Data Cleaning

```
In [1]: import pandas as pd
In [2]: df=pd.read_excel("Customer Call List.xlsx")
```

In [3]: df

Out[3]:

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

1. Remove duplicate

In [4]: df= df.drop_duplicates()

In [5]: df

Out[5]:

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

2. Remove Column

```
In [6]: df = df.drop(columns = "Not_Useful_Column")
```

In [7]: df

Out[7]:

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

3. Fixing Last Name Column

Using Strip Python Code

```
In [8]: |df["Last_Name"].str.strip()
Out[8]: 0
                   Baggins
                     Nadir
        2
                    /White
        3
                   Schrute
        4
                      Snow
        5
                   Swanson
        6
                    Winger
                    Holmes
        7
        8
                       NaN
        9
                    Parker
        10
                    Gamgee
        11
                 ...Potter
        12
                    Draper
        13
                     Knope
        14
               Flenderson_
        15
                   Weasley
                     Scott
        16
        17
                      Kent
        18
                    Braton
        19
                 Skywalker
        Name: Last_Name, dtype: object
In [9]: #df["Last_Name"] = df["Last_Name"].str.lstrip("...")
        #df["Last_Name"] = df["Last_Name"].str.lstrip("/")
        #df["Last_Name"] = df["Last_Name"].str.rstrip("_")
        df["Last_Name"] = df["Last_Name"].str.strip("123._/")
```

In [10]:

df

Out[10]:

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

4. Fixing Phone Number Column

Using Replace Code

```
In [11]: df["Phone_Number"] = df["Phone_Number"].str.replace('[^a-zA-Z0-9]','')

C:\Users\Tarun Gaurav\AppData\Local\Temp\ipykernel_20084\1866839349.py:1:
    FutureWarning: The default value of regex will change from True to False i
    n a future version.
    df["Phone_Number"] = df["Phone_Number"].str.replace('[^a-zA-Z0-9]','')
```

In [12]:

df

Out[12]:

				Phone_Number	Address	Customer	Do_Not_C
0	1001	Frodo	Baggins	1235455421	123 Shire Lane, Shire	Yes	
1	1002	Abed	Nadir	1236439775	93 West Main Street	No	
2	1003	Walter	White	NaN	298 Drugs Driveway	N	
3	1004	Dwight	Schrute	1235432345	980 Paper Avenue, Pennsylvania, 18503	Yes	
4	1005	Jon	Snow	8766783469	123 Dragons Road	Υ	
5	1006	Ron	Swanson	3047622467	768 City Parkway	Yes	
6	1007	Jeff	Winger	NaN	1209 South Street	No	
7	1008	Sherlock	Holmes	8766783469	98 Clue Drive	N	
8	1009	Gandalf	NaN	Na	123 Midd l e Earth	Yes	
9	1010	Peter	Parker	1235455421	25th Main Street, New York	Yes	
10	1011	Samwise	Gamgee	NaN	612 Shire Lane, Shire	Yes	
11	1012	Harry	Potter	NaN	2394 Hogwarts Avenue	Y	
12	1013	Don	Draper	1235432345	2039 Main Street	Yes	
13	1014	Leslie	Knope	8766783469	343 City Parkway	Yes	
14	1015	Toby	Flenderson	3047622467	214 HR Avenue	N	
15	1016	Ron	Weasley	1235455421	2395 Hogwarts Avenue	No	
16	1017	Michael	Scott	1236439775	121 Paper Avenue, Pennsylvania	Yes	
17	1018	Clark	Kent	NaN	3498 Super Lane	Υ	
18	1019	Creed	Braton	Na	N/a	N/a	
19	1020	Anakin	Skywalker	8766783469	910 Tatooine Road, Tatooine	Yes	
4							

Changing to string and place -- USA format mobile number

```
In [13]: df["Phone_Number"]=df["Phone_Number"].apply(lambda x: str(x))
In [14]: df["Phone_Number"]=df["Phone_Number"].apply(lambda x: x[0:3] + '-' + x[3:6]
```

In [15]: df

Out[15]:

