## Data Cleaning in Python

```
import pandas as pd
import numpy as np
df = pd.read excel(r"C:\Users\User\Downloads\Customer Call List.xlsx")
df
    CustomerID First Name
                               Last Name
                                            Phone Number \
0
           1001
                      Frodo
                                  Baggins
                                            123-545-5421
           1002
1
                       Abed
                                    Nadir
                                            123/643/9775
2
           1003
                    Walter
                                   /White
                                              7066950392
3
           1004
                     Dwight
                                  Schrute
                                            123-543-2345
4
           1005
                                     Snow
                                            876 | 678 | 3469
                        Jon
5
                        Ron
                                  Swanson
                                            304-762-2467
           1006
6
           1007
                       Jeff
                                   Winger
                                                      NaN
7
           1008
                  Sherlock
                                   Holmes
                                            876 | 678 | 3469
8
           1009
                   Gandalf
                                      NaN
                                                      N/a
9
                                            123-545-5421
           1010
                      Peter
                                   Parker
10
           1011
                   Samwise
                                   Gamqee
                                                      NaN
11
           1012
                      Harry
                                              7066950392
                                ...Potter
12
           1013
                                            123-543-2345
                        Don
                                   Draper
13
           1014
                     Leslie
                                    Knope
                                            876 | 678 | 3469
14
           1015
                       Toby
                             Flenderson
                                            304-762-2467
15
           1016
                        Ron
                                  Weasley
                                            123-545-5421
16
           1017
                  Michael
                                    Scott
                                            123/643/9775
17
           1018
                                     Kent
                      Clark
                                              7066950392
18
           1019
                      Creed
                                   Braton
                                                      N/a
19
           1020
                     Anakin
                                Skywalker
                                            876 | 678 | 3469
20
           1020
                    Anakin
                                Skywalker
                                            876 | 678 | 3469
                                     Address Paying Customer
Do Not Contact
0
                      123 Shire Lane, Shire
                                                           Yes
No
1
                        93 West Main Street
                                                            No
Yes
2
                         298 Drugs Driveway
                                                             N
NaN
    980 Paper Avenue, Pennsylvania, 18503
                                                           Yes
3
Υ
4
                           123 Dragons Road
                                                             Υ
No
5
                           768 City Parkway
                                                           Yes
Yes
                          1209 South Street
                                                            No
6
No
7
                              98 Clue Drive
                                                             N
```

No		
8	123 Middle Earth	Yes
NaN 9	JEth Main Street New York	Vos
9 No	25th Main Street, New York	Yes
10	612 Shire Lane, Shire	Yes
No	2224 11	.,
11 NaN	2394 Hogwarts Avenue	Y
12	2039 Main Street	Yes
N		
13	343 City Parkway	Yes
No 14	214 HR Avenue	N
No	214 III. Avenue	IN
15	2395 Hogwarts Avenue	No
N	121 Daniel America Daniel Inchi	V
16 No	121 Paper Avenue, Pennsylvania	Yes
17	3498 Super Lane	Υ
NaN		
18	N/a	N/a
Yes 19	910 Tatooine Road, Tatooine	Yes
N	310 Tatoothe Road, Tatoothe	103
20	910 Tatooine Road, Tatooine	Yes
N		
	Not Useful Column	
0	True	
1	False	
2 3 4	True	
3	True	
5	True True	
	False	
6 7 8 9	False	
8	False	
	True	
10	True	
11	True	
12	False	
13	False	
14	False	
15	False	
16 17	False True	
18	True	

```
19
                   True
20
                   True
#Remove the duplicates
df=df.drop duplicates()
df
    CustomerID First Name
                                            Phone Number
                                Last Name
0
           1001
                      Frodo
                                   Baggins
                                             123-545-5421
1
           1002
                       Abed
                                     Nadir
                                             123/643/9775
2
           1003
                     Walter
                                    /White
                                               7066950392
3
                                             123-543-2345
           1004
                     Dwight
                                   Schrute
4
           1005
                                      Snow
                                             876 | 678 | 3469
                        Jon
5
           1006
                                             304 - 762 - 2467
                        Ron
                                   Swanson
6
                       Jeff
           1007
                                   Winger
                                                       NaN
7
                   Sherlock
           1008
                                   Holmes
                                             876 | 678 | 3469
8
                    Gandalf
                                       NaN
           1009
                                                       N/a
9
           1010
                      Peter
                                    Parker
                                             123-545-5421
10
           1011
                    Samwise
                                    Gamgee
                                                       NaN
11
           1012
                                               7066950392
                      Harry
                                 ...Potter
12
           1013
                                   Draper
                                             123-543-2345
                        Don
13
           1014
                     Leslie
                                            876 | 678 | 3469
                                     Knope
14
           1015
                       Toby
                              Flenderson
                                             304-762-2467
15
           1016
                                  Weasley
                        Ron
                                             123-545-5421
16
           1017
                   Michael
                                             123/643/9775
                                     Scott
17
           1018
                      Clark
                                      Kent
                                               7066950392
18
           1019
                      Creed
                                    Braton
                                                       N/a
19
                                Skywalker
           1020
                     Anakin
                                            876 | 678 | 3469
                                      Address Paying Customer
Do Not_Contact
                      123 Shire Lane, Shire
                                                            Yes
No
                        93 West Main Street
1
                                                             No
Yes
2
                                                              N
                         298 Drugs Driveway
NaN
    980 Paper Avenue, Pennsylvania, 18503
3
                                                            Yes
Υ
                                                              Υ
4
                            123 Dragons Road
No
5
                            768 City Parkway
                                                            Yes
Yes
                           1209 South Street
                                                             No
6
No
7
                               98 Clue Drive
                                                              N
No
                            123 Middle Earth
8
                                                            Yes
NaN
                25th Main Street, New York
9
                                                            Yes
```

```
No
                     612 Shire Lane, Shire
                                                         Yes
10
No
                                                          Υ
11
                      2394 Hogwarts Avenue
NaN
                          2039 Main Street
12
                                                         Yes
N
13
                          343 City Parkway
                                                         Yes
No
14
                             214 HR Avenue
                                                           N
No
15
                      2395 Hogwarts Avenue
                                                          No
N
16
           121 Paper Avenue, Pennsylvania
                                                         Yes
No
17
                                                          Υ
                           3498 Super Lane
NaN
18
                                        N/a
                                                         N/a
Yes
19
              910 Tatooine Road, Tatooine
                                                         Yes
Ν
    Not_Useful_Column
0
                 True
1
                 False
2
                 True
3
                  True
4
                  True
5
                 True
6
                 False
7
                 False
8
                 False
9
                 True
10
                 True
                 True
11
12
                 False
13
                 False
14
                 False
15
                 False
16
                 False
                 True
17
18
                  True
19
                 True
#Remove the columns which does not need
df=df.drop(columns="Not Useful Column")
df
    CustomerID First_Name
                                          Phone Number \
                              Last Name
0
          1001
                     Frodo
                                Baggins
                                          123-545-5421
```

1 1002 Abed Nadir 123/643/9775 7066950392 1003 Walter /White 7066950392 1004 Dwight Schrute 123-543-2345 1006 Ron Snow 876 1678 13469 5 1006 Ron Swanson 304-762-2467 6 1007 Jeff Winger NaN 7 1008 Sherlock Holmes 876 1678 13469 8 1009 Gandalf NaN 9 1010 Peter Parker 123-545-5421 10 1011 Samwise Gamgee NaN 11 1012 HarryPotter 7066950392 12 1013 Don Draper 123-543-2345 13 1014 Leslie Knope 876 1678 13469 14 1015 Toby Flenderson 304-762-2467 15 1016 Ron Weasley 123-545-5421 16 1017 Michael Scott 123/643/9775 17 1018 Clark Kent 7066950392 18 1019 Creed Braton N/a 19 1020 Anakin Skywalker 876 1678   3469						
Do_Not_Contact 0	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019	Walter Dwight Jon Ron Jeff Sherlock Gandalf Peter Samwise Harry Don Leslie Toby Ron Michael Clark Creed	/White Schrute Snow Swanson Winger Holmes NaN Parker GamgeePotter Draper Knope Flenderson_ Weasley Scott Kent Braton Skywalker	7066950392 123-543-2345 876 678 3469 304-762-2467 NaN 876 678 3469 N/a 123-545-5421 NaN 7066950392 123-543-2345 876 678 3469 304-762-2467 123-545-5421 123/643/9775 7066950392 N/a 876 678 3469	
No 1 93 West Main Street No Yes 2 298 Drugs Driveway N NaN 3 980 Paper Avenue, Pennsylvania, 18503 Yes Y 4 123 Dragons Road Y No 5 768 City Parkway Yes 6 1209 South Street No No 7 98 Clue Drive N No 8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes	_	Not_Contact				
1 93 West Main Street No Yes 2 298 Drugs Driveway N NaN 3 980 Paper Avenue, Pennsylvania, 18503 Yes Y 4 123 Dragons Road Y No 5 768 City Parkway Yes Yes 6 1209 South Street No No No 7 98 Clue Drive N No 8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes		<del>-</del>				Yes
2 298 Drugs Driveway N NaN 3 980 Paper Avenue, Pennsylvania, 18503 Yes Y 4 123 Dragons Road Y No 5 768 City Parkway Yes Yes 6 1209 South Street No No No 7 98 Clue Drive N No 8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N		93 West Main Street				
NaN 3 980 Paper Avenue, Pennsylvania, 18503 Yes Y 4 123 Dragons Road Y No 5 768 City Parkway Yes Yes 6 1209 South Street No No 7 98 Clue Drive N No 8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N			200	Druge Driver	21/	N.I
3 980 Paper Avenue, Pennsylvania, 18503 Yes Y 4 123 Dragons Road Y No 5 768 City Parkway Yes Yes 6 1209 South Street No No 7 98 Clue Drive N No 8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes			298	ugs privew	ay	IN
4 123 Dragons Road Y No 5 768 City Parkway Yes Yes 6 1209 South Street No No 7 98 Clue Drive N No 8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N		980 Paper A	venue, Penn	sylvania, 185	03	Yes
No 5 768 City Parkway Yes Yes 6 1209 South Street No No 7 98 Clue Drive N No 8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N			12	23 Dragons Ro	ad	Υ
Yes 6 1209 South Street No No 7 98 Clue Drive N No 8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N	No	<u> </u>				
6 1209 South Street No No 7 98 Clue Drive N No 8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N						
7 98 Clue Drive N No 8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N	6	1209 South Street No				No
No 8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 2039 Main Street Yes N						NI
NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N		98 Clue Drive				
9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N			17	23 Middle Ear	th	Yes
No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N		25th Main Street New York Yes				
No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N	No	25th Harn Street, New Tork				
11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N		612 Shire Lane, Shire Yes				
NaN 12 2039 Main Street Yes N		2394 Hogwarts Avenue Y				
N	NaN			_		
		2039 Main Street				Yes
		343 City Parkway Yes				Yes

```
No
14
                               214 HR Avenue
                                                              N
No
15
                       2395 Hogwarts Avenue
                                                             No
N
16
            121 Paper Avenue, Pennsylvania
                                                           Yes
No
17
                            3498 Super Lane
                                                              Υ
NaN
18
                                          N/a
                                                           N/a
Yes
19
               910 Tatooine Road, Tatooine
                                                           Yes
Ν
#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. /")
df
    CustomerID First Name
                               Last Name
                                           Phone Number
0
           1001
                      Frodo
                                 Baggins
                                           123-545-5421
                                           123/643/9775
1
           1002
                       Abed
                                   Nadir
2
                                             7066950392
           1003
                     Walter
                                   White
3
                                           123-543-2345
           1004
                     Dwight
                                 Schrute
4
                                           876 | 678 | 3469
           1005
                        Jon
                                    Snow
5
           1006
                                 Swanson
                                           304-762-2467
                        Ron
6
           1007
                       Jeff
                                  Winger
                                                     NaN
7
           1008
                  Sherlock
                                  Holmes
                                           876 | 678 | 3469
8
                    Gandalf
           1009
                                     NaN
                                                     N/a
9
           1010
                      Peter
                                  Parker
                                           123-545-5421
10
           1011
                    Samwise
                                  Gamqee
                                                     NaN
11
           1012
                                             7066950392
                      Harry
                                  Potter
12
           1013
                                           123-543-2345
                        Don
                                  Draper
13
           1014
                     Leslie
                                   Knope
                                           876 | 678 | 3469
14
           1015
                       Toby
                              Flenderson
                                           304-762-2467
15
           1016
                        Ron
                                 Weasley
                                           123-545-5421
16
           1017
                  Michael
                                   Scott
                                           123/643/9775
17
           1018
                      Clark
                                    Kent
                                             7066950392
18
           1019
                      Creed
                                  Braton
                                                     N/a
19
           1020
                     Anakin
                               Skywalker
                                           876 | 678 | 3469
                                     Address Paying Customer
Do Not Contact
                      123 Shire Lane, Shire
0
                                                           Yes
No
                        93 West Main Street
1
                                                             No
Yes
2
                                                              N
                         298 Drugs Driveway
NaN
```

```
3
    980 Paper Avenue, Pennsylvania, 18503
                                                           Yes
Υ
4
                           123 Dragons Road
                                                            Υ
No
5
                           768 City Parkway
                                                           Yes
Yes
                          1209 South Street
                                                            No
6
No
7
                              98 Clue Drive
                                                            N
No
                           123 Middle Earth
                                                           Yes
8
NaN
9
                25th Main Street, New York
                                                           Yes
No
10
                      612 Shire Lane, Shire
                                                           Yes
No
                                                            Υ
                       2394 Hogwarts Avenue
11
NaN
12
                           2039 Main Street
                                                           Yes
N
13
                           343 City Parkway
                                                           Yes
No
                                                             N
14
                              214 HR Avenue
No
15
                       2395 Hogwarts Avenue
                                                            No
N
16
            121 Paper Avenue, Pennsylvania
                                                           Yes
No
                                                            Υ
17
                            3498 Super Lane
NaN
18
                                         N/a
                                                           N/a
Yes
               910 Tatooine Road, Tatooine
19
                                                          Yes
Ν
df["Phone Number"]=df["Phone Number"].str.replace('[^a-zA-Z0-9]','')
df
    CustomerID First Name
                                          Phone Number
                              Last_Name
0
           1001
                      Frodo
                                 Baggins
                                          123-545-5421
           1002
1
                      Abed
                                  Nadir
                                          123/643/9775
2
           1003
                    Walter
                                   White
                                                    NaN
3
           1004
                     Dwight
                                 Schrute
                                          123-543-2345
                                          876 | 678 | 3469
4
           1005
                                    Snow
                        Jon
5
           1006
                        Ron
                                 Swanson
                                          304-762-2467
6
           1007
                       Jeff
                                 Winger
                                                    NaN
7
           1008
                  Sherlock
                                  Holmes
                                          876 | 678 | 3469
8
                   Gandalf
           1009
                                     NaN
                                                    N/a
9
           1010
                      Peter
                                  Parker
                                          123-545-5421
10
           1011
                   Samwise
                                  Gamgee
                                                    NaN
```

11 12 13 14 15 16 17 18 19	1012 Harry Potter NaN 1013 Don Draper 123-543-2345 1014 Leslie Knope 876 678 3469 1015 Toby Flenderson 304-762-2467 1016 Ron Weasley 123-545-5421 1017 Michael Scott 123/643/9775 1018 Clark Kent NaN 1019 Creed Braton N/a 1020 Anakin Skywalker 876 678 3469					
	Address Paying Custome	r				
Do N	Not Contact	5 I				
0	123 Shire Lane, Shire Ye	25				
No						
1	93 West Main Street N	Ю				
Yes	200 Daving Daivious	N.I				
2 NaN	298 Drugs Driveway	N				
3	980 Paper Avenue, Pennsylvania, 18503 Ye	25				
Ϋ́	Too Tupe: Attender, Fermis, Evania, 1999					
4	123 Dragons Road	Υ				
No						
5	768 City Parkway Yes					
Yes 6	1200 South Stroot No					
No	1209 South Street No					
7	98 Clue Drive N					
No	32 333 3.213					
8	123 Middle Earth Yes					
NaN						
9 No	25th Main Street, New York Ye	25				
10	612 Shire Lane, Shire Yes					
No	orz Shirt C Lune, Shirt C					
11	2394 Hogwarts Avenue Y					
NaN						
12	2039 Main Street Ye	S				
N 13	343 City Parkway Ye	) C				
No	545 CILY Falkway 16	. 3				
14	214 HR Avenue N					
No						
15	2395 Hogwarts Avenue N	lo				
N 16	121 Donon Avenue Donovilvania					
16 No	121 Paper Avenue, Pennsylvania Ye	25				
17	3498 Super Lane	Υ				
NaN	5 130 Super Edite	•				
18	N/a N/	'a				

```
Yes
19
              910 Tatooine Road, Tatooine
                                                        Yes
N
df["Phone Number"]=df["Phone Number"].apply(lambda
x:x[0:3]+'-'+x[3:6]+'-'+x[6:\overline{10}]
df
TypeError
                                           Traceback (most recent call
last)
Cell In[69], line 1
---> 1 df["Phone Number"]=df["Phone Number"].apply(lambda
x:x[0:3]+'-'+x[3:6]+'-'+x[6:10]
      2 df
File ~\anaconda3\Lib\site-packages\pandas\core\series.py:4924, in
Series.apply(self, func, convert dtype, args, by row, **kwargs)
   4789 def apply(
   4790
            self,
   4791
            func: AggFuncType,
   (\ldots)
   4796
            **kwarqs,
   4797 ) -> DataFrame | Series:
   4798
            Invoke function on values of Series.
   4799
   4800
   (\ldots)
   4915
            dtype: float64
   4916
            return SeriesApply(
   4917
   4918
                self,
   4919
                func.
                convert dtype=convert dtype,
   4920
   4921
                by row=by row,
   4922
                args=args,
   4923
                kwargs=kwargs,
-> 4924
            ).apply()
File ~\anaconda3\Lib\site-packages\pandas\core\apply.py:1427, in
SeriesApply.apply(self)
            return self.apply compat()
   1424
   1426 # self.func is Callable
-> 1427 return self.apply standard()
File ~\anaconda3\Lib\site-packages\pandas\core\apply.py:1507, in
SeriesApply.apply_standard(self)
   1501 # row-wise access
   1502 # apply doesn't have a `na action` keyword and for backward
```

```
compat reasons
   1503 # we need to give `na action="ignore"` for categorical data.
   1504 # TODO: remove the `na action="ignore"` when that default has
been changed in
   1505 # Categorical (GH51645).
   1506 action = "ignore" if isinstance(obj.dtype, CategoricalDtype)
else None
-> 1507 mapped = obj. map values(
            mapper=curried, na action=action,
   1508
convert=self.convert dtype
   1509 )
   1511 if len(mapped) and isinstance(mapped[0], ABCSeries):
            # GH#43986 Need to do list(mapped) in order to get treated
   1512
as nested
   1513
            # See also GH#25959 regarding EA support
   1514
            return obj. constructor expanddim(list(mapped),
index=obj.index)
File ~\anaconda3\Lib\site-packages\pandas\core\base.py:921, in
IndexOpsMixin. map values(self, mapper, na action, convert)
    918 if isinstance(arr, ExtensionArray):
            return arr.map(mapper, na action=na action)
--> 921 return algorithms.map array(arr, mapper, na action=na action,
convert=convert)
File ~\anaconda3\Lib\site-packages\pandas\core\algorithms.py:1743, in
map array(arr, mapper, na action, convert)
   1741 values = arr.astype(object, copy=False)
   1742 if na action is None:
-> 1743
            return lib.map infer(values, mapper, convert=convert)
   1744 else:
            return lib.map infer mask(
   1745
   1746
                values, mapper, mask=isna(values).view(np.uint8),
convert=convert
   1747
File lib.pyx:2972, in pandas. libs.lib.map infer()
Cell In[69], line 1, in < lambda > (x)
----> 1 df["Phone Number"]=df["Phone_Number"].apply(lambda
x:x[0:3]+'-'+x[3:\overline{6}]+'-'+x[6:10]
     2 df
TypeError: 'float' object is not subscriptable
df["Phone Number"]=df["Phone Number"].str.replace('NaN','')
df
    CustomerID First Name
                            Last Name Phone Number \
          1001
                    Frodo
0
                              Baggins 123-545-5421
```

1 1002 Abed Nadir 213/643/9775   2 1003 Walter White						
13	2 3 4 5 6 7 8 9 10 11	1003 1004 1005 1006 1007 1008 1009 1010 1011 1012	Walter Dwight Jon Ron Jeff Sherlock Gandalf Peter Samwise Harry	White Schrute Snow Swanson Winger Holmes NaN Parker Gamgee Potter	NaN 123-543-2345 876 678 3469 304-762-2467 NaN 876 678 3469 N/a 123-545-5421 NaN	
Do_Not_Contact 0	13 14 15 16 17 18	1014 1015 1016 1017 1018 1019	Leslie Toby Ron Michael Clark Creed	Knope Flenderson Weasley Scott Kent Braton	876 678 3469 304-762-2467 123-545-5421 123/643/9775 NaN N/a	
No 1 93 West Main Street No Yes 2 298 Drugs Driveway N NaN 3 980 Paper Avenue, Pennsylvania, 18503 Yes Y 123 Dragons Road Y No 5 768 City Parkway Yes 6 1209 South Street No No 7 98 Clue Drive N No 8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N	_	Not_Contact			, ,	
1 93 West Main Street No Yes 2 298 Drugs Driveway N NaN 3 980 Paper Avenue, Pennsylvania, 18503 Yes Y 4 123 Dragons Road Y No 5 768 City Parkway Yes Yes 6 1209 South Street No No 7 98 Clue Drive N No 8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes			123 Sh.	ire Lane, Sh	ıre	Yes
2 298 Drugs Driveway N NaN 3 980 Paper Avenue, Pennsylvania, 18503 Yes Y 4 123 Dragons Road Y No 5 768 City Parkway Yes Yes 6 1209 South Street No No 7 98 Clue Drive N No 8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N	1		93 W	est Main Str	eet	No
NaN 3 980 Paper Avenue, Pennsylvania, 18503 Yes Y 4 123 Dragons Road Y No 5 768 City Parkway Yes Yes 6 1209 South Street No No 7 98 Clue Drive N No 8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N			298	Drugs Drive	way	N
Y 4 123 Dragons Road Y No 5 768 City Parkway Yes Yes 6 1209 South Street No No 7 98 Clue Drive N No 8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N		OSO Danor A		-	•	Vec
No 5 768 City Parkway Yes Yes 6 1209 South Street No No 7 98 Clue Drive N No 8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N	Υ	sou raper A	venue, Penn	Sylvaliid, 18	303	
768 City Parkway Yes Yes 6 1209 South Street No No 7 98 Clue Drive N No 8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N		123 Dragons Road				
6 1209 South Street No No 7 98 Clue Drive N No 8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N	5	768 City Parkway				Yes
No 7 98 Clue Drive N No 8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N						No
No 8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 2039 Main Street Yes N	No					
8 123 Middle Earth Yes NaN 9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N		98 Clue Drive				N
9 25th Main Street, New York Yes No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N	8		13	23 Middle Ea	rth	Yes
No 10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N						
10 612 Shire Lane, Shire Yes No 11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N		25th Main Street, New York Yes				
11 2394 Hogwarts Avenue Y NaN 12 2039 Main Street Yes N	10	612 Shire Lane, Shire Yes				
NaN 12 2039 Main Street Yes N			230/	Hogwarte Ave	nue	٧
12 2039 Main Street Yes N			ZJ34	nogwarts Ave	iiue	ı
	12		2039 Main Street			Yes
	N 13	Yes				

```
No
                            214 HR Avenue
                                                         N
14
No
15
                     2395 Hogwarts Avenue
                                                        No
N
16
           121 Paper Avenue, Pennsylvania
                                                       Yes
No
17
                          3498 Super Lane
                                                         Υ
NaN
18
                                       N/a
                                                       N/a
Yes
19
              910 Tatooine Road, Tatooine
                                                       Yes
N
df[["Street
Adress", "State", "ZipCode"]]=df["Address"].str.split(',',2,expands=True
)
df
                                           Traceback (most recent call
TypeError
last)
Cell In[77], line 1
----> 1 df[["Street
Adress", "State", "ZipCode"]]=df["Address"].str.split(',',2,expands=True
      2 df
File ~\anaconda3\Lib\site-packages\pandas\core\strings\
accessor.py:137, in
forbid nonstring types.<locals>. forbid nonstring types.<locals>.wrapp
er(self, *args, **kwargs)
            msq = (
    132
    133
                f"Cannot use .str.{func name} with values of "
    134
                f"inferred dtype '{self. inferred dtype}'."
    135
    136
            raise TypeError(msg)
--> 137 return func(self, *args, **kwargs)
TypeError: StringMethods.split() got an unexpected keyword argument
'expands'
df["Paying Customer"]=df["Paying Customer"].str.replace('Yes','Y')
df["Paying Customer"]=df["Paying Customer"].str.replace('No','N')
df
    CustomerID First Name
                            Last Name Phone Number \
0
          1001
                    Frodo
                                       123-545-5421
                               Baggins
1
          1002
                     Abed
                                Nadir 123/643/9775
```

2 3	1003 1004	Walter Dwight	White Schrute	NaN 123-543-2345	
4	1005	Jon	Snow	876   678   3469	
5 6 7	1006 1007	Ron Jeff	Swanson Winger	304-762-2467 NaN	
7	1008	Sherlock	Holmes	876   678   3469	
8 9	1009 1010	Gandalf Peter	NaN Parker	N/a 123-545-5421	
10	1011	Samwise	Gamgee	NaN	
11 12	1012 1013	Harry Don	Potter Draper	NaN 123-543-2345	
13	1013	Leslie	Knope	876   678   3469	
14 15	1015	Toby	Flenderson		
16	1016 1017	Ron Michael	Weasley Scott		
17	1018	Clark	Kent	NaN	
18 19	1019 1020	Creed Anakin	Braton Skywalker	N/a 876 678 3469	
			Addr	ess Paying Cust	omer
Do_Not <sub>_</sub>	_Contact	123 Sh	ire Lane, Sh	ire	Υ
No					
1 Yes		93 We	est Main Str	eet	N
2	298 Drugs Driveway				
NaN 3 980 Y	980 Paper Avenue, Pennsylvania, 18503 Y				
4 No	123 Dragons Road Y				
5	768 City Parkway				
Yes 6	1209 South Street				
No					
7 No	98 Clue Drive				
8	123 Middle Earth				
NaN 9	25th Main Street. New York				
No	25th Main Street, New York				
10 No.		612 Sh:	ire Lane, Sh	ire	Y
No 11		2394 H	Hogwarts Ave	nue	Υ
NaN		2.0	020 Main C+n	00+	V
12 N		20	939 Main Str	eet	Y
13	343 City Parkway Y				Y
No					

```
14
                               214 HR Avenue
                                                              N
No
15
                       2395 Hogwarts Avenue
                                                              N
N
16
                                                              Υ
            121 Paper Avenue, Pennsylvania
No
                                                              Υ
17
                             3498 Super Lane
NaN
18
                                                            N/a
                                          N/a
Yes
                                                              Υ
19
               910 Tatooine Road, Tatooine
Ν
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
    CustomerID First Name
                               Last_Name
                                           Phone Number
                      Frodo
                                           123-545-5421
0
           1001
                                 Baggins
1
           1002
                                           123/643/9775
                       Abed
                                   Nadir
2
           1003
                     Walter
                                   White
                                                     NaN
3
           1004
                                           123-543-2345
                     Dwight
                                 Schrute
4
                                           876 | 678 | 3469
           1005
                        Jon
                                    Snow
5
           1006
                        Ron
                                           304-762-2467
                                 Swanson
6
                       Jeff
           1007
                                  Winger
                                                     NaN
7
           1008
                  Sherlock
                                  Holmes
                                           876 | 678 | 3469
8
           1009
                   Gandalf
                                     NaN
                                                     N/a
9
                                           123-545-5421
           1010
                      Peter
                                  Parker
10
           1011
                    Samwise
                                  Gamqee
                                                     NaN
11
           1012
                      Harry
                                  Potter
                                                     NaN
12
           1013
                                  Draper
                                           123-543-2345
                        Don
13
           1014
                     Leslie
                                           876 | 678 | 3469
                                   Knope
14
           1015
                       Toby
                              Flenderson
                                           304-762-2467
15
           1016
                        Ron
                                 Weasley
                                           123-545-5421
16
                  Michael
           1017
                                   Scott
                                           123/643/9775
17
           1018
                      Clark
                                    Kent
                                                     NaN
18
           1019
                                  Braton
                      Creed
                                                     N/a
           1020
19
                     Anakin
                               Skywalker
                                           876 | 678 | 3469
                                     Address Paying Customer
Do Not Contact
                                                              Υ
                      123 Shire Lane, Shire
N
1
                        93 West Main Street
                                                              N
Υ
2
                         298 Drugs Driveway
                                                              N
NaN
                                                              Υ
    980 Paper Avenue, Pennsylvania, 18503
3
Υ
4
                                                              Υ
                           123 Dragons Road
```

```
N
5
                          768 City Parkway
                                                          Υ
Υ
6
                         1209 South Street
                                                          N
N
7
                             98 Clue Drive
                                                          N
N
8
                          123 Middle Earth
                                                          Υ
NaN
               25th Main Street, New York
                                                          Υ
9
N
                     612 Shire Lane, Shire
                                                          Υ
10
N
11
                      2394 Hogwarts Avenue
                                                          Υ
NaN
                                                          Υ
12
                          2039 Main Street
N
13
                                                          Υ
                          343 City Parkway
N
14
                             214 HR Avenue
                                                          N
N
15
                      2395 Hogwarts Avenue
                                                          N
N
                                                          Υ
16
           121 Paper Avenue, Pennsylvania
17
                                                          Υ
                           3498 Super Lane
NaN
18
                                       N/a
                                                        N/a
Υ
19
              910 Tatooine Road, Tatooine
                                                          Υ
N
#df.replace('N/a','')
#df.replace('NaN','')
df=df.filled('')
df
AttributeError
                                           Traceback (most recent call
last)
~\AppData\Local\Temp\ipykernel 10188\1390790910.py in ?()
      1 #df.replace('N/a','')
      2 #df.replace('NaN','')
----> 3 df=df.filled('')
      4 df
~\anaconda3\Lib\site-packages\pandas\core\generic.py in ?(self, name)
   6295
                     and name not in self. accessors
   6296
                     and
```

```
self._info_axis._can_hold_identifiers_and_holds_name(name)
6297 ):
6298     return self[name]
-> 6299     return object.__getattribute__(self, name)
AttributeError: 'DataFrame' object has no attribute 'filled'
```