Data Cleaning Assignment

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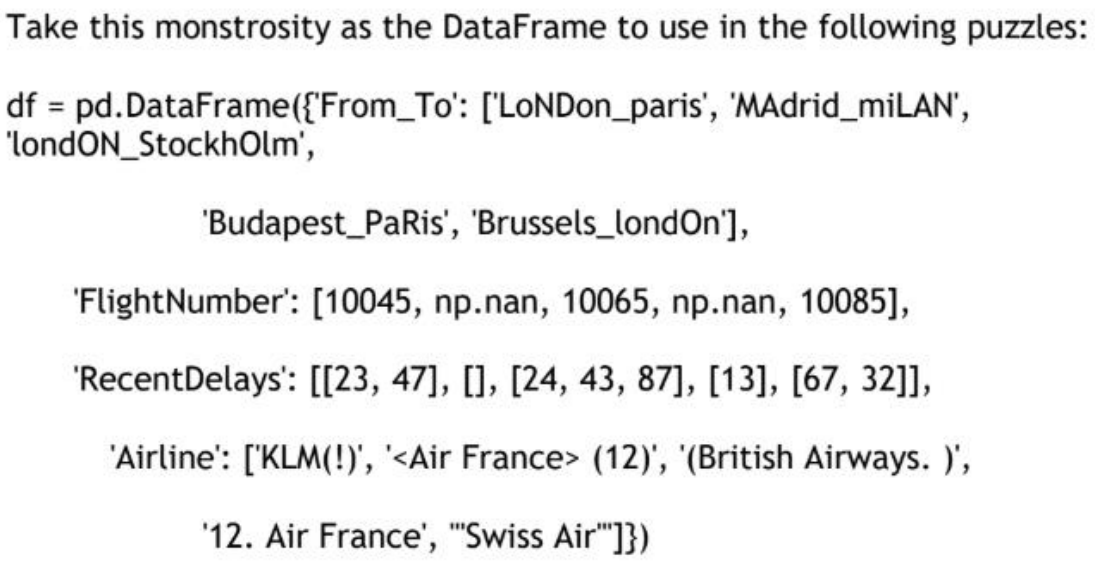
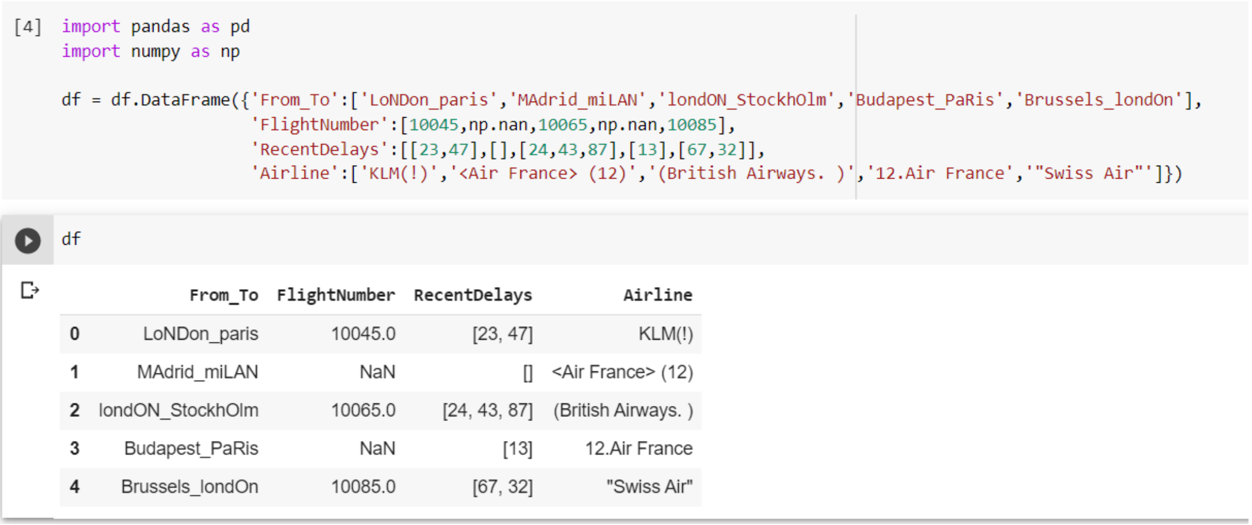


