In [1]:

```
import warnings
warnings.filterwarnings("ignore")
```

In [2]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
```

In [3]:

```
from sklearn.metrics import mean_squared_error
```

In [25]:

```
df = pd.read_csv('/content/Sales_Data.csv')
```

In [26]:

```
df.isnull().sum()
```

Out[26]:

```
Month     0
Qty       2
dtype: int64
```

In [27]:

```
df['Qty'] = df['Qty'].fillna(df['Qty'].median())
```

In [28]:

```
df.head(3)
```

Out[28]:

	Month	Qty
0	Jan-21	25.0
1	Feb-21	25.0
2	Mar-21	33.0

Exponential Smoothening (Weighted Moving Averages)

In [29]:

```
df['ewm0.2'] = np.round(df.Qty.ewm(alpha = 0.2).mean(),0)
```

In [30]:

```
df
```

Out[30]:

	Month	Qty	ewm0.2
0	Jan-21	25.0	25.0
1	Feb-21	25.0	25.0
2	Mar-21	33.0	28.0
3	Apr-21	25.0	27.0

	Month	Qty	ewm0.2
4	May-21	20.0	25.0
5	Jun-21	30.0	26.0
6	Jul-21	53.0	33.0
7	Aug-21	40.0	35.0
8	Sep-21	30.0	34.0
9	Oct-21	53.0	38.0
10	Nov-21	50.0	41.0
11	Dec-21	30.0	38.0
12	Jan-22	30.0	37.0

In [31]:

```
# defining a function get_mape to calculate MAPE (Mean Absolute Percentage Error)

def get_mape(actual, pred):
  return np.round(np.mean(np.abs(100*(actual-pred)/actual)),2)
```

In [24]:

```
mape = get_mape(df.Qty, df.ewm0.2)
mape
```

Out[24]:

```
17.03
```

In [20]:

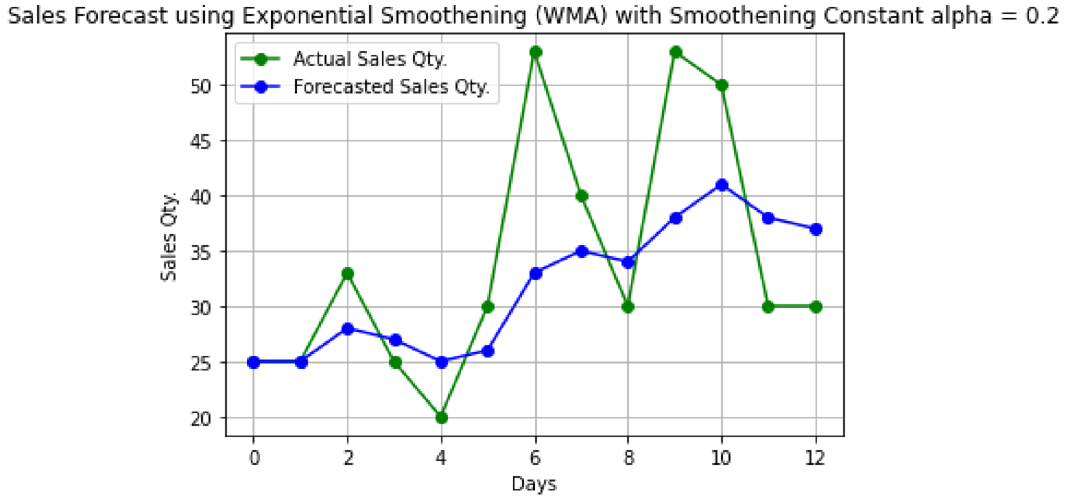
```
rmse = np.round(np.sqrt(mean_squared_error(df.Qty, df.ewm0.2)),2)
rmse
```

Out[20]:

```
8.46
```

In [33]:

```
plt.plot(df['Qty'], label = 'Actual Sales Qty.', marker = 'o', color = 'green')
plt.plot(df['ewm0.2'], label = 'Forecasted Sales Qty.', marker = 'o', color = 'blue')
plt.title('Sales Forecast using Exponential Smoothening (WMA) with Smoothening Constant a
lpha = 0.2')
plt.xlabel('Days')
plt.ylabel('Sales Qty.')
plt.legend()
plt.grid(True)
plt.figure(figsize=(15,10))
plt.show()
```



```
<Figure size 1080x720 with 0 Axes>
```

In [ ]:

```
```