Chocolate Sales Data Analysis

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

df = pd.read_csv('Chocolate_Sales.csv')
df.head()
```

```
     Sales Person    Country              Product       Date    Amount
\
0  Jehu Rudeforth         UK      Mint Chip Choco  04-Jan-22   $5,320

1     Van Tuxwell      India        85% Dark Bars  01-Aug-22   $7,896

2    Gigi Bohling      India  Peanut Butter Cubes  07-Jul-22   $4,501

3    Jan Morforth  Australia  Peanut Butter Cubes  27-Apr-22  $12,726

4  Jehu Rudeforth         UK  Peanut Butter Cubes  24-Feb-22  $13,685


   Boxes Shipped
0            180
1             94
2             91
3            342
4            184
```

Checking Info of our Data

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1094 entries, 0 to 1093
Data columns (total 6 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   Sales Person   1094 non-null   object
 1   Country        1094 non-null   object
 2   Product        1094 non-null   object
 3   Date           1094 non-null   object
 4   Amount         1094 non-null   object
 5   Boxes Shipped  1094 non-null   int64
dtypes: int64(1), object(5)
memory usage: 51.4+ KB
```

Amount Column is Showing as Object so, need to change it in Numeric value

```
df['Amount'] = df['Amount'].str.replace('[$,]', '',
regex=True).astype(float)
```

Changing Date from object into Date

```
df['Date'] = pd.to_datetime(df['Date'], format='%d-%b-%y')
df['Date']
```

```
0       2022-01-04
1       2022-08-01
2       2022-07-07
3       2022-04-27
4       2022-02-24
           ...
1089    2022-05-17
1090    2022-06-07
1091    2022-07-26
1092    2022-07-28
1093    2022-05-23
Name: Date, Length: 1094, dtype: datetime64[ns]
```

Extract Year and Month From Date

```
# Extract Year and Month
df['Year'] = df['Date'].dt.year
df['Month'] = df['Date'].dt.month
year_month_group = df.groupby(['Year', 'Month'])
monthly_counts = year_month_group.size().reset_index(name='Count')
monthly_sales =
year_month_group["Amount"].sum().reset_index(name='sale_sum')
box_monthly =  year_month_group["Boxes
Shipped"].sum().reset_index(name='box_sum')
box_monthly
```

```
   Year  Month  box_sum
0  2022      1    27535
1  2022      2    18015
2  2022      3    19561
3  2022      4    21003
4  2022      5    21856
5  2022      6    26260
6  2022      7    22876
7  2022      8    19901
```

Now Describing the Data

```
df.describe()
```

```
                                Date        Amount  Boxes Shipped
Year  \
count                           1094   1094.000000    1094.000000
1094.0
mean   2022-05-03 09:04:56.160877568   5652.308044     161.797989
2022.0
min              2022-01-03 00:00:00      7.000000       1.000000
2022.0
25%              2022-03-02 00:00:00   2390.500000      70.000000
2022.0
50%              2022-05-11 00:00:00   4868.500000     135.000000
2022.0
75%              2022-07-04 00:00:00   8027.250000     228.750000
2022.0
max              2022-08-31 00:00:00  22050.000000     709.000000
2022.0
std                              NaN   4102.442014     121.544145
0.0

             Month
count  1094.000000
mean      4.576782
min       1.000000
25%       3.000000
50%       5.000000
75%       7.000000
max       8.000000
std       2.316465
```

Exploratory Data Analysis (EDA)

```
df['Product']
```

```
0           Mint Chip Choco
1             85% Dark Bars
2       Peanut Butter Cubes
3       Peanut Butter Cubes
4       Peanut Butter Cubes
               ...
1089    Spicy Special Slims
1090             White Choc
1091    Organic Choco Syrup
1092                Eclairs
1093         70% Dark Bites
Name: Product, Length: 1094, dtype: object
```

Monthly Chocolate Sales

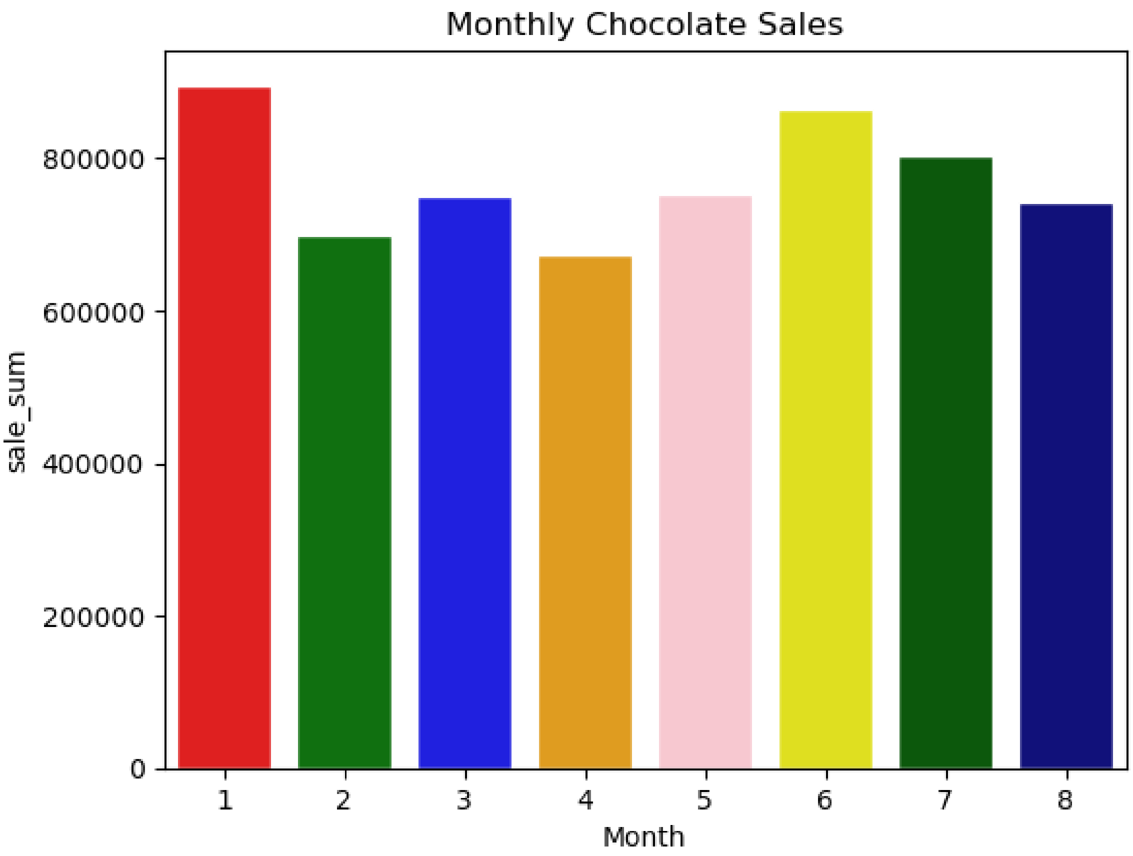
```
c =
['red','green','blue','orange','pink','yellow','darkgreen','darkblue']

sns.barplot(data = monthly_sales , x = "Month", y = "sale_sum",
palette = c, edgecolor = "white")
plt.title('Monthly Chocolate Sales')
plt.show()
```

```
C:\Users\ashis\AppData\Local\Temp\ipykernel_25536\1926534783.py:3:
FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be
removed in v0.14.0. Assign the `x` variable to `hue` and set
`legend=False` for the same effect.

  sns.barplot(data = monthly_sales , x = "Month", y = "sale_sum",
palette = c, edgecolor = "white")
```



Country Chocolate Sales

```
country_sales = df.groupby(['Country'])[['Amount']].sum()
country_sales
```

```
                Amount
Country
Australia    1137367.0
Canada        962899.0
India        1045800.0
New Zealand   950418.0
UK           1051792.0
USA          1035349.0
```

```
country_sales = df.groupby(["Country"])
["Amount"].sum().reset_index(name='sale_sum_country')
country_sales
```

```
       Country  sale_sum_country
0    Australia         1137367.0
1       Canada          962899.0
2        India         1045800.0
3  New Zealand          950418.0
4           UK         1051792.0
5          USA         1035349.0
```

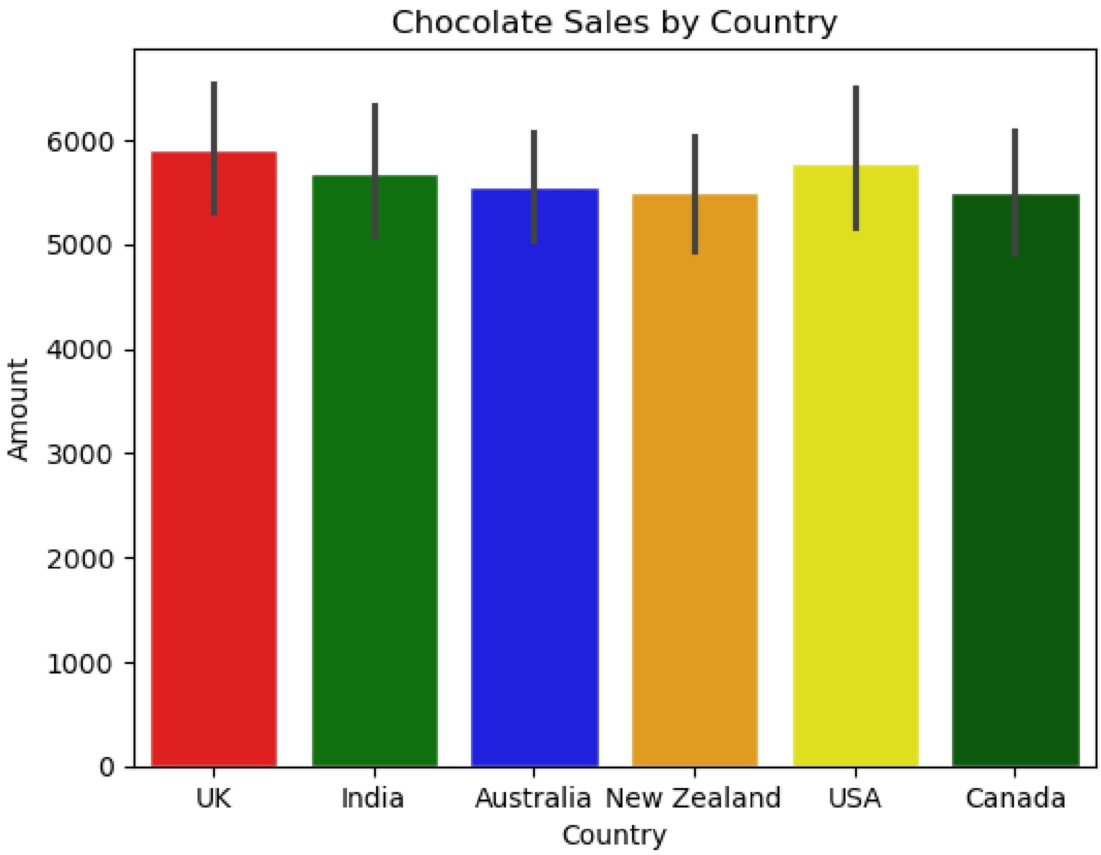
```
c = ['red','green','blue','orange','yellow','darkgreen','darkblue']

sns.barplot(data = df, x =  'Country', y = 'Amount', palette = c ,
edgecolor = "white")
plt.title('Chocolate Sales by Country')
plt.show()
```

```
C:\Users\ashis\AppData\Local\Temp\ipykernel_25536\154087448.py:3:
FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be
removed in v0.14.0. Assign the `x` variable to `hue` and set
`legend=False` for the same effect.

  sns.barplot(data = df, x =  'Country', y = 'Amount', palette = c ,
edgecolor = "white")
C:\Users\ashis\AppData\Local\Temp\ipykernel_25536\154087448.py:3:
UserWarning: The palette list has more values (7) than needed (6),
which may not be intended.
  sns.barplot(data = df, x =  'Country', y = 'Amount', palette = c ,
edgecolor = "white")
```



Total Chocolate Sales Percantage In Countries

```
sale_sum = country_sales["sale_sum_country"].sum()
country_sales['percent_sales'] = round(100
*country_sales["sale_sum_country"]/sale_sum, 1 )
country_sales
```

```
       Country  sale_sum_country  percent_sales
0    Australia         1137367.0           18.4
1       Canada          962899.0           15.6
2        India         1045800.0           16.9
3  New Zealand          950418.0           15.4
4           UK         1051792.0           17.0
5          USA         1035349.0           16.7
```

Total Chocolate Sales by Products

```
df.groupby("Product")
["Amount"].sum().reset_index(name="total_sales").sort_values(by="total
_sales", ascending=False)
```

```
                Product  total_sales
19    Smooth Sliky Salty     349692.0
```

```
0          50% Dark Bites     341712.0
21             White Choc     329147.0
17    Peanut Butter Cubes     324842.0
10                Eclairs     312445.0
3         99% Dark & Pure     299796.0
2           85% Dark Bars     299229.0
16    Organic Choco Syrup     294700.0
20    Spicy Special Slims     293454.0
14        Mint Chip Choco     283969.0
5            Almond Choco     277536.0
12     Manuka Honey Choco     275541.0
13              Milk Bars     269248.0
18        Raspberry Choco     264740.0
4             After Nines     261331.0
11       Fruit & Nut Bars     259147.0
9           Drinking Coco     256655.0
15           Orange Choco     256144.0
6     Baker's Choco Chips     249613.0
8    Choco Coated Almonds     241486.0
7    Caramel Stuffed Bars     231588.0
1          70% Dark Bites     211610.0
```

TOP 10 Product Sales in Country

```
df.groupby(["Product", "Country"])
["Amount"].sum().reset_index(name="total_sales").sort_values(by="total
_sales", ascending=False).head(10)
```

```
                  Product      Country  total_sales
0          50% Dark Bites    Australia      89222.0
87        Mint Chip Choco  New Zealand      86709.0
113       Raspberry Choco          USA      83524.0
106   Peanut Butter Cubes           UK      79695.0
22        99% Dark & Pure           UK      79100.0
62                Eclairs        India      79009.0
104   Peanut Butter Cubes        India      76909.0
116    Smooth Sliky Salty        India      76041.0
118    Smooth Sliky Salty           UK      75628.0
122   Spicy Special Slims        India      75495.0
```

```
df.groupby(["Country"])["Boxes Shipped"].sum().reset_index(name=
"total_boxes").sort_values(by= "total_boxes", ascending= False)
```

```
       Country  total_boxes
0    Australia        32647
1       Canada        31221
4           UK        30265
2        India        29470
5          USA        26824
3  New Zealand        26580
```

Most Popular Products In India

```
comparison_india_price = df[df['Country'] ==
"India"].groupby("Product")["Amount"].sum().reset_index(name="Total
Sale")
comparison_india_boxes = df[df['Country'] ==
"India"].groupby("Product")["Boxes
Shipped"].sum().reset_index(name="Total Boxes")

comparison_india =
comparison_india_price.merge(comparison_india_boxes, on="Product")
comparison_india
```

```
                 Product  Total Sale  Total Boxes
0          50% Dark Bites     64547.0         1237
1          70% Dark Bites     34713.0         1511
2           85% Dark Bars     56630.0         1584
3         99% Dark & Pure     41923.0         1455
4             After Nines     58758.0         1874
5            Almond Choco     50820.0         1296
6      Baker's Choco Chips     27510.0         1265
7     Caramel Stuffed Bars     35427.0         1635
8    Choco Coated Almonds     27958.0         1328
9           Drinking Coco     45892.0         1101
10                Eclairs     79009.0         1985
11        Fruit & Nut Bars     18368.0          953
12      Manuka Honey Choco     18760.0          991
13              Milk Bars     24206.0         1069
14        Mint Chip Choco     69153.0         1516
15           Orange Choco     23219.0         1152
16     Organic Choco Syrup     68075.0          897
17     Peanut Butter Cubes     76909.0         1445
18        Raspberry Choco     39501.0          788
19      Smooth Sliky Salty     76041.0          722
20     Spicy Special Slims     75495.0         2037
21            White Choc     32886.0         1629
```

Most Fav Products For Each Country

```
def most_fav_product(df):
    mostfav = (df.groupby(['Country', 'Product']).agg(total_sales =
("Amount", "sum"), total_boxes = ("Boxes Shipped",
"sum")).reset_index())
    mostfav = mostfav.sort_values(by = ["Country", "total_sales"],
ascending = [True, False])
    mostfav = mostfav.groupby("Country").head(1)
    return mostfav
Mostfav_df = most_fav_product(df)
Mostfav_df
```

```
        Country              Product  total_sales  total_boxes
0     Australia       50% Dark Bites      89222.0         3182
41       Canada    Smooth Sliky Salty      68257.0         2271
54        India              Eclairs      79009.0         1985
80  New Zealand      Mint Chip Choco      86709.0         2537
105          UK  Peanut Butter Cubes      79695.0         1265
128         USA      Raspberry Choco      83524.0         1497
```

Least Fav product for Each Country

```
def least_fav_product(df):
    leastfav = (df.groupby(['Country', 'Product']).agg(total_sales =
("Amount", "sum"), total_boxes = ("Boxes Shipped",
"sum")).reset_index())
    leastfav = leastfav.sort_values(by = ["Country", "total_sales"],
ascending = [True, False])
    leastfav = leastfav.groupby("Country").tail(1)
    return leastfav
Leastfav_df = least_fav_product(df)
Leastfav_df
```

```
        Country                Product  total_sales  total_boxes
4     Australia            After Nines      27769.0          912
40       Canada        Raspberry Choco      12873.0          971
55        India       Fruit & Nut Bars      18368.0          953
74  New Zealand   Choco Coated Almonds      20888.0          455
89           UK         70% Dark Bites      20713.0         1259
111         USA         70% Dark Bites      20580.0          631
```

Most Fav Products in Different Months

```
monthly_fav_product = df.groupby(["Year", "Month", "Product"])
["Amount"].sum().reset_index(name = "Monthly Total")
top_products  =
monthly_fav_product.loc[monthly_fav_product.groupby(['Year', 'Month'])
['Monthly Total'].idxmax()]
top_products
```

```
     Year  Month              Product  Monthly Total
3    2022      1       99% Dark & Pure        71883.0
39   2022      2  Peanut Butter Cubes        64533.0
63   2022      3   Smooth Sliky Salty        73969.0
84   2022      4      Raspberry Choco        63406.0
107  2022      5   Smooth Sliky Salty        71939.0
121  2022      6     Fruit & Nut Bars        87682.0
148  2022      7  Organic Choco Syrup        94241.0
156  2022      8        85% Dark Bars        97209.0
```

Sales Person Performance

```
sales_performance = df.groupby(['Sales Person'])
['Amount'].sum().reset_index(name = "sales_sum").sort_values(by  =
"sales_sum", ascending = False)
sales_performance
```

```
            Sales Person  sales_sum
5           Ches Bonnell   320901.0
20            Oby Sorrel   316645.0
17       Madelene Upcott   316099.0
3            Brien Boise   312816.0
16         Kelci Walkden   311710.0
23           Van Tuxwell   303149.0
7    Dennison Crosswaite   291669.0
2         Beverie Moffet   278922.0
14           Kaine Padly   266490.0
19        Marney O'Breen   259742.0
1           Barr Faughny   258713.0
22       Roddy Speechley   251062.0
10       Gunar Cockshoot   238483.0
9           Gigi Bohling   232666.0
15      Karlen McCaffrey   223895.0
13        Jehu Rudeforth   220976.0
12          Jan Morforth   219667.0
6         Curtice Advani   216461.0
21   Rafaelita Blaksland   210245.0
11          Husein Augar   205212.0
0         Andria Kimpton   201747.0
18        Mallorie Waber   200592.0
4         Camilla Castle   196616.0
8         Dotty Strutley   190624.0
24        Wilone O'Kielt   138523.0
```

Best Sales Person for Every Month

```
monthly_sales_person = df.groupby(['Month', 'Year', "Sales Person"])
["Amount"].sum().reset_index(name = "Monthly_sales")
top_sales_person =
monthly_sales_person.loc[monthly_sales_person.groupby(['Month','Year']
)['Monthly_sales'].idxmax()]
top_sales_person
```

```
     Month  Year     Sales Person  Monthly_sales
14       1  2022      Kaine Padly        66192.0
27       2  2022   Beverie Moffet        65135.0
65       3  2022    Kelci Walkden        68159.0
79       4  2022     Ches Bonnell        53753.0
102      5  2022      Brien Boise        75390.0
147      6  2022      Van Tuxwell        81326.0
```

```
169       7  2022       Oby Sorrel        54600.0
184       8  2022  Gunar Cockshoot        69251.0
```

