In [3]:
```
import pandas as pd

df = pd.read_excel(r'C:\Users\IT\Downloads\Fytlyff_DS_Interview_Data.xlsx')
print(df)
```

```
      Year Month   Laptop/Desktop Type_of_Customers?           Coming from  \
0     2020   Jan  Desktop_Website  Existing_Customer    Came_From_LinkedIn
1     2020   Jan  Desktop_Website  Existing_Customer    Came_From_LinkedIn
2     2020   Jan  Desktop_Website  Existing_Customer    Came_From_LinkedIn
3     2020   Jan  Desktop_Website  Existing_Customer    Came_From_LinkedIn
4     2020   Jan  Desktop_Website  Existing_Customer    Came_From_LinkedIn
...    ...   ...              ...                ...                   ...
2155  2022   Dec   Laptop_Website       New_Customer  Unidentified_Sources
2156  2022   Dec   Laptop_Website       New_Customer  Unidentified_Sources
2157  2022   Dec   Laptop_Website       New_Customer  Unidentified_Sources
2158  2022   Dec   Laptop_Website       New_Customer  Unidentified_Sources
2159  2022   Dec   Laptop_Website       New_Customer  Unidentified_Sources

     Place_in_India   Level 1   Level 2  Level 3  Level 4
0         Bengaluru       NaN       NaN    56892    17178
1         Hyderabad       NaN       NaN    41460    11916
2          Dehradun       NaN       NaN    55561    19461
3            Indore       NaN       NaN   320923   110667
4              Pune       NaN       NaN   220937    46033
...             ...       ...       ...      ...      ...
2155      Bengaluru   67299.0   21255.0     6984     1882
2156      Hyderabad  430294.0  156510.0    46676    16703
2157       Dehradun   48713.0   27770.0     7515     2089
2158         Indore  593021.0  310836.0   161575    78465
2159           Pune  372897.0  123057.0    48802    19441

[2160 rows x 10 columns]
```

In [5]:
```
Data =  pd.read_excel(r'C:\Users\IT\Downloads\Fytlyff_DS_Interview_Data.xlsx')
```

In [55]:
```
df = pd.DataFrame(Data, columns=['Type_of_Customers?','Coming from','Place_in_India'])
display(df)
```

```
Type_of_Customers?    2160
Coming from           2160
Place_in_India        2160
dtype: int64
```

In [ ]:
```

```

In [13]:
```
df
```

Out[13]:

	Type_of_Customers?	Coming from	Place_in_India
0	Existing_Customer	Came_From_LinkedIn	Bengaluru
1	Existing_Customer	Came_From_LinkedIn	Hyderabad
2	Existing_Customer	Came_From_LinkedIn	Dehradun
3	Existing_Customer	Came_From_LinkedIn	Indore
4	Existing_Customer	Came_From_LinkedIn	Pune
...	...	...	...
2155	New_Customer	Unidentified_Sources	Bengaluru
2156	New_Customer	Unidentified_Sources	Hyderabad
2157	New_Customer	Unidentified_Sources	Dehradun
2158	New_Customer	Unidentified_Sources	Indore
2159	New_Customer	Unidentified_Sources	Pune

2160 rows × 3 columns

In [14]:
```
df_1 = pd.read_excel(r'C:\Users\IT\Downloads\Fytlyff_DS_Interview_Data.xlsx')
print(df_1)
```

```
      Year Month   Laptop/Desktop Type_of_Customers?           Coming from  \
0     2020   Jan  Desktop_Website  Existing_Customer    Came_From_LinkedIn
1     2020   Jan  Desktop_Website  Existing_Customer    Came_From_LinkedIn
2     2020   Jan  Desktop_Website  Existing_Customer    Came_From_LinkedIn
3     2020   Jan  Desktop_Website  Existing_Customer    Came_From_LinkedIn
4     2020   Jan  Desktop_Website  Existing_Customer    Came_From_LinkedIn
...    ...   ...              ...                ...                   ...
2155  2022   Dec   Laptop_Website       New_Customer  Unidentified_Sources
2156  2022   Dec   Laptop_Website       New_Customer  Unidentified_Sources
2157  2022   Dec   Laptop_Website       New_Customer  Unidentified_Sources
2158  2022   Dec   Laptop_Website       New_Customer  Unidentified_Sources
2159  2022   Dec   Laptop_Website       New_Customer  Unidentified_Sources

     Place_in_India   Level 1   Level 2  Level 3  Level 4
0         Bengaluru       NaN       NaN    56892    17178
1         Hyderabad       NaN       NaN    41460    11916
2          Dehradun       NaN       NaN    55561    19461
3            Indore       NaN       NaN   320923   110667
4              Pune       NaN       NaN   220937    46033
...             ...       ...       ...      ...      ...
2155      Bengaluru   67299.0   21255.0     6984     1882
2156      Hyderabad  430294.0  156510.0    46676    16703
2157       Dehradun   48713.0   27770.0     7515     2089
2158         Indore  593021.0  310836.0   161575    78465
2159           Pune  372897.0  123057.0    48802    19441

[2160 rows x 10 columns]
```