Take this monstrosity as the DataFrame to use in the following puzzles:

```
df = pd.DataFrame({'From_To': ['LoNDon_paris', 'MAdrid_miLAN',
'londON_StockhOlm',
                    'Budapest_PaRis', 'Brussels_londOn'],
        'FlightNumber': [10045, np.nan, 10065, np.nan, 10085],
        'RecentDelays': [[23, 47], [], [24, 43, 87], [13], [67, 32]],
           'Airline': ['KLM(!)', '<Air France> (12)', '(British Airways. )',
                    '12. Air France', '"Swiss Air"']})
```



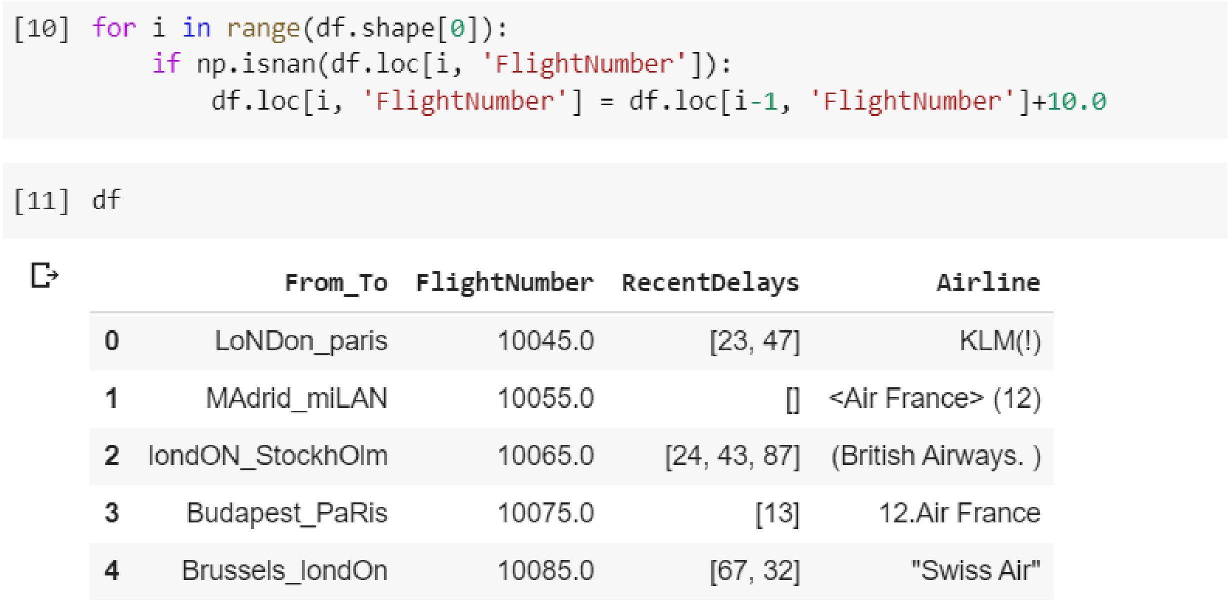
```
import pandas as pd
import numpy as np

df = df.DataFrame({'From_To':['LoNDon_paris','MAdrid_miLAN','londON_StockhOlm','Budapest_PaRis','Brussels_londOn'],
                   'FlightNumber':[10045,np.nan,10065,np.nan,10085],
                   'RecentDelays':[[23,47],[],[24,43,87],[13],[67,32]],
                   'Airline':['KLM(!)','<Air France> (12)','(British Airways. )','12.Air France','"Swiss Air"']})
```

```
df
```

```
           From_To  FlightNumber  RecentDelays              Airline
0     LoNDon_paris       10045.0      [23, 47]               KLM(!)
1     MAdrid_miLAN           NaN            []    <Air France> (12)
2  londON_StockhOlm      10065.0  [24, 43, 87]  (British Airways. )
3   Budapest_PaRis           NaN          [13]       12.Air France
4  Brussels_londOn       10085.0      [67, 32]         "Swiss Air"
```