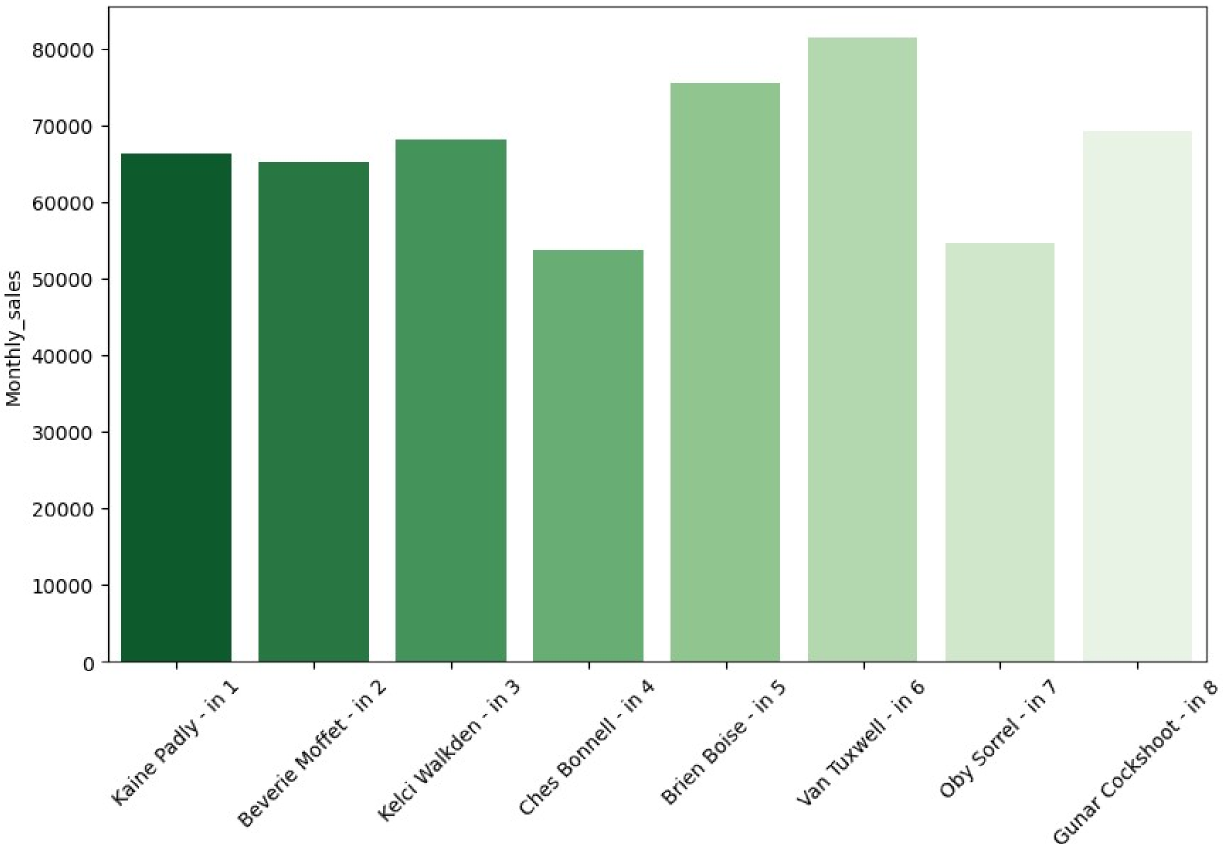
```
top_sales_person['X_Label'] = top_sales_person['Sales Person'] + ' - in ' + top_sales_person['Month'].astype(str)
plt.figure(figsize=(10, 6))
sns.barplot(data=top_sales_person, x='X_Label', y='Monthly_sales', palette="Greens_r")
plt.xticks(rotation=45)
```

```
C:\Users\ashis\AppData\Local\Temp\ipykernel_25536\2193996986.py:3: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `x` variable to `hue` and set `legend=False` for the same effect.

  sns.barplot(data=top_sales_person, x='X_Label', y='Monthly_sales', palette="Greens_r")
```

```
([0, 1, 2, 3, 4, 5, 6, 7],
 [Text(0, 0, 'Kaine Padly - in 1'),
  Text(1, 0, 'Beverie Moffet - in 2'),
  Text(2, 0, 'Kelci Walkden - in 3'),
  Text(3, 0, 'Ches Bonnell - in 4'),
  Text(4, 0, 'Brien Boise - in 5'),
  Text(5, 0, 'Van Tuxwell - in 6'),
  Text(6, 0, 'Oby Sorrel - in 7'),
  Text(7, 0, 'Gunar Cockshoot - in 8')])
```


80000
70000
60000
50000
40000
30000
20000
10000
0
Monthly_sales
Kaine Padly - in 1
Beverie Moffet - in 2
Kelci Walkden - in 3
Ches Bonnell - in 4
Brien Boise - in 5
Van Tuxwell - in 6
Oby Sorrel - in 7
Gunar Cockshoot - in 8
X_Label