

Importation de la bibliothèque Pandas

```
In [117]: import pandas as pd
```

Exploration des données

```
In [118]: df = pd.read_excel(r'C:\Users\ramik\OneDrive\Bureau\Project python\Data cleaning\Customer Call List (1).xlsx')
```

```
In [119]: df
```

Out[119]:

	CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_Contact	Not_Useful_Column
0	1001	Frodo	Baggins	123-545-5421	123 Shire Lane, Shire	Yes	No	True
1	1002	Abed	Nadir	123/643/9775	93 West Main Street	No	Yes	False
2	1003	Walter	/White	7066950392	298 Drugs Driveway	N	NaN	True
3	1004	Dwight	Schrute	123-543-2345	980 Paper Avenue, Pennsylvania, 18503	Yes	Y	True
4	1005	Jon	Snow	876 678 3469	123 Dragons Road	Y	No	True
5	1006	Ron	Swanson	304-762-2467	768 City Parkway	Yes	Yes	True
6	1007	Jeff	Winger	NaN	1209 South Street	No	No	False
7	1008	Sherlock	Holmes	876 678 3469	98 Clue Drive	N	No	False
8	1009	Gandalf	NaN	N/a	123 Middle Earth	Yes	NaN	False
9	1010	Peter	Parker	123-545-5421	25th Main Street, New York	Yes	No	True
10	1011	Samwise	Gamgee	NaN	612 Shire Lane, Shire	Yes	No	True
11	1012	Harry	...Potter	7066950392	2394 Hogwarts Avenue	Y	NaN	True
12	1013	Don	Draper	123-543-2345	2039 Main Street	Yes	N	False
13	1014	Leslie	Knope	876 678 3469	343 City Parkway	Yes	No	False
14	1015	Toby	Flenderson_	304-762-2467	214 HR Avenue	N	No	False
15	1016	Ron	Weasley	123-545-5421	2395 Hogwarts Avenue	No	N	False
16	1017	Michael	Scott	123/643/9775	121 Paper Avenue, Pennsylvania	Yes	No	False
17	1018	Clark	Kent	7066950392	3498 Super Lane	Y	NaN	True
18	1019	Creed	Braton	N/a	N/a	N/a	Yes	True
19	1020	Anakin	Skywalker	876 678 3469	910 Tatooine Road, Tatooine	Yes	N	True
20	1020	Anakin	Skywalker	876 678 3469	910 Tatooine Road, Tatooine	Yes	N	True

In [120...]

df.info()

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 21 entries, 0 to 20
Data columns (total 8 columns):
 #   Column           Non-Null Count  Dtype  
--- 
 0   CustomerID      21 non-null     int64  
 1   First_Name       21 non-null     object  
 2   Last_Name        20 non-null     object  
 3   Phone_Number     19 non-null     object  
 4   Address          21 non-null     object  
 5   Paying Customer  21 non-null     object  
 6   Do_Not_Contact   17 non-null     object  
 7   Not_Useful_Column 21 non-null    bool    
dtypes: bool(1), int64(1), object(6)
memory usage: 1.3+ KB
```

Supprimer les doublons

In [121...]

