

## ✓ 07. Mobile and web visitors

**With the following two tables, return the fraction of users who only visited mobile, only visited web, and visited both.**

```
import pandas as pd
import numpy as np

data1 = {'user_id' : [1,2,3,4,9,2,10],
         'page_url' : ['A','B','C','A','B','C','B']}

data2 = {'user_id' : [6,2,3,7,4,8,5],
         'page_url' : ['A','B','C','A','B','C','B']}

mobile=pd.DataFrame(data1)
web=pd.DataFrame(data2)
```

```
print(f'mobile users:\n {mobile}')
```

```
⇒ mobile users:
   user_id page_url
0         1        A
1         2        B
2         3        C
3         4        A
4         9        B
5         2        C
6        10        B
```

```
print(f'web users:\n {web}')
```

```
⇒ web users:
   user_id page_url
0         6        A
1         2        B
2         3        C
3         7        A
4         4        B
5         8        C
6         5        B
```

```
df1=(pd.merge(mobile.drop(columns=['page_url']),
              web.drop(columns=['page_url']),
              on='user_id',
              how='outer',
              indicator=True)
      .drop_duplicates())
```

```
)
print(df1)
```

```
⇒ user_id  _merge
0         1  left_only
1         2    both
3         3    both
4         4    both
5         5  right_only
6         6  right_only
7         7  right_only
8         8  right_only
9         9  left_only
10        10  left_only
```

```
df2=(pd.merge(mobile.drop(columns=['page_url']),
              web.drop(columns=['page_url']),
              on='user_id',
              how='outer',
              indicator=True)
      .drop_duplicates()
)
df3=(pd.get_dummies(user_preferences['_merge'])
     .rename(columns={'left_only':'mobile'
                     , 'right_only':'web'
                     }
            )
)
print(f'have users visited via web or mobile:\n{df3}')
```

```
⇒ have users visited via web or mobile:
   mobile  web  both
0     True False False
1     False False  True
3     False False  True
4     False False  True
5     False  True False
6     False  True False
7     False  True False
8     False  True False
9      True False False
10     True False False
```

```
df=(pd.merge(mobile.drop(columns=['page_url']),
              web.drop(columns=['page_url']),
              on='user_id',
              how='outer',
              indicator=True
            )
     .drop_duplicates()
)
frequencies=(pd.get_dummies(df['_merge'])
             .rename(columns={'left_only':'mobile'
                             , 'right_only':'web'
                             }
                )
)
```

```
        .mean()  
)  
print('fractions:')  
frequencies
```

```
⇒ fractions:  
      0  
-----  
mobile 0.3  
web    0.4  
both   0.3  
  
dtype: float64
```