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

Repacing NAN-- and Na--

```
In [16]: df["Phone_Number"]=df["Phone_Number"].str.replace('nan--','')
df["Phone_Number"]=df["Phone_Number"].str.replace('Na--','')
```

In [17]:

df

Out[17]:

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

Cleaning address spliting into three column

Using split

In [18]: df[["Street_Address","State","Zip_code"]]=df["Address"].str.split(',',2,exp

In [19]:

df

Out[19]:

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

Replacing Yes to y and No to y

Using replace

```
In [20]: df["Paying Customer"]=df["Paying Customer"].str.replace('Yes','Y')
In [21]: df["Paying Customer"]=df["Paying Customer"].str.replace('No','N')
```

In [22]: df

Out[22]:

- -

0 1001 Frodo Baggins 123-545-5421 123 Shire Lane, Shire Lane, Shire Y 1 1002 Abed Nadir 123-643-9775 93 West Main Street N 2 1003 Walter White 298 Drugs Driveway N 3 1004 Dwight Schrute 123-543-2345 Driveway N 4 1005 Jon Snow 876-678-3469 Paper Avenue, Pennsylvania, 18503 Y 4 1005 Jon Snow 876-678-3469 123 Dragons Road Y 5 1006 Ron Swanson 304-762-2467 768 City Parkway Y 6 1007 Jeff Winger 1209 South Street N Street 7 1008 Sherlock Holmes 876-678-3469 98 Clue Drive N 8 1009 Gandalf NaN 123 Middle Earth Y 9 1010 Peter Parker 123-545-5421 Street, New York Y 10		CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_C
1 1002 Abed Nadif 123-643-97/5 Street N 2 1003 Walter White 298 Drugs Driveway Driveway N 3 1004 Dwight Schrute 123-543-2345 Pennsylvania, 18503 Y 4 1005 Jon Snow 876-678-3469 123 Dragons Road Y 5 1006 Ron Swanson 304-762-2467 768 City Parkway Y 6 1007 Jeff Winger 1209 South Street N 7 1008 Sherlock Holmes 876-678-3469 98 Clue Drive N 8 1009 Gandalf NaN 123 Middle Earth Y 9 1010 Peter Parker 123-545-5421 Street, New York Y 10 1011 Samwise Gamgee 123-545-5421 Street, New York Y 11 1012 Harry Potter 123-543-2345 2039 Main Street Y 12 1013	0	1001	Frodo	Baggins	123-545-5421		Y	
1003 Water White	1	1002	Abed	Nadir	123-643-9775		N	
3 1004 Dwight Schrute 123-543-2345 Pennsylvania, 18503 Y 4 1005 Jon Snow 876-678-3469 123 Dragons Road Y 5 1006 Ron Swanson 304-762-2467 768 City Parkway Y 6 1007 Jeff Winger 1209 South Street N 7 1008 Sherlock Holmes 876-678-3469 98 Clue Drive N 8 1009 Gandalf NaN 123 Middle Earth Y 9 1010 Peter Parker 123-545-5421 Street, New York Y 10 1011 Samwise Gamgee 612 Shire Y 11 1012 Harry Potter Hogwarts Y 12 1013 Don Draper 123-543-2345 2039 Main Y 13 1014 Leslie Knope 876-678-3469 343 City Parkway Y 14 1015 Toby Flenders	2	1003	Walter	White			N	
5 1006 Ron Swanson 304-762-2467 768 City Parkway Y 6 1007 Jeff Winger 1209 South Street N 7 1008 Sherlock Holmes 876-678-3469 98 Clue Drive N 8 1009 Gandalf NaN 123 Middle Earth Y 9 1010 Peter Parker 123-545-5421 Street, New York Y 10 1011 Samwise Gamgee 612 Shire Lane, Shire Y 11 1012 Harry Potter 2394 Hogwarts Y 12 1013 Don Draper 123-543-2345 2039 Main Y 13 1014 Leslie Knope 876-678-3469 343 City Parkway Y 14 1015 Toby Flenderson 304-762-2467 214 HR Avenue N 15 1016 Ron Weasley 123-545-5421 Hogwarts N 16 1017 Mic	3	1004	Dwight	Schrute	123-543-2345	Avenue, Pennsylvania,	Υ	
6 1006 Roll Swansoll 304-762-2467 Parkway T 6 1007 Jeff Winger 1209 South Street N 7 1008 Sherlock Holmes 876-678-3469 98 Clue Drive N 8 1009 Gandalf NaN 123 Middle Earth Y 9 1010 Peter Parker 123-545-5421 Street, New York Y 10 1011 Samwise Gamgee 612 Shire Lane, Shire Y 11 1012 Harry Potter 2394 Hogwarts Avenue Y 12 1013 Don Draper 123-543-2345 2039 Main Street Y 13 1014 Leslie Knope 876-678-3469 343 City Parkway Y 14 1015 Toby Flenderson 304-762-2467 214 HR Avenue N 15 1016 Ron Weasley 123-545-5421 Hogwarts Avenue N Avenue Pennsylvanie	4	1005	Jon	Snow	876-678-3469		Υ	
6 1007 Jeff Winger Street N 7 1008 Sherlock Holmes 876-678-3469 98 Clue Drive N 8 1009 Gandalf NaN 123 Middle Earth Y 9 1010 Peter Parker 123-545-5421 Street, New York Y 10 1011 Samwise Gamgee 612 Shire Lane, Shire Lane Y 11 1012 Harry Potter 2394 Hogwarts Avenue Y 12 1013 Don Draper 123-543-2345 2039 Main Street Y 13 1014 Leslie Knope 876-678-3469 343 City Parkway Y 14 1015 Toby Flenderson 304-762-2467 214 HR Avenue N 15 1016 Ron Weasley 123-545-5421 Hogwarts Avenue N 16 1017 <th>5</th> <th>1006</th> <th>Ron</th> <th>Swanson</th> <th>304-762-2467</th> <th></th> <th>Υ</th> <th></th>	5	1006	Ron	Swanson	304-762-2467		Υ	
8 1009 Gandalf NaN 123 Middle Earth Earth Earth Y 9 1010 Peter Parker 123-545-5421 25th Main Street, New York Y 10 1011 Samwise Gamgee 612 Shire Lane, Shire Y 11 1012 Harry Potter 2394 Hogwarts Avenue Y 12 1013 Don Draper 123-543-2345 2039 Main Street Y 13 1014 Leslie Knope 876-678-3469 343 City Parkway Y 14 1015 Toby Flenderson 304-762-2467 214 HR Avenue N 15 1016 Ron Weasley 123-545-5421 Hogwarts Avenue N 16 1017 Michael Scott 123-643-9775 121 Paper Avenue, Pennsylvania Y 17 1018 Clark Kent 3498 Super Lane Y 18 1019 Creed Braton N/a N/a 19 1020 Anakin Skywalker 876-678-3469 910 Tatooine Road, Prodo Y	6	1007	Jeff	Winger			N	
8 1009 Gandall Nan Earth Y 9 1010 Peter Parker 123-545-5421 Street, New York Y 10 1011 Samwise Gamgee 612 Shire Lane, Shire Y 11 1012 Harry Potter 2394 Y 12 1013 Don Draper 123-543-2345 2039 Main Street Y 13 1014 Leslie Knope 876-678-3469 343 City Parkway Y 14 1015 Toby Flenderson 304-762-2467 214 HR Avenue N 15 1016 Ron Weasley 123-545-5421 Hogwarts Avenue N 16 1017 Michael Scott 123-643-9775 Avenue, Pennsylvania Y 17 1018 Clark Kent 3498 Super Lane Y 18 1019 Creed Braton N/a N/a 19 1020 Anakin Skywalker 876-678-346	7	1008	Sherlock	Holmes	876-678-3469	98 Clue Drive	N	
9 1010 Peter Peter Parker 123-545-5421 Street, New York Y 10 1011 Samwise Gamgee 612 Shire Lane, Shire Y 11 1012 Harry Potter 2394 Hogwarts Avenue Y 12 1013 Don Draper 123-543-2345 2039 Main Street Y 13 1014 Leslie Knope 876-678-3469 343 City Parkway Y 14 1015 Toby Flenderson 304-762-2467 214 HR Avenue N 15 1016 Ron Weasley 123-545-5421 Hogwarts Avenue N 16 1017 Michael Scott 123-643-9775 121 Paper Avenue, Pennsylvania Y 17 1018 Clark Kent 3498 Super Lane Y 18 1019 Creed Braton N/a N/a 19 1020 Anakin Skywalker 876-678-3469 Road, Y	8	1009	Gandalf	NaN			Υ	