```
#Suppression des valeurs dupliquées
df.drop_duplicates()
```

Out[121]:

	CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_Contact	Not_Useful_Column
0	1001	Frodo	Baggins	123-545-5421	123 Shire Lane, Shire	Yes	No	True
1	1002	Abed	Nadir	123/643/9775	93 West Main Street	No	Yes	False
2	1003	Walter	/White	7066950392	298 Drugs Driveway	N	NaN	True
3	1004	Dwight	Schrute	123-543-2345	980 Paper Avenue, Pennsylvania, 18503	Yes	Y	True
4	1005	Jon	Snow	876 678 3469	123 Dragons Road	Y	No	True
5	1006	Ron	Swanson	304-762-2467	768 City Parkway	Yes	Yes	True
6	1007	Jeff	Winger	NaN	1209 South Street	No	No	False
7	1008	Sherlock	Holmes	876 678 3469	98 Clue Drive	N	No	False
8	1009	Gandalf	NaN	N/a	123 Middle Earth	Yes	NaN	False
9	1010	Peter	Parker	123-545-5421	25th Main Street, New York	Yes	No	True
10	1011	Samwise	Gamgee	NaN	612 Shire Lane, Shire	Yes	No	True
11	1012	Harry	...Potter	7066950392	2394 Hogwarts Avenue	Y	NaN	True
12	1013	Don	Draper	123-543-2345	2039 Main Street	Yes	N	False
13	1014	Leslie	Knope	876 678 3469	343 City Parkway	Yes	No	False
14	1015	Toby	Flenderson_	304-762-2467	214 HR Avenue	N	No	False
15	1016	Ron	Weasley	123-545-5421	2395 Hogwarts Avenue	No	N	False
16	1017	Michael	Scott	123/643/9775	121 Paper Avenue, Pennsylvania	Yes	No	False
17	1018	Clark	Kent	7066950392	3498 Super Lane	Y	NaN	True
18	1019	Creed	Braton	N/a	N/a	N/a	Yes	True
19	1020	Anakin	Skywalker	876 678 3469	910 Tatooine Road, Tatooine	Yes	N	True

In [122...]

#Supprimer et enregistrer cette tache dans le tableau d'entrée

```
df = df.drop_duplicates()
df
```

Out[122]:

	CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_Contact	Not_Useful_Column
0	1001	Frodo	Baggins	123-545-5421	123 Shire Lane, Shire	Yes	No	True
1	1002	Abed	Nadir	123/643/9775	93 West Main Street	No	Yes	False
2	1003	Walter	/White	7066950392	298 Drugs Driveway	N	NaN	True
3	1004	Dwight	Schrute	123-543-2345	980 Paper Avenue, Pennsylvania, 18503	Yes	Y	True
4	1005	Jon	Snow	876 678 3469	123 Dragons Road	Y	No	True
5	1006	Ron	Swanson	304-762-2467	768 City Parkway	Yes	Yes	True
6	1007	Jeff	Winger	NaN	1209 South Street	No	No	False
7	1008	Sherlock	Holmes	876 678 3469	98 Clue Drive	N	No	False
8	1009	Gandalf	NaN	N/a	123 Middle Earth	Yes	NaN	False
9	1010	Peter	Parker	123-545-5421	25th Main Street, New York	Yes	No	True
10	1011	Samwise	Gamgee	NaN	612 Shire Lane, Shire	Yes	No	True
11	1012	Harry	...Potter	7066950392	2394 Hogwarts Avenue	Y	NaN	True
12	1013	Don	Draper	123-543-2345	2039 Main Street	Yes	N	False
13	1014	Leslie	Knope	876 678 3469	343 City Parkway	Yes	No	False
14	1015	Toby	Flenderson_	304-762-2467	214 HR Avenue	N	No	False
15	1016	Ron	Weasley	123-545-5421	2395 Hogwarts Avenue	No	N	False
16	1017	Michael	Scott	123/643/9775	121 Paper Avenue, Pennsylvania	Yes	No	False
17	1018	Clark	Kent	7066950392	3498 Super Lane	Y	NaN	True
18	1019	Creed	Braton	N/a	N/a	N/a	Yes	True
19	1020	Anakin	Skywalker	876 678 3469	910 Tatooine Road, Tatooine	Yes	N	True

In [123...]

#Suppression de La colonne inutile et enregistrement de la tache dans la table d'entrée

df = df.drop(columns = "Not_Useful_Column")
df

Out[123]:

	CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_Contact
0	1001	Frodo	Baggins	123-545-5421	123 Shire Lane, Shire	Yes	No
1	1002	Abed	Nadir	123/643/9775	93 West Main Street	No	Yes
2	1003	Walter	/White	7066950392	298 Drugs Driveway	N	NaN
3	1004	Dwight	Schrute	123-543-2345	980 Paper Avenue, Pennsylvania, 18503	Yes	Y
4	1005	Jon	Snow	876 678 3469	123 Dragons Road	Y	No
5	1006	Ron	Swanson	304-762-2467	768 City Parkway	Yes	Yes
6	1007	Jeff	Winger	NaN	1209 South Street	No	No
7	1008	Sherlock	Holmes	876 678 3469	98 Clue Drive	N	No
8	1009	Gandalf	NaN	N/a	123 Middle Earth	Yes	NaN
9	1010	Peter	Parker	123-545-5421	25th Main Street, New York	Yes	No
10	1011	Samwise	Gamgee	NaN	612 Shire Lane, Shire	Yes	No
11	1012	Harry	...Potter	7066950392	2394 Hogwarts Avenue	Y	NaN
12	1013	Don	Draper	123-543-2345	2039 Main Street	Yes	N
13	1014	Leslie	Knope	876 678 3469	343 City Parkway	Yes	No
14	1015	Toby	Flenderson_	304-762-2467	214 HR Avenue	N	No
15	1016	Ron	Weasley	123-545-5421	2395 Hogwarts Avenue	No	N
16	1017	Michael	Scott	123/643/9775	121 Paper Avenue, Pennsylvania	Yes	No
17	1018	Clark	Kent	7066950392	3498 Super Lane	Y	NaN
18	1019	Creed	Braton	N/a	N/a	N/a	Yes
19	1020	Anakin	Skywalker	876 678 3469	910 Tatooine Road, Tatooine	Yes	N

Nettoyage de la colonne [Last_Name]

In [124...]