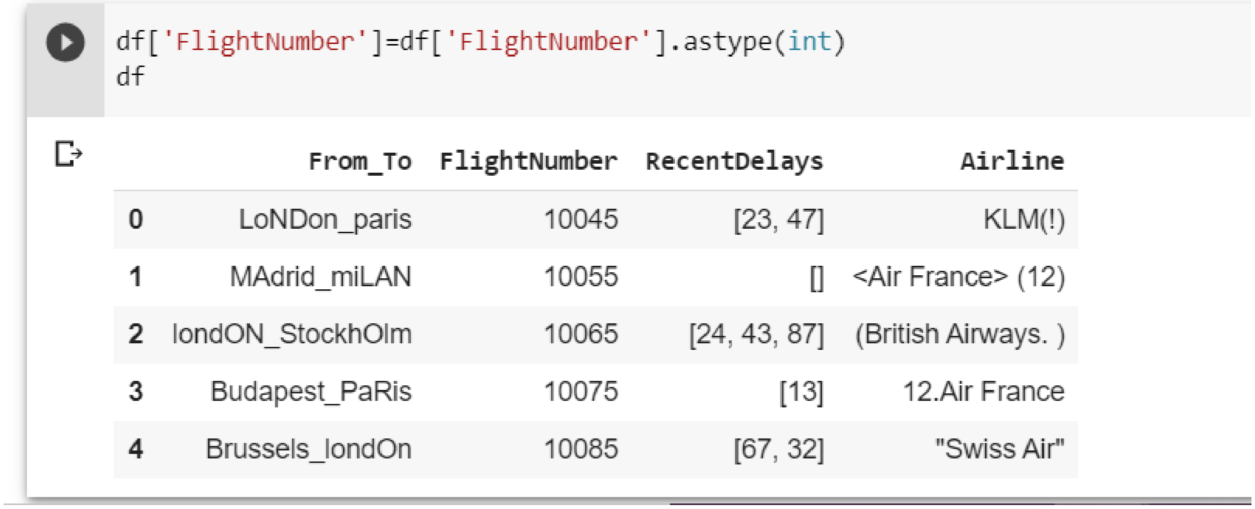
1. Some values in the the FlightNumber column are missing. These numbers are meant to increase by 10 with each row so 10055 and 10075 need to be put in place. Fill in these missing numbers and make the column an integer column (instead of a float column).



```
[10] for i in range(df.shape[0]):
         if np.isnan(df.loc[i, 'FlightNumber']):
             df.loc[i, 'FlightNumber'] = df.loc[i-1, 'FlightNumber']+10.0
```

```
[11] df
```

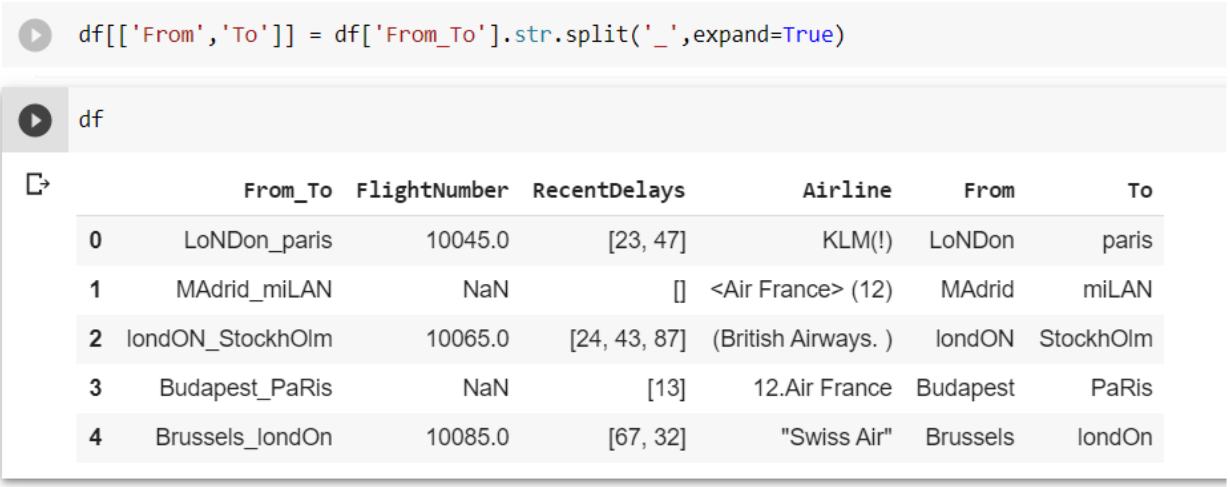
	From_To	FlightNumber	RecentDelays	Airline
0	LoNDon_paris	10045.0	[23, 47]	KLM(!)
1	MAdrid_miLAN	10055.0	[]	<Air France> (12)
2	londON_StockhOlm	10065.0	[24, 43, 87]	(British Airways.)
3	Budapest_PaRis	10075.0	[13]	12.Air France
4	Brussels_londOn	10085.0	[67, 32]	"Swiss Air"



```
df['FlightNumber']=df['FlightNumber'].astype(int)
df
```

	From_To	FlightNumber	RecentDelays	Airline
0	LoNDon_paris	10045	[23, 47]	KLM(!)
1	MAdrid_miLAN	10055	[]	<Air France> (12)
2	londON_StockhOlm	10065	[24, 43, 87]	(British Airways.)
3	Budapest_PaRis	10075	[13]	12.Air France
4	Brussels_londOn	10085	[67, 32]	"Swiss Air"

2. The From_To column would be better as two separate columns! Split each string on the underscore delimiter _ to give a new temporary DataFrame with the correct values. Assign the correct column names to this temporary DataFrame.

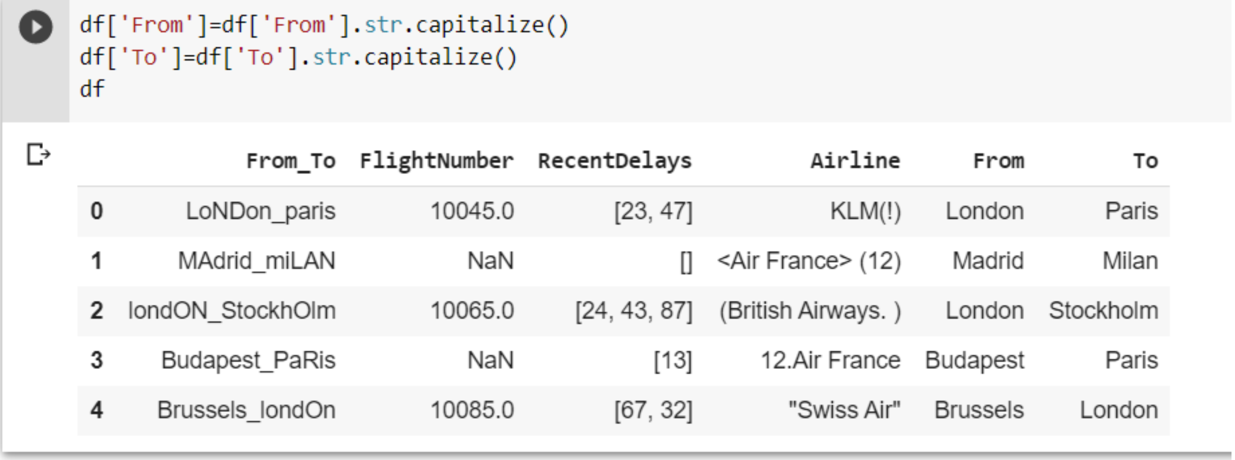


```
df[['From','To']] = df['From_To'].str.split('_',expand=True)
```

```
df
```

	From_To	FlightNumber	RecentDelays	Airline	From	To
0	LoNDon_paris	10045.0	[23, 47]	KLM(!)	LoNDon	paris
1	MAdrid_miLAN	NaN	[]	<Air France> (12)	MAdrid	miLAN
2	londON_StockhOlm	10065.0	[24, 43, 87]	(British Airways.)	londON	StockhOlm
3	Budapest_PaRis	NaN	[13]	12.Air France	Budapest	PaRis
4	Brussels_londOn	10085.0	[67, 32]	"Swiss Air"	Brussels	londOn

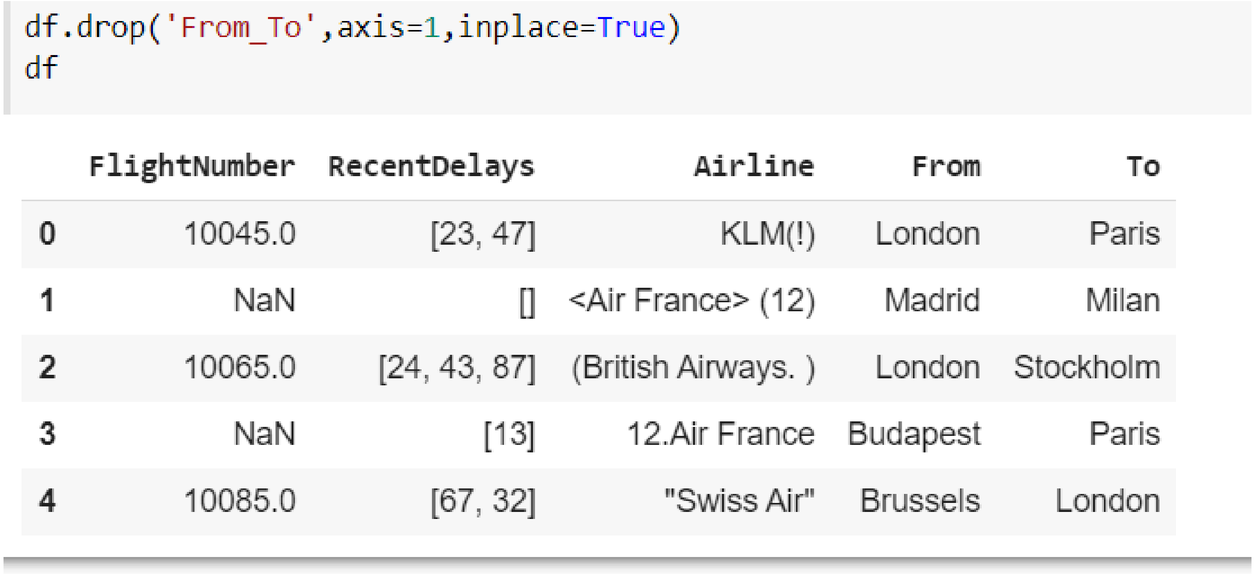
3. Notice how the capitalisation of the city names is all mixed up in this temporary DataFrame. Standardise the strings so that only the first letter is uppercase (e.g. "londON" should become "London".)



```
df['From']=df['From'].str.capitalize()
df['To']=df['To'].str.capitalize()
df
```

	From_To	FlightNumber	RecentDelays	Airline	From	To
0	LoNDon_paris	10045.0	[23, 47]	KLM(!)	London	Paris
1	MAdrid_miLAN	NaN	[]	<Air France> (12)	Madrid	Milan
2	londON_StockhOlm	10065.0	[24, 43, 87]	(British Airways.)	London	Stockholm
3	Budapest_PaRis	NaN	[13]	12.Air France	Budapest	Paris
4	Brussels_londOn	10085.0	[67, 32]	"Swiss Air"	Brussels	London

4. Delete the From_To column from df and attach the temporary DataFrame from the previous questions.

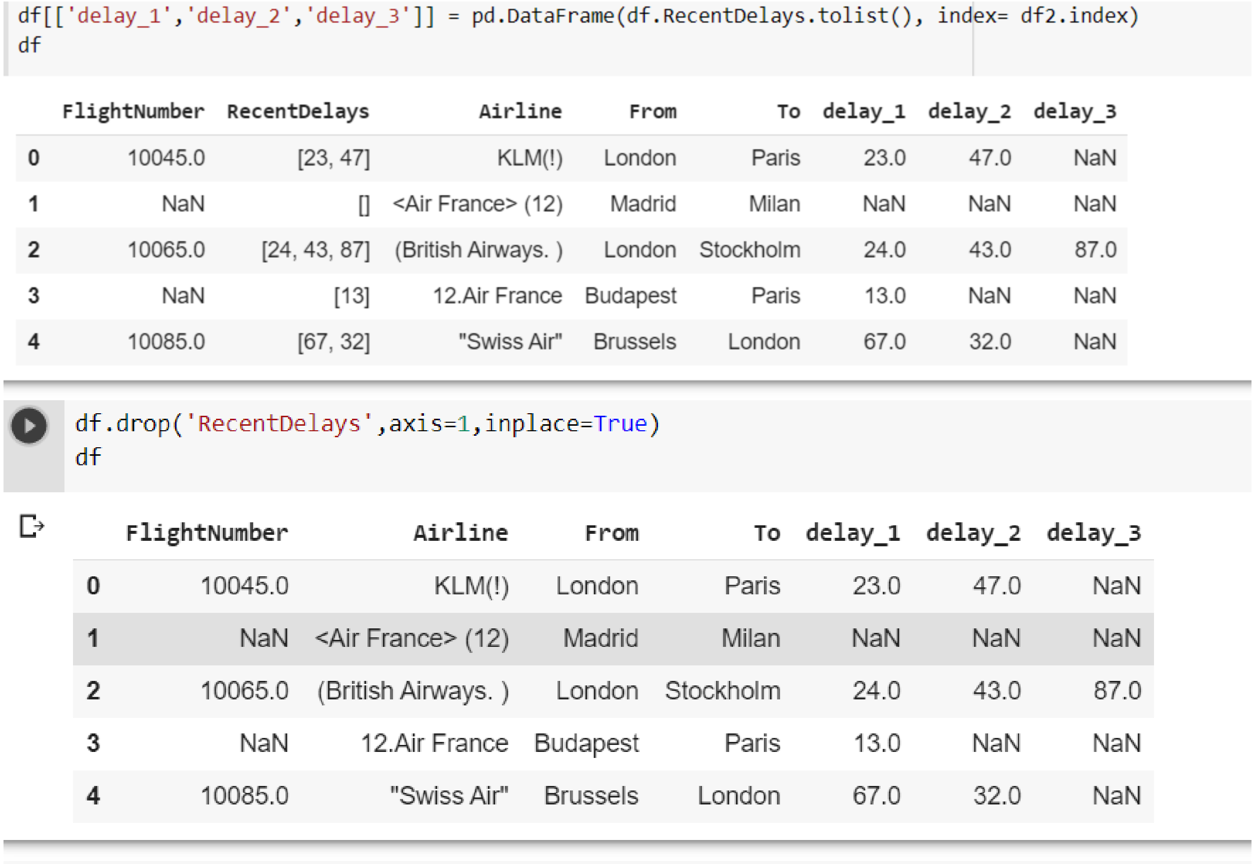


```
df.drop('From_To',axis=1,inplace=True)
df
```

	FlightNumber	RecentDelays	Airline	From	To
0	10045.0	[23, 47]	KLM(!)	London	Paris
1	NaN	[]	<Air France> (12)	Madrid	Milan
2	10065.0	[24, 43, 87]	(British Airways.)	London	Stockholm
3	NaN	[13]	12.Air France	Budapest	Paris
4	10085.0	[67, 32]	"Swiss Air"	Brussels	London

5. In the RecentDelays column, the values have been entered into the DataFrame as a list. We would like each first value in its own column, each second value in its own column, and so on. If there isn't an Nth value, the value should be NaN.

Expand the Series of lists into a DataFrame named delays, rename the columns delay_1, delay_2, etc. and replace the unwanted RecentDelays column in df with delays.



```
df[['delay_1','delay_2','delay_3']] = pd.DataFrame(df.RecentDelays.tolist(), index= df2.index)
df
```

	FlightNumber	RecentDelays	Airline	From	To	delay_1	delay_2	delay_3
0	10045.0	[23, 47]	KLM(!)	London	Paris	23.0	47.0	NaN
1	NaN	[]	<Air France> (12)	Madrid	Milan	NaN	NaN	NaN
2	10065.0	[24, 43, 87]	(British Airways.)	London	Stockholm	24.0	43.0	87.0
3	NaN	[13]	12.Air France	Budapest	Paris	13.0	NaN	NaN
4	10085.0	[67, 32]	"Swiss Air"	Brussels	London	67.0	32.0	NaN

```
df.drop('RecentDelays',axis=1,inplace=True)
df
```

	FlightNumber	Airline	From	To	delay_1	delay_2	delay_3
0	10045.0	KLM(!)	London	Paris	23.0	47.0	NaN
1	NaN	<Air France> (12)	Madrid	Milan	NaN	NaN	NaN
2	10065.0	(British Airways.)	London	Stockholm	24.0	43.0	87.0
3	NaN	12.Air France	Budapest	Paris	13.0	NaN	NaN
4	10085.0	"Swiss Air"	Brussels	London	67.0	32.0	NaN