10 1011 Samwise Gamgee Lane, Shire Y 11 1012 Harry Potter 2394 Hogwarts Avenue Y 12 1013 Don Draper 123-543-2345 2039 Main Street Y 13 1014 Leslie Knope 876-678-3469 343 City Parkway Y 14 1015 Toby Flenderson 304-762-2467 214 HR Avenue N 15 1016 Ron Weasley 123-545-5421 Hogwarts Avenue N 16 1017 Michael Scott 123-643-9775 Avenue, 	9	1010	Peter	Parker	123-545-5421	Street, New	Y	
11 1012 Harry Potter Hogwarts Avenue Y 12 1013 Don Draper 123-543-2345 2039 Main Street Y 13 1014 Leslie Knope 876-678-3469 343 City Parkway Y 14 1015 Toby Flenderson 304-762-2467 214 HR Avenue N 15 1016 Ron Weasley 123-545-5421 Hogwarts Avenue N 16 1017 Michael Scott 123-643-9775 121 Paper Avenue, Pennsylvania Y 17 1018 Clark Kent 3498 Super Lane Y 18 1019 Creed Braton N/a N/a 19 1020 Anakin Skywalker 876-678-3469 Road, Y	10	1011	Samwise	Gamgee			Υ	
12 1013 Don Draper 123-543-2345 Street Y 13 1014 Leslie Knope 876-678-3469 343 City Parkway Y 14 1015 Toby Flenderson 304-762-2467 214 HR Avenue N 15 1016 Ron Weasley 123-545-5421 Hogwarts Avenue N 16 1017 Michael Scott 123-643-9775 Avenue, Pennsylvania Y 17 1018 Clark Kent 3498 Super Lane Y 18 1019 Creed Braton N/a N/a 19 1020 Anakin Skywalker 876-678-3469 Road, Road, Y	11	1012	Harry	Potter		Hogwarts	Y	
13 1014 Leslie Knope 876-678-3469 Parkway Y 14 1015 Toby Flenderson 304-762-2467 214 HR Avenue N 15 1016 Ron Weasley 123-545-5421 Hogwarts Avenue N 16 1017 Michael Scott 123-643-9775 Avenue, Pennsylvania Y 17 1018 Clark Kent 3498 Super Lane Y 18 1019 Creed Braton N/a N/a 19 1020 Anakin Skywalker 876-678-3469 Road, Road, Y	12	1013	Don	Draper	123-543-2345		Υ	
14 1015 loby Flenderson 304-762-2467 Avenue N 15 1016 Ron Weasley 123-545-5421 Hogwarts Avenue N 16 1017 Michael Scott 123-643-9775 Avenue, Pennsylvania Y 17 1018 Clark Kent 3498 Super Lane Y 18 1019 Creed Braton N/a N/a 19 1020 Anakin Skywalker 876-678-3469 Road, Y	13	1014	Leslie	Knope	876-678-3469		Υ	
15 1016 Ron Weasley 123-545-5421 Hogwarts Avenue N Avenue 16 1017 Michael Scott 123-643-9775 Avenue, Pennsylvania Y 17 1018 Clark Kent 3498 Super Lane Y 18 1019 Creed Braton N/a N/a 19 1020 Anakin Skywalker 876-678-3469 Road, Road, Y	14	1015	Toby	Flenderson	304-762-2467		N	
16 1017 Michael Scott 123-643-9775 Avenue, Pennsylvania Y 17 1018 Clark Kent 3498 Super Lane Y 18 1019 Creed Braton N/a N/a 19 1020 Anakin Skywalker 876-678-3469 Road, Y	15	1016	Ron	Weasley	123-545-5421	Hogwarts	N	
18 1019 Creed Braton N/a N/a 910 Tatooine 19 1020 Anakin Skywalker 876-678-3469 Road, Y	16	1017	Michael	Scott	123-643-9775	Avenue,	Y	
910 Tatooine 19 1020 Anakin Skywalker 876-678-3469 Road, Y	17	1018	Clark	Kent			Υ	
19 1020 Anakin Skywalker 876-678-3469 Road, Y	18	1019	Creed	Braton		N/a	N/a	
→	19	1020	Anakin	Skywalker	876-678-3469	Road,	Y	
	4)