```
df["Last_Name"]
```

```
Out[124]: 0      Baggins
           1      Nadir
           2      /White
           3      Schrute
           4      Snow
           5      Swanson
           6      Winger
           7      Holmes
           8      NaN
           9      Parker
          10     Gamgee
          11     ...Potter
          12     Draper
          13     Knope
          14     Flenderson_
          15     Weasley
          16     Scott
          17     Kent
          18     Braton
          19     Skywalker
Name: Last_Name, dtype: object
```

```
In [125...]: # Supprimer les slash (ligne 2)
df["Last_Name"] = df["Last_Name"].str.lstrip('/')
df
```

Out[125]:

	CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_Contact
0	1001	Frodo	Baggins	123-545-5421	123 Shire Lane, Shire	Yes	No
1	1002	Abed	Nadir	123/643/9775	93 West Main Street	No	Yes
2	1003	Walter	White	7066950392	298 Drugs Driveway	N	NaN
3	1004	Dwight	Schrute	123-543-2345	980 Paper Avenue, Pennsylvania, 18503	Yes	Y
4	1005	Jon	Snow	876 678 3469	123 Dragons Road	Y	No
5	1006	Ron	Swanson	304-762-2467	768 City Parkway	Yes	Yes
6	1007	Jeff	Winger	NaN	1209 South Street	No	No
7	1008	Sherlock	Holmes	876 678 3469	98 Clue Drive	N	No
8	1009	Gandalf	NaN	N/a	123 Middle Earth	Yes	NaN
9	1010	Peter	Parker	123-545-5421	25th Main Street, New York	Yes	No
10	1011	Samwise	Gamgee	NaN	612 Shire Lane, Shire	Yes	No
11	1012	Harry	...Potter	7066950392	2394 Hogwarts Avenue	Y	NaN
12	1013	Don	Draper	123-543-2345	2039 Main Street	Yes	N
13	1014	Leslie	Knope	876 678 3469	343 City Parkway	Yes	No
14	1015	Toby	Flenderson_	304-762-2467	214 HR Avenue	N	No
15	1016	Ron	Weasley	123-545-5421	2395 Hogwarts Avenue	No	N
16	1017	Michael	Scott	123/643/9775	121 Paper Avenue, Pennsylvania	Yes	No
17	1018	Clark	Kent	7066950392	3498 Super Lane	Y	NaN
18	1019	Creed	Braton	N/a	N/a	N/a	Yes
19	1020	Anakin	Skywalker	876 678 3469	910 Tatooine Road, Tatooine	Yes	N

In [126...]

```
# Supprimer Les points (Ligne 11)
df["Last_Name"] = df["Last_Name"].str.lstrip("...")
df["Last_Name"]
```

```
Out[126]: 0      Baggins
           1      Nadir
           2      White
           3    Schrute
           4      Snow
           5   Swanson
           6     Winger
           7    Holmes
           8      NaN
           9    Parker
          10   Gamgee
          11   Potter
          12   Draper
          13    Knope
          14 Flenderson_
          15    Weasley
          16    Scott
          17    Kent
          18   Braton
          19 Skywalker
Name: Last_Name, dtype: object
```

In [127...]

```
# Supprimer les tirets (ligne 14)
df["Last_Name"] = df["Last_Name"].str.rstrip("_")
df["Last_Name"]
```

```
Out[127]: 0      Baggins
           1      Nadir
           2      White
           3    Schrute
           4      Snow
           5   Swanson
           6     Winger
           7    Holmes
           8      NaN
           9    Parker
          10   Gamgee
          11   Potter
          12   Draper
          13    Knope
          14 Flenderson
          15   Weasley
          16    Scott
          17    Kent
          18   Braton
          19 Skywalker
Name: Last_Name, dtype: object
```

```
In [128...]: # Check de la table après ces traitements
df
```

Out[128]:

	CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_Contact
0	1001	Frodo	Baggins	123-545-5421	123 Shire Lane, Shire	Yes	No
1	1002	Abed	Nadir	123/643/9775	93 West Main Street	No	Yes
2	1003	Walter	White	7066950392	298 Drugs Driveway	N	NaN
3	1004	Dwight	Schrute	123-543-2345	980 Paper Avenue, Pennsylvania, 18503	Yes	Y
4	1005	Jon	Snow	876 678 3469	123 Dragons Road	Y	No
5	1006	Ron	Swanson	304-762-2467	768 City Parkway	Yes	Yes
6	1007	Jeff	Winger	NaN	1209 South Street	No	No
7	1008	Sherlock	Holmes	876 678 3469	98 Clue Drive	N	No
8	1009	Gandalf	NaN	N/a	123 Middle Earth	Yes	NaN
9	1010	Peter	Parker	123-545-5421	25th Main Street, New York	Yes	No
10	1011	Samwise	Gamgee	NaN	612 Shire Lane, Shire	Yes	No
11	1012	Harry	Potter	7066950392	2394 Hogwarts Avenue	Y	NaN
12	1013	Don	Draper	123-543-2345	2039 Main Street	Yes	N
13	1014	Leslie	Knope	876 678 3469	343 City Parkway	Yes	No
14	1015	Toby	Flenderson	304-762-2467	214 HR Avenue	N	No
15	1016	Ron	Weasley	123-545-5421	2395 Hogwarts Avenue	No	N
16	1017	Michael	Scott	123/643/9775	121 Paper Avenue, Pennsylvania	Yes	No
17	1018	Clark	Kent	7066950392	3498 Super Lane	Y	NaN
18	1019	Creed	Braton	N/a	N/a	N/a	Yes
19	1020	Anakin	Skywalker	876 678 3469	910 Tatooine Road, Tatooine	Yes	N

In [129...]

```
# Combiner les traitements précédents en une seule ligne
```

In [130...]

```
df['Last_Name'] = df['Last_Name'].str.strip('123._/') # il faudra annuler les précédents traitement de compiler cette ligne;
```

Nettoyage de la colonne [Phone_Number]

In [157...]

```
#Supprimer Les valeurs non numériques dans la colonne  
df["Phone_Number"] = df["Phone_Number"].str.replace('[^0-9]', '')
```

C:\Users\ramik\AppData\Local\Temp\ipykernel_4560\3863582347.py:2: FutureWarning: The default value of regex will change from True to False in a future version.

```
df["Phone_Number"] = df["Phone_Number"].str.replace('[^0-9]', '')
```

In [158...]

```
df["Phone_Number"]
```

Out[158]:

```
0    12354554  
1    12364397  
2  
3    12354323  
4    87667834  
5    30476224  
6  
7    87667834  
8  
9    12354554  
10  
11  
12    12354323  
13    87667834  
14    30476224  
15    12354554  
16    12364397  
17  
18  
19    87667834  
Name: Phone_Number, dtype: object
```

In [169...]

```
# Mettre en forme La colonne
```

A fin de séparer les chiffres dans la colonne phone number, notre colonne doit etre sous la forme str.

In [170...]

```
df["Phone_Number"] = df["Phone_Number"].apply(lambda x: str(x))
```

In [194...]

```
df["Phone_Number"]
```

```
Out[194]: 0    123545
          1    123643
          2
          3    123543
          4    876678
          5    304762
          6
          7    876678
          8
          9    123545
         10
         11
         12    123543
         13    876678
         14    304762
         15    123545
         16    123643
         17
         18
         19    876678
Name: Phone_Number, dtype: object
```

In [195...]

```
# Remplacer les valeurs nulle (nan)
df["Phone_Number"] = df["Phone_Number"].str.replace('nan---','')
df["Phone_Number"] = df["Phone_Number"].str.replace('NAN---','')
df["Phone_Number"] = df["Phone_Number"].str.replace('--','')
df["Phone_Number"] = df["Phone_Number"].str.replace('-','')
df
```

Out[195]:

	CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_Contact	Street_Address	State	Zip_Code
0	1001	Frodo	Baggins	123545	123 Shire Lane, Shire	Yes	N	123 Shire Lane	Shire	
1	1002	Abed	Nadir	123643	93 West Main Street	No	Y	93 West Main Street		
2	1003	Walter	White		298 Drugs Driveway	N		298 Drugs Driveway		
3	1004	Dwight	Schrute	123543	980 Paper Avenue, Pennsylvania, 18503	Yes	Y	980 Paper Avenue	Pennsylvania	18503
4	1005	Jon	Snow	876678	123 Dragons Road	Y	N	123 Dragons Road		
5	1006	Ron	Swanson	304762	768 City Parkway	Yes	Y	768 City Parkway		
6	1007	Jeff	Winger		1209 South Street	No	N	1209 South Street		
7	1008	Sherlock	Holmes	876678	98 Clue Drive	N	N	98 Clue Drive		
8	1009	Gandalf			123 Middle Earth	Yes		123 Middle Earth		
9	1010	Peter	Parker	123545	25th Main Street, New York	Yes	N	25th Main Street	New York	
10	1011	Samwise	Gamgee		612 Shire Lane, Shire	Yes	N	612 Shire Lane	Shire	
11	1012	Harry	Potter		2394 Hogwarts Avenue	Y		2394 Hogwarts Avenue		
12	1013	Don	Draper	123543	2039 Main Street	Yes	N	2039 Main Street		
13	1014	Leslie	Knope	876678	343 City Parkway	Yes	N	343 City Parkway		
14	1015	Toby	Flenderson	304762	214 HR Avenue	N	N	214 HR Avenue		
15	1016	Ron	Weasley	123545	2395 Hogwarts Avenue	No	N	2395 Hogwarts Avenue		
16	1017	Michael	Scott	123643	121 Paper Avenue, Pennsylvania	Yes	N	121 Paper Avenue	Pennsylvania	
17	1018	Clark	Kent		3498 Super Lane	Y		3498 Super Lane		
18	1019	Creed	Braton		N/a	N/a	Y		N/a	

CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_Contact	Street_Address	State	Zip_Code
19	1020	Anakin	Skywalker	876678 910 Tatooine Road, Tatooine	Yes	N	910 Tatooine Road	Tatooine	

Décomposition de la colonne [Adress]

In [196...]

```
#Decomposition de La colonne adresse en different 3 colonnes ()
df[["Street_Address", "State", "Zip_Code"]] = df["Address"].str.split(',', 2, expand=True)
df
```

Out[196]:

	CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_Contact	Street_Address	State	Zip_Code
0	1001	Frodo	Baggins	123545	123 Shire Lane, Shire	Yes	N	123 Shire Lane	Shire	None
1	1002	Abed	Nadir	123643	93 West Main Street	No	Y	93 West Main Street	None	None
2	1003	Walter	White		298 Drugs Driveway	N		298 Drugs Driveway	None	None
3	1004	Dwight	Schrute	123543	980 Paper Avenue, Pennsylvania, 18503	Yes	Y	980 Paper Avenue	Pennsylvania	18503
4	1005	Jon	Snow	876678	123 Dragons Road	Y	N	123 Dragons Road	None	None
5	1006	Ron	Swanson	304762	768 City Parkway	Yes	Y	768 City Parkway	None	None
6	1007	Jeff	Winger		1209 South Street	No	N	1209 South Street	None	None
7	1008	Sherlock	Holmes	876678	98 Clue Drive	N	N	98 Clue Drive	None	None
8	1009	Gandalf			123 Middle Earth	Yes		123 Middle Earth	None	None
9	1010	Peter	Parker	123545	25th Main Street, New York	Yes	N	25th Main Street	New York	None
10	1011	Samwise	Gamgee		612 Shire Lane, Shire	Yes	N	612 Shire Lane	Shire	None
11	1012	Harry	Potter		2394 Hogwarts Avenue	Y		2394 Hogwarts Avenue	None	None
12	1013	Don	Draper	123543	2039 Main Street	Yes	N	2039 Main Street	None	None
13	1014	Leslie	Knope	876678	343 City Parkway	Yes	N	343 City Parkway	None	None
14	1015	Toby	Flenderson	304762	214 HR Avenue	N	N	214 HR Avenue	None	None
15	1016	Ron	Weasley	123545	2395 Hogwarts Avenue	No	N	2395 Hogwarts Avenue	None	None
16	1017	Michael	Scott	123643	121 Paper Avenue, Pennsylvania	Yes	N	121 Paper Avenue	Pennsylvania	None
17	1018	Clark	Kent		3498 Super Lane	Y		3498 Super Lane	None	None
18	1019	Creed	Braton		N/a	N/a	Y	N/a	None	None

CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_Contact	Street_Address	State	Zip_Code	
19	1020	Anakin	Skywalker	876678	910 Tatooine Road, Tatooine	Yes	N	910 Tatooine Road	Tatooine	None

Nettoyage de la colonne [Do_Not_Contact]

In [197...]

```
#Remplacer les valeurs
df["Do_Not_Contact"] = df["Do_Not_Contact"].str.replace('Yes','Y')