In [25]:
```
df2 = df_1["Level 1"].mean()
print(df2)
```

```
783870.2220166513
```

In [27]:
```
df3 = df_1["Level 2"].mean()
print(df2)
```

```
783870.2220166513
```

In [57]:
```
constVal = 783870.2220166513
df_1['Level 1'].fillna(value=constVal, inplace=True)
```

In [58]:
```
constVal = 783870.2220166513
df_1['Level 2'].fillna(value=constVal, inplace=True)
```

In [59]:
```
df_1
```

Out[59]:

	Year	Month	Laptop/Desktop	Type_of_Customers?	Coming from	Place_in_India	
0	2020	Jan	Desktop_Website	Existing_Customer	Came_From_LinkedIn	Bengaluru	783870
1	2020	Jan	Desktop_Website	Existing_Customer	Came_From_LinkedIn	Hyderabad	783870
2	2020	Jan	Desktop_Website	Existing_Customer	Came_From_LinkedIn	Dehradun	783870
3	2020	Jan	Desktop_Website	Existing_Customer	Came_From_LinkedIn	Indore	783870
4	2020	Jan	Desktop_Website	Existing_Customer	Came_From_LinkedIn	Pune	783870
...	...	...	...	...	...	...	
2155	2022	Dec	Laptop_Website	New_Customer	Unidentified_Sources	Bengaluru	67299
2156	2022	Dec	Laptop_Website	New_Customer	Unidentified_Sources	Hyderabad	430294
2157	2022	Dec	Laptop_Website	New_Customer	Unidentified_Sources	Dehradun	48713
2158	2022	Dec	Laptop_Website	New_Customer	Unidentified_Sources	Indore	593021
2159	2022	Dec	Laptop_Website	New_Customer	Unidentified_Sources	Pune	372897

2160 rows × 11 columns

In [46]:
```
df_1['inc/dec percentage'] =  (df_1['Level 1'] - df_1['Level 4']) / df_1['Level 1']*10
```

In [47]:
```
df_1
```

Out[47]:

	Year	Month	Laptop/Desktop	Type_of_Customers?	Coming from	Place_in_India	
0	2020	Jan	Desktop_Website	Existing_Customer	Came_From_LinkedIn	Bengaluru	783870
1	2020	Jan	Desktop_Website	Existing_Customer	Came_From_LinkedIn	Hyderabad	783870
2	2020	Jan	Desktop_Website	Existing_Customer	Came_From_LinkedIn	Dehradun	783870
3	2020	Jan	Desktop_Website	Existing_Customer	Came_From_LinkedIn	Indore	783870
4	2020	Jan	Desktop_Website	Existing_Customer	Came_From_LinkedIn	Pune	783870
...	...	...	...	...	...	...	
2155	2022	Dec	Laptop_Website	New_Customer	Unidentified_Sources	Bengaluru	67299
2156	2022	Dec	Laptop_Website	New_Customer	Unidentified_Sources	Hyderabad	430294
2157	2022	Dec	Laptop_Website	New_Customer	Unidentified_Sources	Dehradun	48713
2158	2022	Dec	Laptop_Website	New_Customer	Unidentified_Sources	Indore	593021
2159	2022	Dec	Laptop_Website	New_Customer	Unidentified_Sources	Pune	372897

2160 rows × 11 columns

In [62]:
```
# Groupby & multiple aggregations
result = df_1.groupby('Level 1').min()
print(result)
```

```
             Year Month   Laptop/Desktop Type_of_Customers?  \
Level 1
24567.0      2022   Jul  Desktop_Website       New_Customer
24568.0      2022   Sep  Desktop_Website       New_Customer
26027.0      2022   Aug  Desktop_Website       New_Customer
26662.0      2022   Jun  Desktop_Website       New_Customer
27072.0      2022   Apr  Desktop_Website       New_Customer
...           ...   ...              ...                ...
8188402.0    2021   Oct  Desktop_Website       New_Customer
8949571.0    2021   Apr  Desktop_Website       New_Customer
9036434.0    2022   Nov  Desktop_Website       New_Customer
9083552.0    2022   Jun  Desktop_Website       New_Customer
11274131.0   2021   May  Desktop_Website       New_Customer

                     Coming from Place_in_India    Level 2  Level 3  Level 4  \
Level 1
24567.0      Unidentified_Sources      Bengaluru     9661.0     4715     2501
24568.0      Unidentified_Sources      Bengaluru     8425.0     3761     1490
26027.0      Unidentified_Sources      Bengaluru     9107.0     4123     1978
26662.0      Unidentified_Sources      Bengaluru    10361.0     5026     2221
27072.0      Unidentified_Sources      Bengaluru    11624.0     5246     2122
...                           ...            ...        ...      ...      ...
8188402.0         Landed_Directly           Pune  3435272.0   862600   558073
8949571.0         Landed_Directly           Pune  1932569.0   600182   400768
9036434.0         Landed_Directly           Pune  3881092.0  1573991   119167
9083552.0         Landed_Directly           Pune  4079301.0  1942557   923720
11274131.0        Landed_Directly           Pune  2544078.0   658397   389191

             inc/dec percentage
Level 1
24567.0               89.819677
24568.0               93.935200
26027.0               92.400200
26662.0               91.669792
27072.0               92.161643
...                         ...
8188402.0             93.184592
8949571.0             95.521931
9036434.0             98.681261
9083552.0             89.830850
11274131.0            96.547929

[1081 rows x 10 columns]
```

In [74]:
```
result = df_1.groupby('Level 3').min()
print(result)
```

```
         Year Month   Laptop/Desktop Type_of_Customers?          Coming from  \
Level 3
3761     2022   Sep  Desktop_Website       New_Customer  Unidentified_Sources
3780     2022   Dec  Desktop_Website       New_Customer  Unidentified_Sources
3906     2022   Oct  Desktop_Website       New_Customer  Unidentified_Sources
4123     2022   Aug  Desktop_Website       New_Customer  Unidentified_Sources
4243     2022   Nov  Desktop_Website       New_Customer  Unidentified_Sources
...       ...   ...              ...                ...                   ...
2016077  2022   Nov  Desktop_Website       New_Customer       Landed_Directly
2088077  2022   Oct   Laptop_Website       New_Customer       Landed_Directly
2157532  2022   Dec   Laptop_Website       New_Customer       Landed_Directly
2394259  2022   Nov   Laptop_Website       New_Customer       Landed_Directly
3022858  2022   Dec  Desktop_Website       New_Customer       Landed_Directly

        Place_in_India    Level 1    Level 2  Level 4  inc/dec percentage
Level 3
3761         Bengaluru    24568.0     8425.0     1490           93.935200
3780         Bengaluru    30586.0     8702.0     1213           96.034133
3906         Bengaluru    33554.0     8901.0     1346           95.988556
4123         Bengaluru    26027.0     9107.0     1978           92.400200
4243         Bengaluru    34418.0     9697.0     1456           95.769655
...                ...        ...        ...      ...                 ...
2016077         Indore  3789022.0  2427545.0   131488           96.529764
2088077         Indore  4375911.0  2577028.0   279033           93.623431
2157532         Indore  5706772.0  2913442.0   460367           91.932970
2394259         Indore  4845494.0  2908131.0   363237           92.503613
3022858         Indore  4838369.0  3406853.0   407439           91.579001

[2146 rows x 10 columns]
```

In [67]:
```
Data1 =  pd.read_excel(r'C:\Users\IT\Downloads\Fytlyff_DS_Interview_Data.xlsx')
```

In [90]:
```
df3 = pd.DataFrame(Data1, columns=[' Year',' Month',' Laptop/Desktop ','Type_of_Custom
display(df3)
```

```
 Year                              NaN
 Month                             NaN
 Laptop/Desktop                    NaN
Type_of_Customers?     Existing_Customer
Coming from           Came_From_LinkedIn
Level 1                          24567.0
Level 2                           8425.0
Level 3                             3761
Level 4                              766
dtype: object
```

In [81]:
```
df4 = pd.DataFrame(Data1, columns=[' Year',' Month',' Laptop/Desktop ','Type_of_Custom
display(df4)
```

```
 Year                              NaN
 Month                             NaN
 Laptop/Desktop                    NaN
Type_of_Customers?     Existing_Customer
Coming from           Came_From_LinkedIn
Level 2                           8425.0
dtype: object
```

In [82]:
```
df5 = pd.DataFrame(Data1, columns=[' Year',' Month',' Laptop/Desktop ','Type_of_Custom
display(df5)
```

```
 Year                                NaN
 Month                               NaN
 Laptop/Desktop                      NaN
Type_of_Customers?     Existing_Customer
Coming from           Came_From_LinkedIn
Level 3                             3761
dtype: object
```

In [91]:
```
df6 = pd.DataFrame(Data1, columns=[' Year',' Month',' Laptop/Desktop ','Type_of_Custom
display(df6)
```

```
 Year                                NaN
 Month                               NaN
 Laptop/Desktop                      NaN
Type_of_Customers?     Existing_Customer
Coming from           Came_From_LinkedIn
Level 4                              766
dtype: object
```

In [97]:
```
df_1['Result1'] = df_1['Level 2']/df_1['Level 1']
df_1
```

Out[97]:

	Year	Month	Laptop/Desktop	Type_of_Customers?	Coming from	Place_in_India	
0	2020	Jan	Desktop_Website	Existing_Customer	Came_From_LinkedIn	Bengaluru	783870
1	2020	Jan	Desktop_Website	Existing_Customer	Came_From_LinkedIn	Hyderabad	783870
2	2020	Jan	Desktop_Website	Existing_Customer	Came_From_LinkedIn	Dehradun	783870
3	2020	Jan	Desktop_Website	Existing_Customer	Came_From_LinkedIn	Indore	783870
4	2020	Jan	Desktop_Website	Existing_Customer	Came_From_LinkedIn	Pune	783870
...	...	...	...	...	...	...	
2155	2022	Dec	Laptop_Website	New_Customer	Unidentified_Sources	Bengaluru	67299
2156	2022	Dec	Laptop_Website	New_Customer	Unidentified_Sources	Hyderabad	430294
2157	2022	Dec	Laptop_Website	New_Customer	Unidentified_Sources	Dehradun	48713
2158	2022	Dec	Laptop_Website	New_Customer	Unidentified_Sources	Indore	593021
2159	2022	Dec	Laptop_Website	New_Customer	Unidentified_Sources	Pune	372897

2160 rows × 12 columns

In [98]:
```
df_1
```

Out[98]:

	Year	Month	Laptop/Desktop	Type_of_Customers?	Coming from	Place_in_India	
0	2020	Jan	Desktop_Website	Existing_Customer	Came_From_LinkedIn	Bengaluru	783870
1	2020	Jan	Desktop_Website	Existing_Customer	Came_From_LinkedIn	Hyderabad	783870
2	2020	Jan	Desktop_Website	Existing_Customer	Came_From_LinkedIn	Dehradun	783870
3	2020	Jan	Desktop_Website	Existing_Customer	Came_From_LinkedIn	Indore	783870
4	2020	Jan	Desktop_Website	Existing_Customer	Came_From_LinkedIn	Pune	783870
...	...	...	...	...	...	...	
2155	2022	Dec	Laptop_Website	New_Customer	Unidentified_Sources	Bengaluru	67299
2156	2022	Dec	Laptop_Website	New_Customer	Unidentified_Sources	Hyderabad	430294
2157	2022	Dec	Laptop_Website	New_Customer	Unidentified_Sources	Dehradun	48713
2158	2022	Dec	Laptop_Website	New_Customer	Unidentified_Sources	Indore	593021
2159	2022	Dec	Laptop_Website	New_Customer	Unidentified_Sources	Pune	372897

2160 rows × 12 columns

In [105…
```
print(df_1.values[:2])
```

```
[[2020 'Jan' 'Desktop_Website' 'Existing_Customer' 'Came_From_LinkedIn'
  'Bengaluru' 783870.2220166513 783870.2220166513 56892 17178
  97.80856581644262 1.0]
 [2020 'Jan' 'Desktop_Website' 'Existing_Customer' 'Came_From_LinkedIn'
  'Hyderabad' 783870.2220166513 783870.2220166513 41460 11916
  98.47985040567762 1.0]]
```

In [109…
```
df8=df_1.loc[:, ["Laptop/Desktop","Result1"]]
```

In [138…
```
df8
```

Out[138]:

	Laptop/Desktop	Result1
0	Desktop_Website	1.000000
1	Desktop_Website	1.000000
2	Desktop_Website	1.000000
3	Desktop_Website	1.000000
4	Desktop_Website	1.000000
...	...	...
2155	Laptop_Website	0.315829
2156	Laptop_Website	0.363728
2157	Laptop_Website	0.570074
2158	Laptop_Website	0.524157
2159	Laptop_Website	0.330003

2160 rows × 2 columns

In [139…
```
Data1 =  pd.read_excel(r'C:\Users\IT\Downloads\Fytlyff_DS_Interview_Data.xlsx')
```

In [142…
```
df8
```

Out[142]:

	Laptop/Desktop	Result1
0	Desktop_Website	1.000000
1	Desktop_Website	1.000000
2	Desktop_Website	1.000000
3	Desktop_Website	1.000000
4	Desktop_Website	1.000000
...	...	...
2155	Laptop_Website	0.315829
2156	Laptop_Website	0.363728
2157	Laptop_Website	0.570074
2158	Laptop_Website	0.524157
2159	Laptop_Website	0.330003

2160 rows × 2 columns

In [143…
```
df9 = pd.DataFrame(df8, columns=['Type_of_Customers?','Result1']).aggregate('max')
display(df9)
```

```
Type_of_Customers?    NaN
Result1               1.0
dtype: float64
```

In [ ]: