In [1]:
```
import pandas as pd
import numpy as np
```

1) Create a Sales Dictionary:

In [2]:
```
sales = {
    'Tony': 103,
    'Sally': 202,
    "Randy": 380,
    "Ellen": 101,
    "Fred": 82
}
```

and Region Dictionary:

In [3]:
```
region = {
    'Tony': "West",
    'Sally': "South",
    "Carl": "West",
    "Archie": "North",
    "Randy": "East",
    "Ellen": "South",
    "Fred": np.nan,
    "Mo": "East",
    "HanWei": np.nan
}
```

a) Create Sales Dataframe and Region Dataframe using above Dictionaries note: pd.DataFrame.from_dict()

In [4]:
```
salesdf = pd.DataFrame.from_dict(sales, orient="index", columns=["sales"])
salesdf
```

Out[4]:

	sales
Tony	103
Sally	202
Randy	380
Ellen	101
Fred	82

In [5]:
```
regiondf = pd.DataFrame.from_dict(region, orient="index", columns=["region"])
regiondf
```

Out[5]:

	region
Tony	West
Sally	South
Carl	West
Archie	North
Randy	East
Ellen	South
Fred	NaN
Mo	East
HanWei	NaN

b) Write the python command to get the below output:

In [6]:
```
# pd.concat([regiondf, salesdf], axis=1)
regiondf.join(salesdf)
```

Out[6]:

	region	sales
Tony	West	103.0
Sally	South	202.0
Carl	West	NaN
Archie	North	NaN
Randy	East	380.0
Ellen	South	101.0
Fred	NaN	82.0
Mo	East	NaN
HanWei	NaN	NaN

c) Write the python command to get the below output:

In [7]:
```
# salesdf.join(regiondf)
df_inner = regiondf.join(salesdf, how="inner")
df_inner
```

Out[7]:

	region	sales
Tony	West	103
Sally	South	202
Randy	East	380
Ellen	South	101
Fred	NaN	82

d) Write the python command to get the below output:

In [10]:
```
# df = regiondf.join(salesdf).dropna().groupby('region').sum()
# df["sales"] = df["sales"].astype(int)
# df2 = df
# df_sales_region = df.reset_index()
# df2, df_sales_region

df_grouped = df_inner.groupby('region').sum()
df_grouped.reset_index(inplace=True)
df_grouped
```

Out[10]:

	region	sales
0	East	380
1	South	303
2	West	103

e) Write the python command to get the below output:

In [16]:
```
df3 = pd.merge(df_inner, df_grouped, on="region", how="outer", suffixes=("", "_re
df3
```

Out[16]:

	region	sales	sales_region
0	West	103	103.0
1	South	202	303.0
2	South	101	303.0
3	East	380	380.0
4	NaN	82	NaN

f) Write the python command to get the below output:

In [19]:
```
# df3 = pd.merge(df_inner, df2, on="region",
#                suffixes=("", "_region"))
# df3

# df3 = df_inner.merge(df_grouped, on="region",
#                      suffixes=("", "_region"))

df4 = df3.set_index(df_inner.index)
df4.dropna()
```

Out[19]:

	region	sales	sales_region
Tony	West	103	103.0
Sally	South	202	303.0
Randy	South	101	303.0
Ellen	East	380	380.0

g) Write the python command to get the below output:

In [20]:
```
# df3 = pd.merge(df_inner, df2, on="region", how="outer",
#                suffixes=("", "_region"))
# df3

df5 = df3.set_index(df_inner.index)
df5
```

Out[20]:

	region	sales	sales_region
Tony	West	103	103.0
Sally	South	202	303.0
Randy	South	101	303.0
Ellen	East	380	380.0
Fred	NaN	82	NaN

In [ ]:
```

```