df["Do_Not_Contact"] = df["Do_Not_Contact"].str.replace('No','N')
df
```

Out[197]:

	CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_Contact	Street_Address	State	Zip_Code
0	1001	Frodo	Baggins	123545	123 Shire Lane, Shire	Yes	N	123 Shire Lane	Shire	None
1	1002	Abed	Nadir	123643	93 West Main Street	No	Y	93 West Main Street	None	None
2	1003	Walter	White		298 Drugs Driveway	N		298 Drugs Driveway	None	None
3	1004	Dwight	Schrute	123543	980 Paper Avenue, Pennsylvania, 18503	Yes	Y	980 Paper Avenue	Pennsylvania	18503
4	1005	Jon	Snow	876678	123 Dragons Road	Y	N	123 Dragons Road	None	None
5	1006	Ron	Swanson	304762	768 City Parkway	Yes	Y	768 City Parkway	None	None
6	1007	Jeff	Winger		1209 South Street	No	N	1209 South Street	None	None
7	1008	Sherlock	Holmes	876678	98 Clue Drive	N	N	98 Clue Drive	None	None
8	1009	Gandalf			123 Middle Earth	Yes		123 Middle Earth	None	None
9	1010	Peter	Parker	123545	25th Main Street, New York	Yes	N	25th Main Street	New York	None
10	1011	Samwise	Gamgee		612 Shire Lane, Shire	Yes	N	612 Shire Lane	Shire	None
11	1012	Harry	Potter		2394 Hogwarts Avenue	Y		2394 Hogwarts Avenue	None	None
12	1013	Don	Draper	123543	2039 Main Street	Yes	N	2039 Main Street	None	None
13	1014	Leslie	Knope	876678	343 City Parkway	Yes	N	343 City Parkway	None	None
14	1015	Toby	Flenderson	304762	214 HR Avenue	N	N	214 HR Avenue	None	None
15	1016	Ron	Weasley	123545	2395 Hogwarts Avenue	No	N	2395 Hogwarts Avenue	None	None
16	1017	Michael	Scott	123643	121 Paper Avenue, Pennsylvania	Yes	N	121 Paper Avenue	Pennsylvania	None
17	1018	Clark	Kent		3498 Super Lane	Y		3498 Super Lane	None	None
18	1019	Creed	Braton		N/a	N/a	Y	N/a	None	None

CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_Contact	Street_Address	State	Zip_Code	
19	1020	Anakin	Skywalker	876678	910 Tatooine Road, Tatooine	Yes	N	910 Tatooine Road	Tatooine	None

In [204]:

```
# Supprimer les nan
df=df.fillna('')
df
```

Out[204]:

CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_Contact	Street_Address	State	Zip_Code
0	1001	Frodo	Baggins	123545	123 Shire Lane, Shire	Yes	N	123 Shire Lane	Shire
4	1005	Jon	Snow	876678	123 Dragons Road	Y	N	123 Dragons Road	
7	1008	Sherlock	Holmes	876678	98 Clue Drive	N	N	98 Clue Drive	
9	1010	Peter	Parker	123545	25th Main Street, New York	Yes	N	25th Main Street	New York
12	1013	Don	Draper	123543	2039 Main Street	Yes	N	2039 Main Street	
13	1014	Leslie	Knope	876678	343 City Parkway	Yes	N	343 City Parkway	
14	1015	Toby	Flenderson	304762	214 HR Avenue	N	N	214 HR Avenue	
15	1016	Ron	Weasley	123545	2395 Hogwarts Avenue	No	N	2395 Hogwarts Avenue	
16	1017	Michael	Scott	123643	121 Paper Avenue, Pennsylvania	Yes	N	121 Paper Avenue	Pennsylvania
19	1020	Anakin	Skywalker	876678	910 Tatooine Road, Tatooine	Yes	N	910 Tatooine Road	Tatooine

Supprimer les contacts qui n'ont pas de numéro de téléphone dans la table

In [203...]

```
for x in df.index:
    if df.loc[x, "Phone_Number"] == '':
        df.drop(x, inplace=True)

df
```

Out[203]:

	CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_Contact	Street_Address	State	Zip_Code
0	1001	Frodo	Baggins	123545	123 Shire Lane, Shire	Yes	N	123 Shire Lane	Shire	
4	1005	Jon	Snow	876678	123 Dragons Road	Y	N	123 Dragons Road		
7	1008	Sherlock	Holmes	876678	98 Clue Drive	N	N	98 Clue Drive		
9	1010	Peter	Parker	123545	25th Main Street, New York	Yes	N	25th Main Street	New York	
12	1013	Don	Draper	123543	2039 Main Street	Yes	N	2039 Main Street		
13	1014	Leslie	Knope	876678	343 City Parkway	Yes	N	343 City Parkway		
14	1015	Toby	Flenderson	304762	214 HR Avenue	N	N	214 HR Avenue		
15	1016	Ron	Weasley	123545	2395 Hogwarts Avenue	No	N	2395 Hogwarts Avenue		
16	1017	Michael	Scott	123643	121 Paper Avenue, Pennsylvania	Yes	N	121 Paper Avenue	Pennsylvania	
19	1020	Anakin	Skywalker	876678	910 Tatooine Road, Tatooine	Yes	N	910 Tatooine Road	Tatooine	

Supprimer les contacts qui n'ont pas été contactés

In [202...]

```
for x in df.index:
    if df.loc[x, "Do_Not_Contact"] == 'Y':
        df.drop(x, inplace=True)
```

df

Out[202] :

	CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_Contact	Street_Address	State	Zip_Code
0	1001	Frodo	Baggins	123545	123 Shire Lane, Shire	Yes	N	123 Shire Lane	Shire	
2	1003	Walter	White		298 Drugs Driveway	N		298 Drugs Driveway		
4	1005	Jon	Snow	876678	123 Dragons Road	Y	N	123 Dragons Road		
6	1007	Jeff	Winger		1209 South Street	No	N	1209 South Street		
7	1008	Sherlock	Holmes	876678	98 Clue Drive	N	N	98 Clue Drive		
8	1009	Gandalf			123 Middle Earth	Yes		123 Middle Earth		
9	1010	Peter	Parker	123545	25th Main Street, New York	Yes	N	25th Main Street	New York	
10	1011	Samwise	Gamgee		612 Shire Lane, Shire	Yes	N	612 Shire Lane	Shire	
11	1012	Harry	Potter		2394 Hogwarts Avenue	Y		2394 Hogwarts Avenue		
12	1013	Don	Draper	123543	2039 Main Street	Yes	N	2039 Main Street		
13	1014	Leslie	Knope	876678	343 City Parkway	Yes	N	343 City Parkway		
14	1015	Toby	Flenderson	304762	214 HR Avenue	N	N	214 HR Avenue		
15	1016	Ron	Weasley	123545	2395 Hogwarts Avenue	No	N	2395 Hogwarts Avenue		
16	1017	Michael	Scott	123643	121 Paper Avenue, Pennsylvania	Yes	N	121 Paper Avenue	Pennsylvania	
17	1018	Clark	Kent		3498 Super Lane	Y		3498 Super Lane		
19	1020	Anakin	Skywalker	876678	910 Tatooine Road, Tatooine	Yes	N	910 Tatooine Road	Tatooine	

Reset_Index

In [205]:

```
df = df.reset_index(drop=True)
df
```

Out[205]:

	CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_Contact	Street_Address	State	Zip_Code
0	1001	Frodo	Baggins	123545	123 Shire Lane, Shire	Yes	N	123 Shire Lane	Shire	
1	1005	Jon	Snow	876678	123 Dragons Road	Y	N	123 Dragons Road		
2	1008	Sherlock	Holmes	876678	98 Clue Drive	N	N	98 Clue Drive		
3	1010	Peter	Parker	123545	25th Main Street, New York	Yes	N	25th Main Street	New York	
4	1013	Don	Draper	123543	2039 Main Street	Yes	N	2039 Main Street		
5	1014	Leslie	Knope	876678	343 City Parkway	Yes	N	343 City Parkway		
6	1015	Toby	Flenderson	304762	214 HR Avenue	N	N	214 HR Avenue		
7	1016	Ron	Weasley	123545	2395 Hogwarts Avenue	No	N	2395 Hogwarts Avenue		
8	1017	Michael	Scott	123643	121 Paper Avenue, Pennsylvania	Yes	N	121 Paper Avenue	Pennsylvania	
9	1020	Anakin	Skywalker	876678	910 Tatooine Road, Tatooine	Yes	N	910 Tatooine Road	Tatooine	

Merci @Rami KASSIAR