Filling none place to blank "

```
In [23]: #df.replace('N/a')
    #df.replace('NaN')
    df=df.fillna('')
```

In [24]: df

Out[24]:

	CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_C
0	1001	Frodo	Baggins	123-545-5421	123 Shire Lane, Shire	Υ	
1	1002	Abed	Nadir	123-643-9775	93 West Main Street	N	
2	1003	Walter	White		298 Drugs Driveway	N	
3	1004	Dwight	Schrute	123-543-2345	980 Paper Avenue, Pennsylvania, 18503	Υ	
4	1005	Jon	Snow	876-678-3469	123 Dragons Road	Υ	
5	1006	Ron	Swanson	304-762-2467	768 City Parkway	Υ	
6	1007	Jeff	Winger		1209 South Street	N	
7	1008	Sherlock	Holmes	876-678-3469	98 Clue Drive	N	
8	1009	Gandalf			123 Midd l e Earth	Υ	
9	1010	Peter	Parker	123-545-5421	25th Main Street, New York	Y	
10	1011	Samwise	Gamgee		612 Shire Lane, Shire	Υ	
11	1012	Harry	Potter		2394 Hogwarts Avenue	Υ	
12	1013	Don	Draper	123-543-2345	2039 Main Street	Υ	
13	1014	Leslie	Knope	876-678-3469	343 City Parkway	Υ	
14	1015	Toby	Flenderson	304-762-2467	214 HR Avenue	N	
15	1016	Ron	Weasley	123-545-5421	2395 Hogwarts Avenue	N	
16	1017	Michael	Scott	123-643-9775	121 Paper Avenue, Pennsylvania	Y	
17	1018	Clark	Kent		3498 Super Lane	Υ	
18	1019	Creed	Braton		N/a	N/a	
19	1020	Anakin	Skywalker	876-678-3469	910 Tatooine Road, Tatooine	Y	
4							•

In [25]: df.replace('N/a')

Out[25]:

	CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_C
0	1001	Frodo	Baggins	123-545-5421	123 Shire Lane, Shire	Υ	
1	1002	Abed	Nadir	123-643-9775	93 West Main Street	N	
2	1003	Walter	White		298 Drugs Driveway	N	
3	1004	Dwight	Schrute	123-543-2345	980 Paper Avenue, Pennsylvania, 18503	Υ	
4	1005	Jon	Snow	876-678-3469	123 Dragons Road	Υ	
5	1006	Ron	Swanson	304-762-2467	768 City Parkway	Υ	
6	1007	Jeff	Winger		1209 South Street	N	
7	1008	Sherlock	Holmes	876-678-3469	98 Clue Drive	N	
8	1009	Gandalf			123 Midd l e Earth	Υ	
9	1010	Peter	Parker	123-545-5421	25th Main Street, New York	Y	
10	1011	Samwise	Gamgee		612 Shire Lane, Shire	Υ	
11	1012	Harry	Potter		2394 Hogwarts Avenue	Y	
12	1013	Don	Draper	123-543-2345	2039 Main Street	Υ	
13	1014	Leslie	Knope	876-678-3469	343 City Parkway	Υ	
14	1015	Toby	Flenderson	304-762-2467	214 HR Avenue	N	
15	1016	Ron	Weasley	123-545-5421	2395 Hogwarts Avenue	N	
16	1017	Michael	Scott	123-643-9775	121 Paper Avenue, Pennsylvania	Y	
17	1018	Clark	Kent		3498 Super Lane	Υ	
18	1019	Creed	Braton		3498 Super Lane	Υ	
19	1020	Anakin	Skywalker	876-678-3469	910 Tatooine Road, Tatooine	Υ	
4							•

```
In [26]: df["Do_Not_Contact"]=df["Do_Not_Contact"].str.replace('Yes','Y')
df["Do_Not_Contact"]=df["Do_Not_Contact"].str.replace('No','N')
```

In [27]: df

Out[27]:

	CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_C
0	1001	Frodo	Baggins	123-545-5421	123 Shire Lane, Shire	Υ	
1	1002	Abed	Nadir	123-643-9775	93 West Main Street	N	
2	1003	Walter	White		298 Drugs Driveway	N	
3	1004	Dwight	Schrute	123-543-2345	980 Paper Avenue, Pennsylvania, 18503	Υ	
4	1005	Jon	Snow	876-678-3469	123 Dragons Road	Υ	
5	1006	Ron	Swanson	304-762-2467	768 City Parkway	Υ	
6	1007	Jeff	Winger		1209 South Street	N	
7	1008	Sherlock	Holmes	876-678-3469	98 Clue Drive	N	
8	1009	Gandalf			123 Midd l e Earth	Υ	
9	1010	Peter	Parker	123-545-5421	25th Main Street, New York	Υ	
10	1011	Samwise	Gamgee		612 Shire Lane, Shire	Υ	
11	1012	Harry	Potter		2394 Hogwarts Avenue	Υ	
12	1013	Don	Draper	123-543-2345	2039 Main Street	Υ	
13	1014	Leslie	Knope	876-678-3469	343 City Parkway	Υ	
14	1015	Toby	Flenderson	304-762-2467	214 HR Avenue	N	
15	1016	Ron	Weasley	123-545-5421	2395 Hogwarts Avenue	N	
16	1017	Michael	Scott	123-643-9775	121 Paper Avenue, Pennsylvania	Υ	
17	1018	Clark	Kent		3498 Super Lane	Υ	
18	1019	Creed	Braton		N/a	N/a	
19	1020	Anakin	Skywalker	876-678-3469	910 Tatooine Road, Tatooine	Υ	
4							•

Replace N/a to Blank (" ")

In [28]: df=df.replace('N/a')

In [29]: df

Out[29]:

	CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_C
0	1001	Frodo	Baggins	123-545-5421	123 Shire Lane, Shire	Υ	
1	1002	Abed	Nadir	123-643-9775	93 West Main Street	N	
2	1003	Walter	White		298 Drugs Driveway	N	
3	1004	Dwight	Schrute	123-543-2345	980 Paper Avenue, Pennsylvania, 18503	Υ	
4	1005	Jon	Snow	876-678-3469	123 Dragons Road	Υ	
5	1006	Ron	Swanson	304-762-2467	768 City Parkway	Υ	
6	1007	Jeff	Winger		1209 South Street	N	
7	1008	Sherlock	Holmes	876-678-3469	98 Clue Drive	N	
8	1009	Gandalf			123 Midd l e Earth	Υ	
9	1010	Peter	Parker	123-545-5421	25th Main Street, New York	Υ	
10	1011	Samwise	Gamgee		612 Shire Lane, Shire	Υ	
11	1012	Harry	Potter		2394 Hogwarts Avenue	Υ	
12	1013	Don	Draper	123-543-2345	2039 Main Street	Υ	
13	1014	Leslie	Knope	876-678-3469	343 City Parkway	Υ	
14	1015	Toby	Flenderson	304-762-2467	214 HR Avenue	N	
15	1016	Ron	Weasley	123-545-5421	2395 Hogwarts Avenue	N	
16	1017	Michael	Scott	123-643-9775	121 Paper Avenue, Pennsylvania	Υ	
17	1018	Clark	Kent		3498 Super Lane	Υ	
18	1019	Creed	Braton		3498 Super Lane	Υ	
19	1020	Anakin	Skywalker	876-678-3469	910 Tatooine Road, Tatooine	Υ	
4							•

Filtering out Yes in do_not_contact column

```
In [30]: for x in df.index:
    if df.loc[x,"Do_Not_Contact"] == "Y":
        df.drop(x, inplace=True)
```

Out[30]:

	CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_C
0	1001	Frodo	Baggins	123-545-5421	123 Shire Lane, Shire	Υ	
2	1003	Walter	White		298 Drugs Driveway	N	
4	1005	Jon	Snow	876-678-3469	123 Dragons Road	Υ	
6	1007	Jeff	Winger		1209 South Street	N	
7	1008	Sherlock	Holmes	876-678-3469	98 Clue Drive	N	
8	1009	Gandalf			123 Middle Earth	Υ	
9	1010	Peter	Parker	123-545-5421	25th Main Street, New York	Υ	
10	1011	Samwise	Gamgee		612 Shire Lane, Shire	Υ	
11	1012	Harry	Potter		2394 Hogwarts Avenue	Υ	
12	1013	Don	Draper	123-543-2345	2039 Main Street	Υ	
13	1014	Leslie	Knope	876-678-3469	343 City Parkway	Υ	
14	1015	Toby	Flenderson	304-762-2467	214 HR Avenue	N	
15	1016	Ron	Weasley	123-545-5421	2395 Hogwarts Avenue	N	
16	1017	Michael	Scott	123-643-9775	121 Paper Avenue, Pennsylvania	Y	
17	1018	Clark	Kent		3498 Super Lane	Υ	
19	1020	Anakin	Skywalker	876-678-3469	910 Tatooine Road, Tatooine	Y	
4							•

Droping Out Phone_Number to Blank ("")

```
In [31]: for x in df.index:
    if df.loc[x,"Phone_Number"] == "":
        df.drop(x, inplace=True)

df
#df=df.dropna(subset="Phone_Number",inplace=True)
```

Out[31]:

	CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_C
0	1001	Frodo	Baggins	123-545-5421	123 Shire Lane, Shire	Υ	
4	1005	Jon	Snow	876-678-3469	123 Dragons Road	Υ	
7	1008	Sherlock	Holmes	876-678-3469	98 Clue Drive	N	
9	1010	Peter	Parker	123-545-5421	25th Main Street, New York	Υ	
12	1013	Don	Draper	123-543-2345	2039 Main Street	Υ	
13	1014	Leslie	Knope	876-678-3469	343 City Parkway	Υ	
14	1015	Toby	Flenderson	304-762-2467	214 HR Avenue	N	
15	1016	Ron	Weasley	123-545-5421	2395 Hogwarts Avenue	N	
16	1017	Michael	Scott	123-643-9775	121 Paper Avenue, Pennsylvania	Y	
19	1020	Anakin	Skywalker	876-678-3469	910 Tatooine Road, Tatooine	Υ	
4							•

Reset index

```
In [32]: df=df.reset_index(drop=True)
```

In [33]: df

Out[33]:

	CustomerID	First_Name	Last_Name	Phone_Number	Address	Paying Customer	Do_Not_Coi
0	1001	Frodo	Baggins	123-545-5421	123 Shire Lane, Shire	Υ	
1	1005	Jon	Snow	876-678-3469	123 Dragons Road	Υ	
2	1008	Sherlock	Holmes	876-678-3469	98 Clue Drive	N	
3	1010	Peter	Parker	123-545-5421	25th Main Street, New York	Y	
4	1013	Don	Draper	123-543-2345	2039 Main Street	Υ	
5	1014	Leslie	Knope	876-678-3469	343 City Parkway	Υ	
6	1015	Toby	Flenderson	304-762-2467	214 HR Avenue	N	
7	1016	Ron	Weasley	123-545-5421	2395 Hogwarts Avenue	N	
8	1017	Michael	Scott	123-643-9775	121 Paper Avenue, Pennsylvania	Y	
9	1020	Anakin	Skywalker	876-678-3469	910 Tatooine Road, Tatooine	Y	
4							>

In []: