import pandas as pd

import pandas as pd

df=pd.read_excel('/content/mega_data_cleaning_dataset.xlsx')
df

	Customer_ID	Name	Age	Gender	Country	State	City	Email	Signup_Date	Account_
0	1191	Larry Wallace	31	Other	NaN	Arkansas	Janetfort	gonzalezbrandi@shaffer- lambert.com	2021-05-23	I
1	8287	Shawn Palmer	20	Male	Uganda	Texas	Smithhaven	davidmendoza@hotmail.com	2025-05-18	
2	6574	Daniel Cortez	105	Mle	Tajikistan	Montana	West Jennifermouth	hoffmancole@yahoo.com	2025-05-19	
3	3377	Cindy Barber	100	Female	Chile	Ohio	Staceyberg	carpenterlinda@yahoo.com	2024-08-19	
4	5107	William Patel	110	Mle	Timor- Leste	Hawaii	South Hollyfort	blairivan@lyons- christensen.org	2020-05-04	
9995	8287	Deborah Garcia	11	Mle	Cape Verde	Maine	Lake Albert	timothy71@hotmail.com	2025-02-18	ı
9996	8932	Donald Pineda	69	Female	NaN	Pennsylvania	Raymondbury	gsmith@hotmail.com	2022-07-03	
9997	6328	Alexandria Moore	-5	Other	Cocos (Keeling) Islands	Pennsylvania	Port Frank	morgansamantha@hotmail.com	2023-03-01	ŀ
9998	8121	NaN	110	Male	Equatorial Guinea	Maine	Jacquelinefort	courtneybradley@day- gilbert.com	2022-11-20	I
9999	2851	Kathleen Leblanc	67	Mle	Albania	Virginia	South Michelle	kristincook@thompson- campbell.info	2024-04-01	ı
10000 r	ows × 25 colum	nns								

df = df.drop_duplicates()

df

ccount_	Signup_Date	Email	City	State	Country	Gender	Age	Name	Customer_ID	
	2021-05-23	gonzalezbrandi@shaffer- lambert.com	Janetfort	Arkansas	NaN	Other	31	Larry Wallace	1191	0
	2025-05-18	davidmendoza@hotmail.com	Smithhaven	Texas	Uganda	Male	20	Shawn Palmer	8287	1
	2025-05-19	hoffmancole@yahoo.com	West Jennifermouth	Montana	Tajikistan	Mle	105	Daniel Cortez	6574	2
	2024-08-19	carpenterlinda@yahoo.com	Staceyberg	Ohio	Chile	Female	100	Cindy Barber	3377	3
	2020-05-04	blairivan@lyons- christensen.org	South Hollyfort	Hawaii	Timor- Leste	Mle	110	William Patel	5107	4
	2025-02-18	timothy71@hotmail.com	Lake Albert	Maine	Cape Verde	Mle	11	Deborah Garcia	8287	9995
	2022-07-03	gsmith@hotmail.com	Raymondbury	Pennsylvania	NaN	Female	69	Donald Pineda	8932	9996
	2023-03-01	morgansamantha@hotmail.com	Port Frank	Pennsylvania	Cocos (Keeling) Islands	Other	-5	Alexandria Moore	6328	9997
	2022-11-20	courtneybradley@day- gilbert.com	Jacquelinefort	Maine	Equatorial Guinea	Male	110	NaN	8121	9998
			South					Kathleen		

df=df.drop_duplicates(subset='Customer_ID', keep='first')
df

	Customer ID									
		Name	Age	Gender	Country	State	City	Email	Signup_Date	Account_Statu
0	1191	Larry Wallace	31	Other	NaN	Arkansas	Janetfort	gonzalezbrandi@shaffer- lambert.com	2021-05-23	Inactiv
1	8287	Shawn Palmer	20	Male	Uganda	Texas	Smithhaven	davidmendoza@hotmail.com	2025-05-18	Na
2	6574	Daniel Cortez	105	Mle	Tajikistan	Montana	West Jennifermouth	hoffmancole@yahoo.com	2025-05-19	Activ
3	3377	Cindy Barber	100	Female	Chile	Ohio	Staceyberg	carpenterlinda@yahoo.com	2024-08-19	Activ
4	5107	William Patel	110	Mle	Timor- Leste	Hawaii	South Hollyfort	blairivan@lyons- christensen.org	2020-05-04	Na
9991	2919	Tyler Hunter	44	Female	Guam	Indiana	Tylerville	ashley87@yahoo.com	2021-10-23	Na
9993	8538	Harry Carter	108	Female	Tokelau	Texas	West Annaberg	uhayes@clark-webb.com	2023-09-30	Activ
9994	1905	Deborah Young	128	f	Tuvalu	Tennessee	East Anthonytown	james28@yahoo.com	2020-05-04	Na
9998	8121	NaN	110	Male	Equatorial Guinea	Maine	Jacquelinefort	courtneybradley@day- gilbert.com	2022-11-20	Inactiv
9999	2851	Kathleen Leblanc	67	Mle	Albania	Virginia	South Michelle	kristincook@thompson- campbell.info	2024-04-01	Inacti

df = df.drop_duplicates(subset='Email', keep='first')
df

0	Customer_ID	Name	Age	Gender	Country	State	City	Email	Signup_Date	Account_Statu
0	1191	l ar :								
		Larry Wallace	31	Other	NaN	Arkansas	Janetfort	gonzalezbrandi@shaffer- lambert.com	2021-05-23	Inactiv
1	8287	Shawn Palmer	20	Male	Uganda	Texas	Smithhaven	davidmendoza@hotmail.com	2025-05-18	Na
2	6574	Daniel Cortez	105	Mle	Tajikistan	Montana	West Jennifermouth	hoffmancole@yahoo.com	2025-05-19	Activ
3	3377	Cindy Barber	100	Female	Chile	Ohio	Staceyberg	carpenterlinda@yahoo.com	2024-08-19	Activ
4	5107	William Patel	110	Mle	Timor- Leste	Hawaii	South Hollyfort	blairivan@lyons- christensen.org	2020-05-04	Na
9991	2919	Tyler Hunter	44	Female	Guam	Indiana	Tylerville	ashley87@yahoo.com	2021-10-23	Na
9993	8538	Harry Carter	108	Female	Tokelau	Texas	West Annaberg	uhayes@clark-webb.com	2023-09-30	Activ
9994	1905	Deborah Young	128	f	Tuvalu	Tennessee	East Anthonytown	james28@yahoo.com	2020-05-04	Na
9998	8121	NaN	110	Male	Equatorial Guinea	Maine	Jacquelinefort	courtneybradley@day- gilbert.com	2022-11-20	Inacti
9999	2851	Kathleen Leblanc	67	Mle	Albania	Virginia	South Michelle	kristincook@thompson- campbell.info	2024-04-01	Inacti

