3.0
         157     3.0
         158     1.0
         159     3.0
         160     3.0
Name: Env_friendly_imp_order, Length: 161, dtype: float64
```

In [116... # weight to reputation: no to yes

```
df.loc[df['Company_rep_imp'] == "Not important at all", 'Company_rep_imp_order'] = 1
df.loc[df['Company_rep_imp'] == "Somewhat important", 'Company_rep_imp_order'] = 2
df.loc[df['Company_rep_imp'] == "Very important", 'Company_rep_imp_order'] = 3
df.loc[df['Company_rep_imp'] == "Extremely important", 'Company_rep_imp_order'] = 4

df.Company_rep_imp_order
```

```
Out[116]: 0      2.0
          1      2.0
          2      2.0
          3      3.0
          4      3.0
          ...
         156     3.0
         157     2.0
         158     4.0
         159     3.0
         160     2.0
Name: Company_rep_imp_order, Length: 161, dtype: float64
```

In [117... # sustainability: no to yes: DONT KNOW IF RELEVANT

```
df.loc[df['Sustainability_imp'] == "Unimportant", 'Sustainability_imp_order'] = 1
df.loc[df['Sustainability_imp'] == "Somewhat important", 'Sustainability_imp_order'] =
df.loc[df['Sustainability_imp'] == "Very important", 'Sustainability_imp_order'] =
df.loc[df['Sustainability_imp'] == "Extremely important", 'Sustainability_imp_order'] =

df.Sustainability_imp_order
```

```
Out[117]: 0      3.0
          1      2.0
          2      2.0
          3      1.0
          4      3.0
          ...
         156     3.0
         157     3.0
         158     2.0
         159     3.0
         160     4.0
Name: Sustainability_imp_order, Length: 161, dtype: float64
```

In [118... # Customer service imp is ordinal: no to yes

```
df.loc[df['Customer_service_imp'] == "Not at all", 'Customer_service_imp_order'] =
df.loc[df['Customer_service_imp'] == "Somewhat", 'Customer_service_imp_order'] = 2
df.loc[df['Customer_service_imp'] == "A lot", 'Customer_service_imp_order'] = 3
df.loc[df['Customer_service_imp'] == "Extremely", 'Customer_service_imp_order'] = 4

df.Customer_service_imp_order
```

```
Out[118]: 0    3.0
          1    2.0
          2    1.0
          3    2.0
          4    2.0
          ...
         156   3.0
         157   3.0
         158   3.0
         159   3.0
         160   2.0
Name: Customer_service_imp_order, Length: 161, dtype: float64
```

In [119...]: # price is again ordinal and positively correlated with brand hence no to yes

```
df.loc[df['Price_imp'] == "Not at all", 'Price_imp_order'] = 1
df.loc[df['Price_imp'] == "Somewhat", 'Price_imp_order'] = 2
df.loc[df['Price_imp'] == "A lot", 'Price_imp_order'] = 3
df.loc[df['Price_imp'] == "Extremely", 'Price_imp_order'] = 4

df.Price_imp_order
```

```
Out[119]: 0    3.0
          1    2.0
          2    3.0
          3    4.0
          4    3.0
          ...
         156   2.0
         157   3.0
         158   4.0
         159   4.0
         160   4.0
Name: Price_imp_order, Length: 161, dtype: float64
```

In [120...]: # Packaging design: ordinal: positive corr: no to yes

```
df.loc[df['Packaging_design_imp'] == "Not important at all", 'Packaging_design_imp_order'] = 1
df.loc[df['Packaging_design_imp'] == "Somewhat important", 'Packaging_design_imp_order'] = 2
df.loc[df['Packaging_design_imp'] == "Very important", 'Packaging_design_imp_order'] = 3
df.loc[df['Packaging_design_imp'] == "Extremely important", 'Packaging_design_imp_order'] = 4

df.Packaging_design_imp_order
```

```
Out[120]: 0    2.0
          1    2.0
          2    1.0
          3    2.0
          4    2.0
          ...
         156   3.0
         157   2.0
         158   1.0
         159   2.0
         160   2.0
Name: Packaging_design_imp_order, Length: 161, dtype: float64
```

In [121...]: # Q: to find if there is a correlation between consumer's brand loyalty and his/ her

```
# Var 1: Purchasing habits: func of vars: Age_order, Salary_order,
# Social_media_influence_order, Loyalty_prog_avail_order, Reviews_reliance_order, +
# Sale_purchase_freq_order, Purchase_freq_order
# MAIN VAR: Purchase_freq_order
```

```

pur_habits_corr = []

def corrfunc(a,b):
    # create two arrays of data
    x = np.array(a)
    y = np.array(b)
    # find the correlation coefficient value
    corr_coef = np.corrcoef(x, y)[0, 1]
    pur_habits_corr.append(corr_coef)
    print(corr_coef)

```

In [123]: `corrfunc(df["Age_order"],df["Purchase_freq_order"])`

-0.12866833015305573

In [124]: `corrfunc(df["Salary_order"],df["Purchase_freq_order"])`

-0.03401266845180915

In [125]: `corrfunc(df["Social_media_influence_order"],df["Purchase_freq_order"])
corrfunc(df["Loyalty_prog_avail_order"],df["Purchase_freq_order"])
corrfunc(df["Reviews_reliance_order"],df["Purchase_freq_order"])
corrfunc(df["Product_rec_trust_order"],df["Purchase_freq_order"])
corrfunc(df["Sale_purchase_freq_order"],df["Purchase_freq_order"])`

0.14155606437299684

0.255970014961073

0.22943979838902095

0.14249613312283235

0.22766316963581237

In [126]: `pur_habits_corr`

Out[126]: [-0.12866833015305573,
-0.03401266845180915,
0.14155606437299684,
0.255970014961073,
0.22943979838902095,
0.14249613312283235,
0.22766316963581237]

In [127]: `pur_habits_corr[0]`

Out[127]: -0.12866833015305573

In [128]: `# Var 2: Brand Loyalty: func of vars: Brand_switch_Likeliness_order, Brand_name_imp_order, Company_rep_imp_order, Sustainability_imp_order, Customer_service_imp_order, Price_imp_order
MAIN VAR: Brand_name_imp_order`

```

brand_loyalty_corr = []

def corrfunc(a,b):
    # create two arrays of data
    x = np.array(a)
    y = np.array(b)
    # find the correlation coefficient value
    corr_coef = np.corrcoef(x, y)[0, 1]
    brand_loyalty_corr.append(corr_coef)
    print(corr_coef)

```

In [129]: `corrfunc(df["Brand_switch_likeness_order"],df["Brand_name_imp_order"])
corrfunc(df["Env_friendly_imp_order"],df["Brand_name_imp_order"])
corrfunc(df["Company_rep_imp_order"],df["Brand_name_imp_order"])`

```
corrfunc(df["Sustainability_imp_order"],df["Brand_name_imp_order"])
# corrfunc(df["Customer_service_imp_order"],df["Brand_name_imp_order"]) (gives NaN)
corrfunc(df["Price_imp_order"],df["Brand_name_imp_order"])
corrfunc(df["Packaging_design_imp_order"],df["Brand_name_imp_order"])

0.0686061594957347
0.045140745881004585
0.3393714262204687
0.11629642967059678
0.1389465537408261
0.2502561219402368
```

In [130]: brand_loyalty_corr

Out[130]: [0.0686061594957347,
 0.045140745881004585,
 0.3393714262204687,
 0.11629642967059678,
 0.1389465537408261,
 0.2502561219402368]

In [131]: # Var 1: Purchasing habits: func of vars: Age_order, Salary_order,
 # Social_media_influence_order, Loyalty_prog_avail_order, Reviews_reliance_order, +
 # Sale_purchase_freq_order, Purchase_freq_order
 # MAIN VAR: Purchase_freq_order

```
df["Pur_habits_agg"] = (df["Purchase_freq_order"]) + (pur_habits_corr[0]*df["Age_order"])
df.Pur_habits_agg
```

Out[131]: 0 4.443116
1 3.702901
2 3.841740
3 4.301785
4 4.181440
...
156 6.347949
157 2.304435
158 5.502918
159 4.045815
160 4.448720
Name: Pur_habits_agg, Length: 161, dtype: float64

In [132]: # Var 2: Brand Loyalty: func of vars: Brand_switch_Likeliness_order, Brand_name_imp_order
 # Company_rep_imp_order, Sustainability_imp_order, Customer_service_imp_order, Price_imp_order
 # MAIN VAR: Brand_name_imp_order

```
df["Brand_loyalty_agg"] = (df["Brand_name_imp_order"]) + (brand_loyalty_corr[0]*df["Brand_switch_Likeliness_order"])
df.Brand_loyalty_agg
```

Out[132]: 0 4.217619
1 4.030982
2 3.919672
3 4.304456
4 4.556990
...
156 6.599693
157 5.286225
158 5.647080
159 4.627330
160 4.541468
Name: Brand_loyalty_agg, Length: 161, dtype: float64

H0: There is no significant correlation between two variables in a population. In other words, the null hypothesis states that the true correlation coefficient (ρ) between two variables in a population is zero.

H1: There is a significant correlation between the two variables in the population, and this correlation coefficient is not equal to zero.

In [134...]

```
from scipy.stats import spearmanr

corr_coef, p_value = spearmanr(df.Pur_habits_agg, df.Brand_loyalty_agg)

# Print the result
print("Spearman rank correlation coefficient:", corr_coef)
print(p_value)
```

```
Spearman rank correlation coefficient: 0.1843987030228246
0.019199047293723296
```

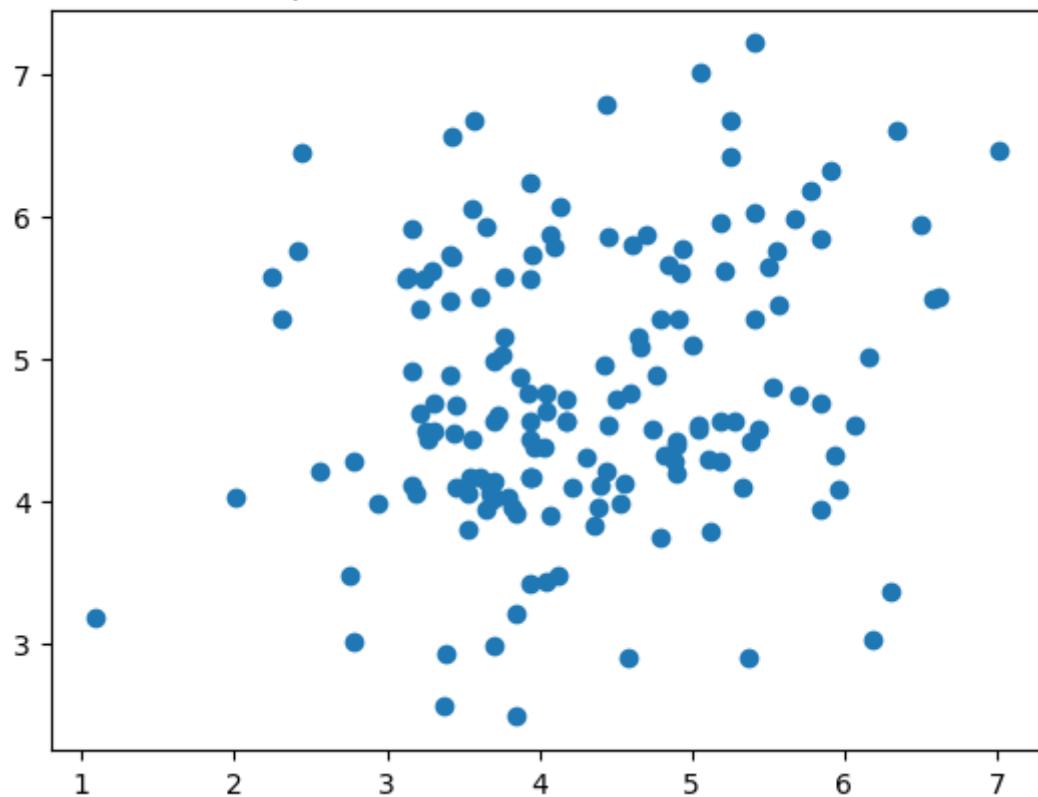
Conclusion: Here the p_value is less than 0.05. Hence we reject H0 i.e,There is a significant correlation between the two variables in the population

In [136...]

```
import numpy as np
from scipy import stats
import matplotlib.pyplot as plt

plt.scatter(df.Pur_habits_agg, df.Brand_loyalty_agg)
plt.title(f'Spearman Rank Correlation: {corr_coef:.2f}')
plt.show()
```

Spearman Rank Correlation: 0.18



In []:

H0:

There is no significant correlation between the two variables 'Pur_habits_agg' and 'Brand_loyalty_agg' in the dataset. In other words, the null hypothesis states that the true correlation coefficient (ρ) between two variables in a population is zero.

H1:

There is a significant correlation between the two variables in the population, and this correlation coefficient is not equal to zero.

LEVEL OF SIGNIFICANCE:

5 %

TEST STATISTIC:

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

TEST USED:

Non-parametric test -> Spearman Rank Correlation Test

SOFTWARE USED:

Python -> Jupyter Notebook

CONCLUSION:

*Here the p_value is less than 0.05. Hence we reject H0, i.e., **there is a significant correlation** between the two variables in the population. And hence we can say that customer purchasing habits*