df = df.drop_duplicates(subset='Product_ID', keep='first')
df

1 8287 Shawn 20 Male Uganda Texas Smithhaven davidmendoza@hotmail.com 2025-05-18 Namper	UZ FIVI						panua	s data dicariiri	g - Colab		
1 8287 Shawn Palmer 20 Male Uganda Texas Smithhaven davidmendoza@hotmail.com 2025-05-18 N 2 6574 Daniel Cortez 105 Mile Tajikistan Montana Jennifermouth hoffmancole@yahoo.com 2025-05-19 Ac 3 3377 Cindy Barber 100 Female Chile Ohio Staceyberg carpenterlinda@yahoo.com 2024-08-19 Ac 4 5107 William Patei 110 Mile Timor-Leste Hawaii South Hollyfort blaintvan@lyons-christensen.org 2020-05-04 N 2955 675 NaN 74 Male Netherlands Antilles Tennessee Lake Beverty nicholas42@yahoo.com 2025-09-17 Ac 3032 1437 Paula Wheeler 111 Mile Greenland Connecticut Port Emilyton hmunoz@kent.com 2024-09-14 N 3034 3786 Karen Miller 22 f France NaN West Brenda zsmall@gmail.com		Customer_ID	Name	Age	Gender	Country	State	City	Email	Signup_Date	Account_Stat
1 6267 Palmer Palmer 20 Male Ogainal lexas Smithinaveil davidiniarious@information. 2223-05-18 Information 2 6574 Daniel Cortez 105 Mile Tajikistan Montana West Jennifermouth hoffmancole@yahoo.com 2025-05-19 Ac 3 3377 Cindy Barber 100 Female Chile Ohio Staceyberg carpenterlinda@yahoo.com 2024-08-19 Ac 4 5107 William Patel 110 Mile Timor-Leste Hawaii South Hollyfort blairivan@lyons-christensen.org 2020-05-04 N .	0	1191	Larry Wallace	31	Other	NaN	Arkansas	Janetfort		2021-05-23	Inac
2	1	8287		20	Male	Uganda	Texas	Smithhaven	davidmendoza@hotmail.com	2025-05-18	N
4 5107 William Patel 110 Mile Timor-Leste Hawaii South Hollyfort christensen.org 2020-05-04 N	2	6574		105	Mle	Tajikistan	Montana		hoffmancole@yahoo.com	2025-05-19	Ac
2955 675 NaN 74 Male Netherlands Antilles Tennessee Lake Beverly nicholas42@yahoo.com 2025-09-17 Ac	3	3377		100	Female	Chile	Ohio	Staceyberg	carpenterlinda@yahoo.com	2024-08-19	Act
2955 675 NaN 74 Male Netherlands Antilles Tennessee Lake Beverly nicholas42@yahoo.com 2025-09-17 Acceptable 3032 1437 Paula Wheeler 111 Mle Greenland Connecticut Port Emilyton hmunoz@kent.com 2024-09-14 N 3034 3786 Karen Miller 22 f France NaN West Brenda zsmall@gmail.com 2023-05-20 N 3039 201 Clayton PhD 80 f Russian Federation South Carolina Andrewton cbennett@wright.com 2022-01-24 N 3298 5796 Angel Hood 53 Mle NaN Arkansas Lake Derek omar32@yahoo.com 2021-08-19 Bant	4	5107		110	Mle	Timor-Leste	Hawaii			2020-05-04	N
3032 1437 Paula Wheeler 111 Mle Greenland Connecticut Port Emilyton hmunoz@kent.com 2024-09-14 N 3034 3786 Karen Miller 22 f France NaN West Brenda zsmall@gmail.com 2023-05-20 N 3039 201 Clayton 80 f Russian South Carolina Andrewton cbennett@wright.com 2022-01-24 N 3298 5796 Angel Hood 53 Mle NaN Arkansas Lake Derek omar32@yahoo.com 2021-08-19 Band											
3034 3786 Karen Miller 22 f France NaN West Brenda zsmall@gmail.com 2023-05-20 Nan Miller 22 f Russian South Carolina Andrewton cbennett@wright.com 2022-01-24 Nan Miller South PhD South	2955	675	NaN	74	Male		Tennessee	Lake Beverly	nicholas42@yahoo.com	2025-09-17	Act
3039 201 Clayton 80 f Russian South Andrewton cbennett@wright.com 2022-01-24 N 3298 5796 Angel Hood 53 Mle NaN Arkansas Lake Derek omar32@yahoo.com 2021-08-19 Bani	3032	1437		111	Mle	Greenland	Connecticut	Port Emilyton	hmunoz@kent.com	2024-09-14	N
3039 201 Clayton 80 f Russian South Andrewton cbennett@wright.com 2022-01-24 N PhD Federation Carolina Andrewton cbennett@wright.com 2022-01-24 N South Andrewton cbennett@wright.com 2021-08-19 N South Andrewton cbennett@wright.com 20	3034	3786		22	f	France	NaN	West Brenda	zsmall@gmail.com	2023-05-20	N
Hood So Wile Nam Arkansas Lake Berek Sinaroz@yanos.com 2021-00-15 Ban	3039	201	Clayton	80	f			Andrewton	cbennett@wright.com	2022-01-24	N
500 rows × 25 columns	3298	5796	Angel Hood	53	Mle	NaN	Arkansas	Lake Derek	omar32@yahoo.com	2021-08-19	Banı
	500 ro	ws × 25 columns									

df['Name'] = df['Name'].fillna('Unknown')
df

/tmp/ipython-input-2059556363.py:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-verdf df['Name'] = df['Name'].fillna('Unknown')

	Customer_ID	Name	Age	Gender	Country	State	City	Email	Signup_Date	Account_Stat
0	1191	Larry Wallace	31	Other	NaN	Arkansas	Janetfort	gonzalezbrandi@shaffer- lambert.com	2021-05-23	Inact
1	8287	Shawn Palmer	20	Male	Uganda	Texas	Smithhaven	davidmendoza@hotmail.com	2025-05-18	N
2	6574	Daniel Cortez	105	Mle	Tajikistan	Montana	West Jennifermouth	hoffmancole@yahoo.com	2025-05-19	Act
3	3377	Cindy Barber	100	Female	Chile	Ohio	Staceyberg	carpenterlinda@yahoo.com	2024-08-19	Act
4	5107	William Patel	110	Mle	Timor-Leste	Hawaii	South Hollyfort	blairivan@lyons- christensen.org	2020-05-04	N
2955	675	Unknown	74	Male	Netherlands Antilles	Tennessee	Lake Beverly	nicholas42@yahoo.com	2025-09-17	Act
3032	1437	Paula Wheeler	111	Mle	Greenland	Connecticut	Port Emilyton	hmunoz@kent.com	2024-09-14	N
3034	3786	Karen Miller	22	f	France	NaN	West Brenda	zsmall@gmail.com	2023-05-20	N
3039	201	Kirk Clayton PhD	80	f	Russian Federation	South Carolina	Andrewton	cbennett@wright.com	2022-01-24	N
3298	5796	Angel Hood	53	Mle	NaN	Arkansas	Lake Derek	omar32@yahoo.com	2021-08-19	Banr

df['Email'].fillna('noemail@example.com')
df

1191 8287 6574 3377 5107	Name Larry Wallace Shawn Palmer Daniel Cortez Cindy Barber William Patel	31 20 105	Other Male Mile Mile	NaN Uganda Tajikistan Chile	Arkansas Texas Montana Ohio	West Jennifermouth Staceyberg	gonzalezbrandi@shaffer-lambert.com davidmendoza@hotmail.com hoffmancole@yahoo.com carpenterlinda@yahoo.com	2021-05-23 2025-05-18 2025-05-19 2024-08-19	Ina A
8287 6574 3377 5107	Shawn Palmer Daniel Cortez Cindy Barber William	20 105 100	Male Mle Female	Uganda Tajikistan Chile	Texas Montana Ohio	Smithhaven West Jennifermouth Staceyberg	lambert.com davidmendoza@hotmail.com hoffmancole@yahoo.com	2025-05-18 2025-05-19	Α
6574 3377 5107	Palmer Daniel Cortez Cindy Barber William	105	Mle Female	Tajikistan Chile	Montana Ohio	West Jennifermouth Staceyberg	hoffmancole@yahoo.com	2025-05-19	А
3377 5107	Cortez Cindy Barber William	100	Female	Chile	Ohio	Jennifermouth Staceyberg	_		
5107	Barber William					, ,	carpenterlinda@yahoo.com	2024-08-19	A
		110	Mle	Timor-Leste	Haweii				
					Hawaii	South Hollyfort	blairivan@lyons- christensen.org	2020-05-04	
675	Unknown	74	Male	Netherlands Antilles	Tennessee	Lake Beverly	nicholas42@yahoo.com	2025-09-17	A
1437	Paula Wheeler	111	Mle	Greenland	Connecticut	Port Emilyton	hmunoz@kent.com	2024-09-14	
3786	Karen Miller	22	f	France	NaN	West Brenda	zsmall@gmail.com	2023-05-20	
201	Kirk Clayton PhD	80	f	Russian Federation	South Carolina	Andrewton	cbennett@wright.com	2022-01-24	
5796	Angel Hood	53	Mle	NaN	Arkansas	Lake Derek	omar32@yahoo.com	2021-08-19	Ва
	1437 3786 201 5796	Wheeler 3786 Karen Miller Kirk 201 Clayton PhD 5706 Angel	1437 Paula Wheeler 111 3786 Karen Miller 22 201 Clayton PhD 80 5796 Angel Hood 53	1437 Paula Wheeler 111 Mle 3786 Karen Miller 22 f Clayton PhD 80 f Angel Hood 53 Mle	1437 Paula Wheeler 111 Mle Greenland 3786 Karen Miller 22 f France 201 Clayton 80 f Russian Federation 5796 Angel Hood 53 Mle NaN	1437 Paula Wheeler 111 Mle Greenland Connecticut 3786 Karen Miller 22 f France NaN Clayton PhD 80 f Russian South Carolina 5796 Angel Hood 53 Mle NaN Arkansas	1437 Paula Wheeler 111 Mle Greenland Connecticut Port Emilyton 3786 Karen Miller 22 f France NaN West Brenda 201 Clayton PhD 80 f Russian South Carolina Andrewton PhD Angel Hood 53 Mle NaN Arkansas Lake Derek	Antilles lennessee Lake Beverly hicholas42@yanoo.com Paula Wheeler 111 Mle Greenland Connecticut Port Emilyton hmunoz@kent.com Karen Miller 22 f France NaN West Brenda zsmall@gmail.com Kirk Clayton PhD 80 f Russian South Carolina Andrewton cbennett@wright.com Federation Carolina Lake Derek omar32@yahoo.com	Antilles lennessee Lake Beverly nicholas42@yanoo.com 2023-09-17 Paula Wheeler 111 Mle Greenland Connecticut Port Emilyton hmunoz@kent.com 2024-09-14 Karen Miller 22 f France NaN West Brenda zsmall@gmail.com 2023-05-20 Kirk Clayton 80 f Russian South Carolina Andrewton cbennett@wright.com 2022-01-24 Angel Hood 53 Mle NaN Arkansas Lake Derek omar32@yahoo.com 2021-08-19

df['Product_Name'] = df['Product_Name'].fillna('Misc')
df

/tmp/ipython-input-1685545772.py:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-ver df['Product_Name'] = df['Product_Name'].fillna('Misc')

2.1	Customer_ID			Gender	Country	State	City	Email	Signup_Date	Account_Stat
0	1191	Larry Wallace	31	Other	NaN	Arkansas	Janetfort	gonzalezbrandi@shaffer- lambert.com	2021-05-23	Inact
1	8287	Shawn Palmer	20	Male	Uganda	Texas	Smithhaven	davidmendoza@hotmail.com	2025-05-18	N
2	6574	Daniel Cortez	105	Mle	Tajikistan	Montana	West Jennifermouth	hoffmancole@yahoo.com	2025-05-19	Act
3	3377	Cindy Barber	100	Female	Chile	Ohio	Staceyberg	carpenterlinda@yahoo.com	2024-08-19	Act
4	5107	William Patel	110	Mle	Timor-Leste	Hawaii	South Hollyfort	blairivan@lyons- christensen.org	2020-05-04	N
2955	675	Unknown	74	Male	Netherlands Antilles	Tennessee	Lake Beverly	nicholas42@yahoo.com	2025-09-17	Act
3032	1437	Paula Wheeler	111	Mle	Greenland	Connecticut	Port Emilyton	hmunoz@kent.com	2024-09-14	N
3034	3786	Karen Miller	22	f	France	NaN	West Brenda	zsmall@gmail.com	2023-05-20	N
3039	201	Kirk Clayton PhD	80	f	Russian Federation	South Carolina	Andrewton	cbennett@wright.com	2022-01-24	N
3298	5796	Angel Hood	53	Mle	NaN	Arkansas	Lake Derek	omar32@yahoo.com	2021-08-19	Banr

df['Category'] = df['Category'].fillna('Misc')
df

/tmp/ipython-input-1577046602.py:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-verdf df['Category'] = df['Category'].fillna('Misc')

	Customer_ID	Name	Age	Gender	Country	State	City	Email	Signup_Date	Account_Stat
0	1191	Larry Wallace	31	Other	NaN	Arkansas	Janetfort	gonzalezbrandi@shaffer- lambert.com	2021-05-23	Inact
1	8287	Shawn Palmer	20	Male	Uganda	Texas	Smithhaven	davidmendoza@hotmail.com	2025-05-18	N
2	6574	Daniel Cortez	105	Mle	Tajikistan	Montana	West Jennifermouth	hoffmancole@yahoo.com	2025-05-19	Act
3	3377	Cindy Barber	100	Female	Chile	Ohio	Staceyberg	carpenterlinda@yahoo.com	2024-08-19	Act
4	5107	William Patel	110	Mle	Timor-Leste	Hawaii	South Hollyfort	blairivan@lyons- christensen.org	2020-05-04	N
2955	675	Unknown	74	Male	Netherlands Antilles	Tennessee	Lake Beverly	nicholas42@yahoo.com	2025-09-17	Act
3032	1437	Paula Wheeler	111	Mle	Greenland	Connecticut	Port Emilyton	hmunoz@kent.com	2024-09-14	N
3034	3786	Karen Miller	22	f	France	NaN	West Brenda	zsmall@gmail.com	2023-05-20	N
3039	201	Kirk Clayton PhD	80	f	Russian Federation	South Carolina	Andrewton	cbennett@wright.com	2022-01-24	N
3298	5796	Angel Hood	53	Mle	NaN	Arkansas	Lake Derek	omar32@yahoo.com	2021-08-19	Banr

df['Feedback_Score'] = df.groupby('Product_ID')['Feedback_Score'].transform(lambda x: x.fillna(x.median()))
df

/tmp/ipython-input-2618572678.py:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-ver df['Feedback_Score'] = df.groupby('Product_ID')['Feedback_Score'].transform(lambda x: x.fillna(x.median()))

Account_Stat	Signup_Date	Email	City	State	Country	Gender	Age	Name	Customer_ID	
Inact	2021-05-23	gonzalezbrandi@shaffer- lambert.com	Janetfort	Arkansas	NaN	Other	31	Larry Wallace	1191	0
N	2025-05-18	davidmendoza@hotmail.com	Smithhaven	Texas	Uganda	Male	20	Shawn Palmer	8287	1
Act	2025-05-19	hoffmancole@yahoo.com	West Jennifermouth	Montana	Tajikistan	Mle	105	Daniel Cortez	6574	2
Act	2024-08-19	carpenterlinda@yahoo.com	Staceyberg	Ohio	Chile	Female	100	Cindy Barber	3377	3
N	2020-05-04	blairivan@lyons- christensen.org	South Hollyfort	Hawaii	Timor-Leste	Mle	110	William Patel	5107	4
Act	2025-09-17	nicholas42@yahoo.com	Lake Beverly	Tennessee	Netherlands Antilles	Male	74	Unknown	675	2955
N	2024-09-14	hmunoz@kent.com	Port Emilyton	Connecticut	Greenland	Mle	111	Paula Wheeler	1437	3032
N	2023-05-20	zsmall@gmail.com	West Brenda	NaN	France	f	22	Karen Miller	3786	3034
N	2022-01-24	cbennett@wright.com	Andrewton	South Carolina	Russian Federation	f	80	Kirk Clayton PhD	201	3039
Banr	2021-08-19	omar32@yahoo.com	Lake Derek	Arkansas	NaN	Mle	53	Angel Hood	5796	3298

df['Quantity'] = df['Quantity'].fillna(1)
df

/tmp/ipython-input-54306166.py:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-ver df['Quantity'] = df['Quantity'].fillna(1)

	Customer_ID	Name	Age	Gender	Country	State	City	Email	Signup_Date	Account_Stat
0	1191	Larry Wallace	31	Other	NaN	Arkansas	Janetfort	gonzalezbrandi@shaffer- lambert.com	2021-05-23	Inact
1	8287	Shawn Palmer	20	Male	Uganda	Texas	Smithhaven	davidmendoza@hotmail.com	2025-05-18	N
2	6574	Daniel Cortez	105	Mle	Tajikistan	Montana	West Jennifermouth	hoffmancole@yahoo.com	2025-05-19	Act
3	3377	Cindy Barber	100	Female	Chile	Ohio	Staceyberg	carpenterlinda@yahoo.com	2024-08-19	Act
4	5107	William Patel	110	Mle	Timor-Leste	Hawaii	South Hollyfort	blairivan@lyons- christensen.org	2020-05-04	N
2955	675	Unknown	74	Male	Netherlands Antilles	Tennessee	Lake Beverly	nicholas42@yahoo.com	2025-09-17	Act
3032	1437	Paula Wheeler	111	Mle	Greenland	Connecticut	Port Emilyton	hmunoz@kent.com	2024-09-14	N
3034	3786	Karen Miller	22	f	France	NaN	West Brenda	zsmall@gmail.com	2023-05-20	N
3039	201	Kirk Clayton PhD	80	f	Russian Federation	South Carolina	Andrewton	cbennett@wright.com	2022-01-24	N
3298	5796	Angel Hood	53	Mle	NaN	Arkansas	Lake Derek	omar32@yahoo.com	2021-08-19	Banr

df = df[df['Price'] >= 0]
df

3 3377 Cindy Barber 100 Female Chile Ohio Staceyberg carpenterfinda@yahoo.com 2024-08-19 Acc 4 5107 William Patel 110 Mle Timor-Leste Hawaii South Hollyfort christensen.org 2020-05-04 In	UZ FIVI						paridas	data cieariiriy	- Colab		
1 8287 Shawn Palmer 20 Male Uganda Texas Smithhaven davidmendoza@hotmail.com 2025-05-18 Inational Lambert.com 2 6574 Daniel Cortez 105 Mile Tajikistan Montana Jennifermouth hoffmancole@yahoo.com 2025-05-19 Additional Lambert.com 3 3377 Cindy Barber 100 Female Chile Ohio Staceyberg carpenterlinda@yahoo.com 2024-08-19 Additional Lambert.com 4 5107 William Patel 110 Mile Timor-Leste Hawaii South Hollyfort blainivan@lyons-christensen.org 2020-05-04 Institute Lambert.com 2955 675 Unknown 74 Male Netherlands Antilles Tennessee Lake Beverty nicholas42@yahoo.com 2025-09-17 Additional Lambert.com 3032 1437 Paula Wheeler 111 Mile Greenland Connecticut Port Emilyton hmunoz@kent.com 2024-09-14 Institute Lambert.com 3034 3786 Karen Mile 22 <th< th=""><th></th><th>Customer_ID</th><th>Name</th><th>Age</th><th>Gender</th><th>Country</th><th>State</th><th>City</th><th>Email</th><th>Signup_Date</th><th>Account_Sta</th></th<>		Customer_ID	Name	Age	Gender	Country	State	City	Email	Signup_Date	Account_Sta
1 626 Palmer Palmer 20 Male Ogana lexas Sminnaven davidinendozaginomal.com 2025-05-19 Indicated and the part of the pa	0	1191		31	Other	NaN	Arkansas	Janetfort		2021-05-23	Inac
3 3377 Context 105 Mile lajikistan Montana Jennifermouth norman-cole@yanoo.com 2025-05-19 Activated and the second series of the second second series of the second series of the second second series of the second second series of the second	1	8287		20	Male	Uganda	Texas	Smithhaven	davidmendoza@hotmail.com	2025-05-18	I
Barber 100 Feliale Clille Clillo Slaceyoring Carpeninana@yando.com 2021-08-19 Activities and the state of the	2	6574		105	Mle	Tajikistan	Montana		hoffmancole@yahoo.com	2025-05-19	Ac
10	3	3377		100	Female	Chile	Ohio	Staceyberg	carpenterlinda@yahoo.com	2024-08-19	Ac
2955 675 Unknown 74 Male Netherlands Antilles Tennessee Lake Beverly nicholas42@yahoo.com 2025-09-17 Accordinate Antilles Tennessee Lake Beverly nicholas42@yahoo.com 2024-09-14 In the second sec	4	5107		110	Mle	Timor-Leste	Hawaii		0,	2020-05-04	١
3032 1437 Paula Wheeler 111 Mle Greenland Connecticut Port Emilyton hmunoz@kent.com 2024-09-14 I Male Wheeler 111 Mle Greenland Connecticut Port Emilyton hmunoz@kent.com 2024-09-14 I Male Sample Sam											
3034 3786 Karen Miller 22 f France NaN West Brenda zsmall@gmail.com 2023-05-20 M 3039 201 Clayton PhD 80 f Russian South Carolina Andrewton cbennett@wright.com 2022-01-24 M 3298 5796 Angel Hood 53 Mle NaN Arkansas Lake Derek omar32@yahoo.com 2021-08-19 Ban	2955	675	Unknown	74	Male		Tennessee	Lake Beverly	nicholas42@yahoo.com	2025-09-17	Ac
3039 Solution and	3032	1437	Paula Wheeler	111	Mle	Greenland	Connecticut	Port Emilyton	hmunoz@kent.com	2024-09-14	1
3039 201 Clayton 80 f Russian South Andrewton cbennett@wright.com 2022-01-24 f PhD South Federation Carolina Andrewton cbennett@wright.com 2022-01-24 f South Andrewton cbennett@wright.com 2021-01-24 f South Andrewton cbennett@wright.	3034	3786		22	f	France	NaN	West Brenda	zsmall@gmail.com	2023-05-20	1
Hood 55 Mile INAIN AIRAIISAS LARE DEIER UITIATSZWYAITOU.CUITI 2021-00-19 Dati	3039	201	Clayton	80	f			Andrewton	cbennett@wright.com	2022-01-24	1
475 rows × 25 columns	3298	5796		53	Mle	NaN	Arkansas	Lake Derek	omar32@yahoo.com	2021-08-19	Bar
	475 ro	ws × 25 columns	;								

df = df[df['Price'] > 0]
df

.UZ FIVI						paridas	data cieariiriy	- Colab		
	Customer_ID	Name	Age	Gender	Country	State	City	Email	Signup_Date	Account_Sta
0	1191	Larry Wallace	31	Other	NaN	Arkansas	Janetfort	gonzalezbrandi@shaffer- lambert.com	2021-05-23	Inac
1	8287	Shawn Palmer	20	Male	Uganda	Texas	Smithhaven	davidmendoza@hotmail.com	2025-05-18	1
2	6574	Daniel Cortez	105	Mle	Tajikistan	Montana	West Jennifermouth	hoffmancole@yahoo.com	2025-05-19	Ac
3	3377	Cindy Barber	100	Female	Chile	Ohio	Staceyberg	carpenterlinda@yahoo.com	2024-08-19	Ac
4	5107	William Patel	110	Mle	Timor-Leste	Hawaii	South Hollyfort	blairivan@lyons- christensen.org	2020-05-04	Ν
2955	675	Unknown	74	Male	Netherlands Antilles	Tennessee	Lake Beverly	nicholas42@yahoo.com	2025-09-17	Act
3032	1437	Paula Wheeler	111	Mle	Greenland	Connecticut	Port Emilyton	hmunoz@kent.com	2024-09-14	Ν
3034	3786	Karen Miller	22	f	France	NaN	West Brenda	zsmall@gmail.com	2023-05-20	N
3039	201	Kirk Clayton PhD	80	f	Russian Federation	South Carolina	Andrewton	cbennett@wright.com	2022-01-24	N
3298	5796	Angel Hood	53	Mle	NaN	Arkansas	Lake Derek	omar32@yahoo.com	2021-08-19	Banı
475 ro	ws × 25 columns	S								

df = df[df['Quantity'] >= 0]
df

			data oloaimig							
Account_S	Signup_Date	Email	City	State	Country	Gender	Age	Name	Customer_ID	
lr	2021-05-23	gonzalezbrandi@shaffer- lambert.com	Janetfort	Arkansas	NaN	Other	31	Larry Wallace	1191	0
	2025-05-18	davidmendoza@hotmail.com	Smithhaven	Texas	Uganda	Male	20	Shawn Palmer	8287	1
	2025-05-19	hoffmancole@yahoo.com	West Jennifermouth	Montana	Tajikistan	Mle	105	Daniel Cortez	6574	2
	2024-08-19	carpenterlinda@yahoo.com	Staceyberg	Ohio	Chile	Female	100	Cindy Barber	3377	3
	2020-05-04	blairivan@lyons- christensen.org	South Hollyfort	Hawaii	Timor-Leste	Mle	110	William Patel	5107	4
	2025-09-17	nicholas42@yahoo.com	Lake Beverly	Tennessee	Netherlands Antilles	Male	74	Unknown	675	2955
	2024-09-14	hmunoz@kent.com	Port Emilyton	Connecticut	Greenland	Mle	111	Paula Wheeler	1437	3032
	2023-05-20	zsmall@gmail.com	West Brenda	NaN	France	f	22	Karen Miller	3786	3034
	2022-01-24	cbennett@wright.com	Andrewton	South Carolina	Russian Federation	f	80	Kirk Clayton PhD	201	3039
							53	Angel	5796	

 $\label{eq:df} df = df[(df['Age'] >= 0) & (df['Age'] <= 120)] \\ df$

1 8287 Shawn Palmer 20 Male Uganda Texas Smithhaven davidmendoza@hotmail.com 2025-05-18 I 2 6574 Daniel Cortez 105 Mile Tajikistan Montana West Hoffmancole@yahoo.com 2025-05-19 Additional Ad	UZ FIVI						paridas	data cieariiriy	- Colab		
1		Customer_ID	Name	Age	Gender	Country	State	City	Email	Signup_Date	Account_Sta
1 626 Palmer Palmer 20 Male Ogana lexas Sminnaven davidinendozaginormali.com 2026-05-16 Interest of the part of the pa	0	1191		31	Other	NaN	Arkansas	Janetfort		2021-05-23	Inac
3 3377 Context 105 Mile lajikistan Montana Jennifermouth hoffmancole@yahoo.com 2025-05-19 Accepted and the context of the cont	1	8287		20	Male	Uganda	Texas	Smithhaven	davidmendoza@hotmail.com	2025-05-18	ı
Barber 100 Feliale Clille Clillo Slaceyberg Carpenterinal@yarido.com 2020-05-04 M. 4 5107 William Patel 110 Mile Timor-Leste Hawaii South Hollyfort christensen.org 2020-05-04 M. 2955 675 Unknown 74 Male Netherlands Antilles Tennessee Lake Beverly nicholas42@yahoo.com 2025-09-17 Acc Antilles Tennessee Lake Beverly nicholas42@yahoo.com 2024-09-14 M. 3032 1437 Paula 111 Mile Greenland Connecticut Port Emilyton hmunoz@kent.com 2024-09-14 M. 3034 3786 Karen Miller 22 f France NaN West Brenda zsmall@gmail.com 2023-05-20 M. 3039 201 Clayfon 80 f Russian South Federation Carolina Andrewton cbennett@wright.com 2022-01-24 M. 3298 5796 Angel France NaN Arkansas Lake Derek omar32@yahoo.com 2021-08-19 Ban Hood	2	6574		105	Mle	Tajikistan	Montana		hoffmancole@yahoo.com	2025-05-19	Ac
10	3	3377		100	Female	Chile	Ohio	Staceyberg	carpenterlinda@yahoo.com	2024-08-19	Ac
2955 675 Unknown 74 Male Netherlands Antilles Tennessee Lake Beverly nicholas42@yahoo.com 2025-09-17 Acc Antilles Tennessee Lake Beverly nicholas42@yahoo.com 2024-09-14 No. Antilles Tennessee Lake Beverly nicholas42@yahoo.com 2024-09-17 Acc Antilles Tennessee Lake Beverly nicho	4	5107		110	Mle	Timor-Leste	Hawaii		0,	2020-05-04	٨
3032 1437 Paula Wheeler 111 Mle Greenland Connecticut Port Emilyton hmunoz@kent.com 2024-09-14 Male Meeler 111 Mle Greenland Connecticut Port Emilyton hmunoz@kent.com 2024-09-14 Male Meeler 111 Mle Greenland Connecticut Port Emilyton hmunoz@kent.com 2024-09-14 Male Meeler 111 Mle Greenland Connecticut Port Emilyton hmunoz@kent.com 2024-09-14 Male Meeler 111 Mle Greenland Connecticut Port Emilyton hmunoz@kent.com 2024-09-14 Male Male Meeler 111 Mle Greenland Connecticut Port Emilyton hmunoz@kent.com 2024-09-14 Male Male Male Male Male Meeler Male Meeler 111 Mle Greenland Connecticut Port Emilyton hmunoz@kent.com 2024-09-14 Male Male Male Male Male Male Male Male											
3034 3786 Karen Miller 22 f France NaN West Brenda zsmall@gmail.com 2023-05-20 M 3039 201 Clayton PhD 80 f Russian South Carolina Andrewton cbennett@wright.com 2022-01-24 M 3298 5796 Angel Hood 53 Mle NaN Arkansas Lake Derek omar32@yahoo.com 2021-08-19 Ban	2955	675	Unknown	74	Male		Tennessee	Lake Beverly	nicholas42@yahoo.com	2025-09-17	Ac
3039 201 Clayton 80 f Russian South Andrewton cbennett@wright.com 2022-01-24 N 3039 5796 Angel Hood 53 Mle NaN Arkansas Lake Derek omar32@yahoo.com 2021-08-19 Ban	3032	1437	Paula Wheeler	111	Mle	Greenland	Connecticut	Port Emilyton	hmunoz@kent.com	2024-09-14	١
3039 201 Clayton 80 f Russian South Andrewton cbennett@wright.com 2022-01-24 N PhD Federation Carolina Andrewton cbennett@wright.com 2022-01-24 N 3298 5796 Angel Hood 53 Mle NaN Arkansas Lake Derek omar32@yahoo.com 2021-08-19 Ban	3034	3786		22	f	France	NaN	West Brenda	zsmall@gmail.com	2023-05-20	1
Hood 55 Mile Main Alkalisas Lake Delek Ullial 32 (@yalioo.com 2021-00-19 Dali	3039	201	Clayton	80	f			Andrewton	cbennett@wright.com	2022-01-24	1
333 rows × 25 columns	3298	5796		53	Mle	NaN	Arkansas	Lake Derek	omar32@yahoo.com	2021-08-19	Ban
	333 ro	ws × 25 columns	5								

df = df[(df['Feedback_Score'] >= 1) & (df['Feedback_Score'] <= 5)]
df</pre>

02 1 101						paridao	data cicariirig	Golds		
	Customer_ID	Name	Age	Gender	Country	State	City	Email	Signup_Date	Account_Sta
0	1191	Larry Wallace	31	Other	NaN	Arkansas	Janetfort	gonzalezbrandi@shaffer- lambert.com	2021-05-23	Inac
1	8287	Shawn Palmer	20	Male	Uganda	Texas	Smithhaven	davidmendoza@hotmail.com	2025-05-18	ı
2	6574	Daniel Cortez	105	Mle	Tajikistan	Montana	West Jennifermouth	hoffmancole@yahoo.com	2025-05-19	Ac
3	3377	Cindy Barber	100	Female	Chile	Ohio	Staceyberg	carpenterlinda@yahoo.com	2024-08-19	Ac
4	5107	William Patel	110	Mle	Timor-Leste	Hawaii	South Hollyfort	blairivan@lyons- christensen.org	2020-05-04	١
2657	1802	Brian Simon	114	Mle	Latvia	Tennessee	New Cynthia	uwalker@graham.org	2021-04-27	Ban
2710	1332	Courtney Jenkins	99	f	Mauritania	Alabama	Gonzalezton	jenniferreid@hotmail.com	2025-10-13	Ac
2955	675	Unknown	74	Male	Netherlands Antilles	Tennessee	Lake Beverly	nicholas42@yahoo.com	2025-09-17	Ac
3032	1437	Paula Wheeler	111	Mle	Greenland	Connecticut	Port Emilyton	hmunoz@kent.com	2024-09-14	1
3039	201	Kirk Clayton PhD	80	f	Russian Federation	South Carolina	Andrewton	cbennett@wright.com	2022-01-24	ı
233 ro	ws × 25 columns	3								

df = df[df['Delivery_Date'] >= df['Purchase_Date']]
df

Account_	Signup_Date	Email	City	State	Country	Gender	Age	Name	Customer_ID	
ı	2021-05-23	gonzalezbrandi@shaffer- lambert.com	Janetfort	Arkansas	NaN	Other	31	Larry Wallace	1191	0
	2025-05-18	davidmendoza@hotmail.com	Smithhaven	Texas	Uganda	Male	20	Shawn Palmer	8287	1
	2020-08-02	yvonne52@hall.com	Samanthachester	Idaho	Germany	Mle	83	Louis Cuevas	1379	10
	2021-09-03	erica26@yahoo.com	New Jamieland	Mississippi	Hong Kong	Male	109	Tracy Reed	7739	11
	2020-08-19	ocruz@yahoo.com	Lake Michael	Nebraska	Rwanda	Mle	15	Lynn Garcia	211	13
I	2021-04-30	englishdiane@guzman- schneider.com	Robertsberg	Colorado	Isle of Man	Other	113	Robert Price	5178	1756
I	2020-07-26	timothypeters@yahoo.com	South Douglasbury	Missouri	Antarctica (the territory South of 60 deg S)	Mle	116	Derek Martinez	2268	1950
	2023-12-15	brose@chavez.com	Kimstad	New Mexico	Antigua and Barbuda	Male	58	Erin Goodwin	3253	2175
١	2020-01-08	mariamoyer@yahoo.com	Robinberg	California	Afghanistan	Female	110	Michael Lee	8324	2240
I	2023-05-13	bthomas@evans.com	Morganhaven	Arkansas	Germany	Male	9	Timothy Miller	3364	2417

df['Gender'] = df['Gender'].replace({'Mle':'Male','m':'Male','f':'Female','Fmale':'Female'})
df

/tmp/ipython-input-1943499802.py:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-ver df['Gender'] = df['Gender'].replace({'Mle':'Male','m':'Male','f':'Female','Fmale':'Female'})

Account St	Signup_Date	Email	City	State	Country	Gender	Age	Name	Customer ID	
lna	2021-05-23	gonzalezbrandi@shaffer- lambert.com	Janetfort	Arkansas	NaN	Other	31	Larry Wallace	1191	0
	2025-05-18	davidmendoza@hotmail.com	Smithhaven	Texas	Uganda	Male	20	Shawn Palmer	8287	1
	2020-08-02	yvonne52@hall.com	Samanthachester	Idaho	Germany	Male	83	Louis Cuevas	1379	10
	2021-09-03	erica26@yahoo.com	New Jamieland	Mississippi	Hong Kong	Male	109	Tracy Reed	7739	11
A	2020-08-19	ocruz@yahoo.com	Lake Michael	Nebraska	Rwanda	Male	15	Lynn Garcia	211	13
Ina	2021-04-30	englishdiane@guzman- schneider.com	Robertsberg	Colorado	Isle of Man	Other	113	Robert Price	5178	1756
Ва	2020-07-26	timothypeters@yahoo.com	South Douglasbury	Missouri	Antarctica (the territory South of 60 deg S)	Male	116	Derek Martinez	2268	1950
	2023-12-15	brose@chavez.com	Kimstad	New Mexico	Antigua and Barbuda	Male	58	Erin Goodwin	3253	2175
Ina	2020-01-08	mariamoyer@yahoo.com	Robinberg	California	Afghanistan	Female	110	Michael Lee	8324	2240

df['Payment_Type'] = df['Payment_Type'].str.strip().str.title()
df

/tmp/ipython-input-359501598.py:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-ver df['Payment_Type'] = df['Payment_Type'].str.strip().str.title()

Account_St	Signup_Date	Email	City	State	Country	Gender	Age	Name	Customer_ID	
Ina	2021-05-23	gonzalezbrandi@shaffer- lambert.com	Janetfort	Arkansas	NaN	Other	31	Larry Wallace	1191	0
	2025-05-18	davidmendoza@hotmail.com	Smithhaven	Texas	Uganda	Male	20	Shawn Palmer	8287	1
	2020-08-02	yvonne52@hall.com	Samanthachester	Idaho	Germany	Male	83	Louis Cuevas	1379	10
	2021-09-03	erica26@yahoo.com	New Jamieland	Mississippi	Hong Kong	Male	109	Tracy Reed	7739	11
A	2020-08-19	ocruz@yahoo.com	Lake Michael	Nebraska	Rwanda	Male	15	Lynn Garcia	211	13
Ina	2021-04-30	englishdiane@guzman- schneider.com	Robertsberg	Colorado	Isle of Man	Other	113	Robert Price	5178	1756
Ва	2020-07-26	timothypeters@yahoo.com	South Douglasbury	Missouri	Antarctica (the territory South of 60 deg S)	Male	116	Derek Martinez	2268	1950
	2023-12-15	brose@chavez.com	Kimstad	New Mexico	Antigua and Barbuda	Male	58	Erin Goodwin	3253	2175
Ina	2020-01-08	mariamoyer@yahoo.com	Robinberg	California	Afghanistan	Female	110	Michael Lee	8324	2240

df['Account_Status'] = df['Account_Status'].str.capitalize().replace({'Actve':'Active','Inactiv':'Inactive','Baned':'Banned'})
df

/tmp/ipython-input-2896010401.py:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-ver df['Account_Status'] = df['Account_Status'].str.capitalize().replace({'Actve':'Active','Inactiv':'Inactiv':'Baned':'Banned'})

Account_Sta	Signup_Date	Email	City	State	Country	Gender	Age	Name	Customer_ID	
Ina	2021-05-23	gonzalezbrandi@shaffer- lambert.com	Janetfort	Arkansas	NaN	Other	31	Larry Wallace	1191	0
	2025-05-18	davidmendoza@hotmail.com	Smithhaven	Texas	Uganda	Male	20	Shawn Palmer	8287	1
	2020-08-02	yvonne52@hall.com	Samanthachester	Idaho	Germany	Male	83	Louis Cuevas	1379	10
	2021-09-03	erica26@yahoo.com	New Jamieland	Mississippi	Hong Kong	Male	109	Tracy Reed	7739	11
А	2020-08-19	ocruz@yahoo.com	Lake Michael	Nebraska	Rwanda	Male	15	Lynn Garcia	211	13
Ina	2021-04-30	englishdiane@guzman- schneider.com	Robertsberg	Colorado	Isle of Man	Other	113	Robert Price	5178	1756
Bar	2020-07-26	timothypeters@yahoo.com	South Douglasbury	Missouri	Antarctica (the territory South of 60 deg S)	Male	116	Derek Martinez	2268	1950
	2023-12-15	brose@chavez.com	Kimstad	New Mexico	Antigua and Barbuda	Male	58	Erin Goodwin	3253	2175
Ina	2020-01-08	mariamoyer@yahoo.com	Robinberg	California	Afghanistan	Female	110	Michael Lee	8324	2240

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df = df[df['Email'].str.contains(r'^[\w\.-]+@[\w\.-]+\.\w+\$', na=False)]

df

Account_	Signup_Date	Email	City	State	Country	Gender	Age	Name	Customer_ID	
I	2021-05-23	gonzalezbrandi@shaffer- lambert.com	Janetfort	Arkansas	NaN	Other	31	Larry Wallace	1191	0
	2025-05-18	davidmendoza@hotmail.com	Smithhaven	Texas	Uganda	Male	20	Shawn Palmer	8287	1
	2020-08-02	yvonne52@hall.com	Samanthachester	Idaho	Germany	Male	83	Louis Cuevas	1379	10
	2021-09-03	erica26@yahoo.com	New Jamieland	Mississippi	Hong Kong	Male	109	Tracy Reed	7739	11
	2020-08-19	ocruz@yahoo.com	Lake Michael	Nebraska	Rwanda	Male	15	Lynn Garcia	211	13
I	2021-04-30	englishdiane@guzman- schneider.com	Robertsberg	Colorado	Isle of Man	Other	113	Robert Price	5178	1756
E	2020-07-26	timothypeters@yahoo.com	South Douglasbury	Missouri	Antarctica (the territory South of 60 deg S)	Male	116	Derek Martinez	2268	1950
	2023-12-15	brose@chavez.com	Kimstad	New Mexico	Antigua and Barbuda	Male	58	Erin Goodwin	3253	2175
I	2020-01-08	mariamoyer@yahoo.com	Robinberg	California	Afghanistan	Female	110	Michael Lee	8324	2240
E	2023-05-13	bthomas@evans.com	Morganhaven	Arkansas	Germany	Male	9	Timothy Miller	3364	2417

df[df['Price'] > 500]
df

Account_	Signup_Date	Email	City	State	Country	Gender	Age	Name	Customer_ID	
I	2021-05-23	gonzalezbrandi@shaffer- lambert.com	Janetfort	Arkansas	NaN	Other	31	Larry Wallace	1191	0
	2025-05-18	dmendoza@hotmail.com	Smithhaven	Texas	Uganda	Male	20	Shawn Palmer	8287	1
	2020-08-02	yvonne52@hall.com	Samanthachester	Idaho	Germany	Male	83	Louis Cuevas	1379	10
	2021-09-03	erica26@yahoo.com	New Jamieland	Mississippi	Hong Kong	Male	109	Tracy Reed	7739	11
	2020-08-19	ocruz@yahoo.com	Lake Michael	Nebraska	Rwanda	Male	15	Lynn Garcia	211	13
I	2021-04-30	englishdiane@guzman- schneider.com	Robertsberg	Colorado	Isle of Man	Other	113	Robert Price	5178	1756
E	2020-07-26	nothypeters@yahoo.com	South Douglasbury	Missouri	Antarctica (the territory South of 60 deg S)	Male	116	Derek Martinez	2268	1950
	2023-12-15	brose@chavez.com	Kimstad	New Mexico	Antigua and Barbuda	Male	58	Erin Goodwin	3253	2175
I	2020-01-08	nariamoyer@yahoo.com	Robinberg	California	Afghanistan	Female	110	Michael Lee	8324	2240
		bthomas@evans.com	Morganhaven	Arkansas	Germany	Male	9	Timothy	3364	

df[df['Feedback_Score'] < 3]
df</pre>

Account_	Signup_Date	Email	City	State	Country	Gender	Age	Name	Customer_ID	
I	2021-05-23	gonzalezbrandi@shaffer- lambert.com	Janetfort	Arkansas	NaN	Other	31	Larry Wallace	1191	0
	2025-05-18	davidmendoza@hotmail.com	Smithhaven	Texas	Uganda	Male	20	Shawn Palmer	8287	1
	2020-08-02	yvonne52@hall.com	Samanthachester	Idaho	Germany	Male	83	Louis Cuevas	1379	10
	2021-09-03	erica26@yahoo.com	New Jamieland	Mississippi	Hong Kong	Male	109	Tracy Reed	7739	11
	2020-08-19	ocruz@yahoo.com	Lake Michael	Nebraska	Rwanda	Male	15	Lynn Garcia	211	13
I	2021-04-30	englishdiane@guzman- schneider.com	Robertsberg	Colorado	Isle of Man	Other	113	Robert Price	5178	1756
E	2020-07-26	timothypeters@yahoo.com	South Douglasbury	Missouri	Antarctica (the territory South of 60 deg S)	Male	116	Derek Martinez	2268	1950
	2023-12-15	brose@chavez.com	Kimstad	New Mexico	Antigua and Barbuda	Male	58	Erin Goodwin	3253	2175
I	2020-01-08	mariamoyer@yahoo.com	Robinberg	California	Afghanistan	Female	110	Michael Lee	8324	2240
E	2023-05-13	bthomas@evans.com	Morganhaven	Arkansas	Germany	Male	9	Timothy Miller	3364	2417

df[(df['Customer_Loyalty']=='VIP') & (df['Total_Purchase']>1000)]
df

Account_	Signup_Date	Email	City	State	Country	Gender	Age	Name	Customer_ID	
I	2021-05-23	gonzalezbrandi@shaffer- lambert.com	Janetfort	Arkansas	NaN	Other	31	Larry Wallace	1191	0
	2025-05-18	davidmendoza@hotmail.com	Smithhaven	Texas	Uganda	Male	20	Shawn Palmer	8287	1
	2020-08-02	yvonne52@hall.com	Samanthachester	Idaho	Germany	Male	83	Louis Cuevas	1379	10
	2021-09-03	erica26@yahoo.com	New Jamieland	Mississippi	Hong Kong	Male	109	Tracy Reed	7739	11
	2020-08-19	ocruz@yahoo.com	Lake Michael	Nebraska	Rwanda	Male	15	Lynn Garcia	211	13
									•••	
ı	2021-04-30	englishdiane@guzman- schneider.com	Robertsberg	Colorado	Isle of Man	Other	113	Robert Price	5178	1756
I	2020-07-26	timothypeters@yahoo.com	South Douglasbury	Missouri	Antarctica (the territory South of 60 deg S)	Male	116	Derek Martinez	2268	1950
	2023-12-15	brose@chavez.com	Kimstad	New Mexico	Antigua and Barbuda	Male	58	Erin Goodwin	3253	2175
ļ	2020-01-08	mariamoyer@yahoo.com	Robinberg	California	Afghanistan	Female	110	Michael Lee	8324	2240
ı	2023-05-13	bthomas@evans.com	Morganhaven	Arkansas	Germany	Male	9	Timothy Miller	3364	2417

df[df['Account_Status']=='Banned']
df

Account_	Signup_Date	Email	City	State	Country	Gender	Age	Name	Customer_ID	
I	2021-05-23	gonzalezbrandi@shaffer- lambert.com	Janetfort	Arkansas	NaN	Other	31	Larry Wallace	1191	0
	2025-05-18	davidmendoza@hotmail.com	Smithhaven	Texas	Uganda	Male	20	Shawn Palmer	8287	1
	2020-08-02	yvonne52@hall.com	Samanthachester	Idaho	Germany	Male	83	Louis Cuevas	1379	10
	2021-09-03	erica26@yahoo.com	New Jamieland	Mississippi	Hong Kong	Male	109	Tracy Reed	7739	11
	2020-08-19	ocruz@yahoo.com	Lake Michael	Nebraska	Rwanda	Male	15	Lynn Garcia	211	13

I	2021-04-30	englishdiane@guzman- schneider.com	Robertsberg	Colorado	Isle of Man	Other	113	Robert Price	5178	1756
E	2020-07-26	timothypeters@yahoo.com	South Douglasbury	Missouri	Antarctica (the territory South of 60 deg S)	Male	116	Derek Martinez	2268	1950
	2023-12-15	brose@chavez.com	Kimstad	New Mexico	Antigua and Barbuda	Male	58	Erin Goodwin	3253	2175
I	2020-01-08	mariamoyer@yahoo.com	Robinberg	California	Afghanistan	Female	110	Michael Lee	8324	2240
	2023-05-13	bthomas@evans.com	Morganhaven	Arkansas	Germany	Male	9	Timothy	3364	2417

df[(df['Delivery_Date'] - df['Purchase_Date']).dt.days > 7]
df

Account_	Signup_Date	Email	City	State	Country	Gender	Age	Name	Customer_ID	
I	2021-05-23	gonzalezbrandi@shaffer- lambert.com	Janetfort	Arkansas	NaN	Other	31	Larry Wallace	1191	0
	2025-05-18	davidmendoza@hotmail.com	Smithhaven	Texas	Uganda	Male	20	Shawn Palmer	8287	1
	2020-08-02	yvonne52@hall.com	Samanthachester	Idaho	Germany	Male	83	Louis Cuevas	1379	10
	2021-09-03	erica26@yahoo.com	New Jamieland	Mississippi	Hong Kong	Male	109	Tracy Reed	7739	11
	2020-08-19	ocruz@yahoo.com	Lake Michael	Nebraska	Rwanda	Male	15	Lynn Garcia	211	13
			•••							
I	2021-04-30	englishdiane@guzman- schneider.com	Robertsberg	Colorado	Isle of Man	Other	113	Robert Price	5178	1756
E	2020-07-26	timothypeters@yahoo.com	South Douglasbury	Missouri	Antarctica (the territory South of 60 deg S)	Male	116	Derek Martinez	2268	1950
	2023-12-15	brose@chavez.com	Kimstad	New Mexico	Antigua and Barbuda	Male	58	Erin Goodwin	3253	2175
I	2020-01-08	mariamoyer@yahoo.com	Robinberg	California	Afghanistan	Female	110	Michael Lee	8324	2240
E	2023-05-13	bthomas@evans.com	Morganhaven	Arkansas	Germany	Male	9	Timothy Miller	3364	2417

df[df['Category']=='Electronics']
df

Account_	Signup_Date	Email	City	State	Country	Gender	Age	Name	Customer_ID	
I	2021-05-23	gonzalezbrandi@shaffer- lambert.com	Janetfort	Arkansas	NaN	Other	31	Larry Wallace	1191	0
	2025-05-18	davidmendoza@hotmail.com	Smithhaven	Texas	Uganda	Male	20	Shawn Palmer	8287	1
	2020-08-02	yvonne52@hall.com	Samanthachester	Idaho	Germany	Male	83	Louis Cuevas	1379	10
	2021-09-03	erica26@yahoo.com	New Jamieland	Mississippi	Hong Kong	Male	109	Tracy Reed	7739	11
	2020-08-19	ocruz@yahoo.com	Lake Michael	Nebraska	Rwanda	Male	15	Lynn Garcia	211	13
I	2021-04-30	englishdiane@guzman- schneider.com	Robertsberg	Colorado	Isle of Man	Other	113	Robert Price	5178	1756
E	2020-07-26	timothypeters@yahoo.com	South Douglasbury	Missouri	Antarctica (the territory South of 60 deg S)	Male	116	Derek Martinez	2268	1950
	2023-12-15	brose@chavez.com	Kimstad	New Mexico	Antigua and Barbuda	Male	58	Erin Goodwin	3253	2175
I	2020-01-08	mariamoyer@yahoo.com	Robinberg	California	Afghanistan	Female	110	Michael Lee	8324	2240
E	2023-05-13	bthomas@evans.com	Morganhaven	Arkansas	Germany	Male	9	Timothy Miller	3364	2417

df[df['Country']=='India']
df

Account_	Signup_Date	Email	City	State	Country	Gender	Age	Name	Customer_ID	
I	2021-05-23	gonzalezbrandi@shaffer- lambert.com	Janetfort	Arkansas	NaN	Other	31	Larry Wallace	1191	0
	2025-05-18	davidmendoza@hotmail.com	Smithhaven	Texas	Uganda	Male	20	Shawn Palmer	8287	1
	2020-08-02	yvonne52@hall.com	Samanthachester	Idaho	Germany	Male	83	Louis Cuevas	1379	10
	2021-09-03	erica26@yahoo.com	New Jamieland	Mississippi	Hong Kong	Male	109	Tracy Reed	7739	11
	2020-08-19	ocruz@yahoo.com	Lake Michael	Nebraska	Rwanda	Male	15	Lynn Garcia	211	13
I	2021-04-30	englishdiane@guzman- schneider.com	Robertsberg	Colorado	Isle of Man	Other	113	Robert Price	5178	1756
E	2020-07-26	timothypeters@yahoo.com	South Douglasbury	Missouri	Antarctica (the territory South of 60 deg S)	Male	116	Derek Martinez	2268	1950
	2023-12-15	brose@chavez.com	Kimstad	New Mexico	Antigua and Barbuda	Male	58	Erin Goodwin	3253	2175
I	2020-01-08	mariamoyer@yahoo.com	Robinberg	California	Afghanistan	Female	110	Michael Lee	8324	2240
E	2023-05-13	bthomas@evans.com	Morganhaven	Arkansas	Germany	Male	9	Timothy Miller	3364	2417

df[df['Quantity'] > 10]
df

Account_	Signup_Date	Email	City	State	Country	Gender	Age	Name	Customer_ID	
I	2021-05-23	gonzalezbrandi@shaffer- lambert.com	Janetfort	Arkansas	NaN	Other	31	Larry Wallace	1191	0
	2025-05-18	davidmendoza@hotmail.com	Smithhaven	Texas	Uganda	Male	20	Shawn Palmer	8287	1
	2020-08-02	yvonne52@hall.com	Samanthachester	Idaho	Germany	Male	83	Louis Cuevas	1379	10
	2021-09-03	erica26@yahoo.com	New Jamieland	Mississippi	Hong Kong	Male	109	Tracy Reed	7739	11
	2020-08-19	ocruz@yahoo.com	Lake Michael	Nebraska	Rwanda	Male	15	Lynn Garcia	211	13
			•••							
I	2021-04-30	englishdiane@guzman- schneider.com	Robertsberg	Colorado	Isle of Man	Other	113	Robert Price	5178	1756
E	2020-07-26	timothypeters@yahoo.com	South Douglasbury	Missouri	Antarctica (the territory South of 60 deg S)	Male	116	Derek Martinez	2268	1950
	2023-12-15	brose@chavez.com	Kimstad	New Mexico	Antigua and Barbuda	Male	58	Erin Goodwin	3253	2175
I	2020-01-08	mariamoyer@yahoo.com	Robinberg	California	Afghanistan	Female	110	Michael Lee	8324	2240
E	2023-05-13	bthomas@evans.com	Morganhaven	Arkansas	Germany	Male	9	Timothy Miller	3364	2417

df[df['Discount'] > 50]
df

Account_	Signup_Date	Email	City	State	Country	Gender	Age	Name	Customer_ID	
I	2021-05-23	gonzalezbrandi@shaffer- lambert.com	Janetfort	Arkansas	NaN	Other	31	Larry Wallace	1191	0
	2025-05-18	davidmendoza@hotmail.com	Smithhaven	Texas	Uganda	Male	20	Shawn Palmer	8287	1
	2020-08-02	yvonne52@hall.com	Samanthachester	Idaho	Germany	Male	83	Louis Cuevas	1379	10
	2021-09-03	erica26@yahoo.com	New Jamieland	Mississippi	Hong Kong	Male	109	Tracy Reed	7739	11
	2020-08-19	ocruz@yahoo.com	Lake Michael	Nebraska	Rwanda	Male	15	Lynn Garcia	211	13
			•••							
I	2021-04-30	englishdiane@guzman- schneider.com	Robertsberg	Colorado	Isle of Man	Other	113	Robert Price	5178	1756
E	2020-07-26	timothypeters@yahoo.com	South Douglasbury	Missouri	Antarctica (the territory South of 60 deg S)	Male	116	Derek Martinez	2268	1950
	2023-12-15	brose@chavez.com	Kimstad	New Mexico	Antigua and Barbuda	Male	58	Erin Goodwin	3253	2175
I	2020-01-08	mariamoyer@yahoo.com	Robinberg	California	Afghanistan	Female	110	Michael Lee	8324	2240
E	2023-05-13	bthomas@evans.com	Morganhaven	Arkansas	Germany	Male	9	Timothy Miller	3364	2417

df[df['Price']*df['Quantity'] > 1000]
df

Account_S	Signup_Date	Email	City	State	Country	Gender	Age	Name	Customer_ID	
lı	2021-05-23	gonzalezbrandi@shaffer- lambert.com	Janetfort	Arkansas	NaN	Other	31	Larry Wallace	1191	0
	2025-05-18	davidmendoza@hotmail.com	Smithhaven	Texas	Uganda	Male	20	Shawn Palmer	8287	1
	2020-08-02	yvonne52@hall.com	Samanthachester	Idaho	Germany	Male	83	Louis Cuevas	1379	10
	2021-09-03	erica26@yahoo.com	New Jamieland	Mississippi	Hong Kong	Male	109	Tracy Reed	7739	11
	2020-08-19	ocruz@yahoo.com	Lake Michael	Nebraska	Rwanda	Male	15	Lynn Garcia	211	13
lı	2021-04-30	englishdiane@guzman- schneider.com	Robertsberg	Colorado	Isle of Man	Other	113	Robert Price	5178	756
E	2020-07-26	timothypeters@yahoo.com	South Douglasbury	Missouri	Antarctica (the territory South of 60 deg S)	Male	116	Derek Martinez	2268	1950
	2023-12-15	brose@chavez.com	Kimstad	New Mexico	Antigua and Barbuda	Male	58	Erin Goodwin	3253	2175
lı	2020-01-08	mariamoyer@yahoo.com	Robinberg	California	Afghanistan	Female	110	Michael Lee	8324	2240
E	2023-05-13	bthomas@evans.com	Morganhaven	Arkansas	Germany	Male	9	Timothy Miller	3364	2417

df.groupby('Customer_ID').apply(lambda x:(x['Price']*x['Quantity']).sum())

```
/tmp/ipython-input-47298081.py:1: DeprecationWarning: DataFrameGroupBy.apply operated on the grouping columns. This behavior is
  df.groupby('Customer_ID').apply(lambda x:(x['Price']*x['Quantity']).sum())
Customer_ID
     116
               3578.55
     211
               4000.36
     334
              10235.68
     415
               5209.60
     454
               7222.65
    9025
               6468.63
    9044
               1001.52
               1797.08
    9347
    9425
               4421.12
    9437
               9585.50
111 rows × 1 columns
dtype: float64
```

```
df.groupby('Product_ID')['Feedback_Score'].mean()
             Feedback_Score
 Product_ID
      3
                          2.2
                          4.8
      8
                          3.1
      9
                          1.7
     10
                          1.4
    481
                          1.4
    483
                          1.0
    485
                          1.0
    486
                          3.7
    493
                          1.1
111 rows × 1 columns
dtype: float64
```

```
df.groupby('Customer_ID')['Category'].apply(lambda x:set(x)=={'Electronics'})
```

	Category
Customer_ID	
116	False
211	False
334	True
415	True
454	False
9025	True
9044	True
9347	True
9425	True
9437	False
111 rows × 1 c	olumns

 $\label{local_purchase'} $$ df[df['Customer_Loyalty'] == 'VIP']. groupby('Customer_ID').agg(\{'Total_Purchase': 'sum'\}).nlargest(10, 'Total_Purchase') $$ df[df['Customer_Loyalty'] == 'VIP'].groupby('Customer_ID').agg(\{'Total_Purchase': 'sum'\}).nlargest(10, 'Total_Purchase') $$ df[df['Customer_ID'].agg(\{'Total_Purchase': 'sum'\}).nlargest(10, 'Total_Purchase') $$ df['Customer_ID'].agg(['Customer_ID'].$ df ${\tt Customer_ID}$ Name Age Gender Country State City Email Signup_Date Account_Sta Larry gonzalezbrandi@shaffer-0 1191 31 Other NaN Arkansas Janetfort 2021-05-23 Ina Wallace lambert.com Shawn 8287 1 20 2025-05-18 Male Uganda Texas Smithhaven davidmendoza@hotmail.com Palmer Louis 10 1379 2020-08-02 83 Idaho Samanthachester yvonne52@hall.com Male Germany Cuevas Tracy 11 7739 109 Hong Kong Mississippi erica26@yahoo.com 2021-09-03 Male New Jamieland Reed Lynn 13 211 2020-08-19 Α 15 Male Rwanda Nebraska Lake Michael ocruz@yahoo.com Garcia Robert englishdiane@guzman-1756 5178 113 Other Isle of Man Colorado Robertsberg 2021-04-30 Ina Price schneider.com Antarctica (the Derek South 1950 2268 116 territory 2020-07-26 Male Missouri timothypeters@yahoo.com Bar Martinez Douglasbury South of 60 deg S) Antigua Erin New 2175 3253 58 2023-12-15 Male and Kimstad brose@chavez.com Goodwin Mexico Barbuda Michael 2240 8324 110 Female Afghanistan California Robinberg mariamoyer@yahoo.com 2020-01-08 Ina Lee Timothy 2417 3364 2023-05-13 Male Morganhaven Bar Germany Arkansas bthomas@evans.com Miller 111 rows × 25 columns

df[df['Customer_ID'].isna()]

Customer_ID Name Age Gender Country State City Email Signup_Date Account_Status ... Quantity Purchase_Date Delivery

O rows × 25 columns

	Customer_ID	Name	Age	Gender	Country	State	City	Email	Signup_Date	Account_S1
0	1191	Larry Wallace	31	Other	NaN	Arkansas	Janetfort	gonzalezbrandi@shaffer- lambert.com	2021-05-23	ln:
1	8287	Shawn Palmer	20	Male	Uganda	Texas	Smithhaven	davidmendoza@hotmail.com	2025-05-18	
10	1379	Louis Cuevas	83	Male	Germany	Idaho	Samanthachester	yvonne52@hall.com	2020-08-02	