Import Libraries

In [52]:

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

In [21]:

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

Import Dataset

In [22]:

```
data = pd.read_csv('iris.csv')
data.head()
```

Out[22]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa

In [23]:

```
data.drop(['Id'] , axis = 1 , inplace = True)
```

Data Preprocessing

In [24]:

```
data.head()
```

Out[24]:

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa

In [25]:

```
data.describe()
```

Out[25]:

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm
count	150.000000	150.000000	150.000000	150.000000
mean	5.843333	3.054000	3.758667	1.198667
std	0.828066	0.433594	1.764420	0.763161
min	4.300000	2.000000	1.000000	0.100000
25%	5.100000	2.800000	1.600000	0.300000
50%	5.800000	3.000000	4.350000	1.300000
75%	6.400000	3.300000	5.100000	1.800000
max	7.900000	4.400000	6.900000	2.500000

In [26]:

```
data.head()
```

Out[26]:

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa

In [27]:

```
data.isnull().sum()
```

Out[27]:

```
SepalLengthCm    0
SepalWidthCm     0
PetalLengthCm    0
PetalWidthCm     0
Species          0
dtype: int64
```

In [28]:

```
data['Species'] = data['Species'].str.replace('Iris-' , '')
```

In [29]:

```
data.head()
```

Out[29]:

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	5.1	3.5	1.4	0.2	setosa
1	4.9	3.0	1.4	0.2	setosa
2	4.7	3.2	1.3	0.2	setosa
3	4.6	3.1	1.5	0.2	setosa
4	5.0	3.6	1.4	0.2	setosa

In [30]:

```
data['Species'] = data['Species'].str.replace('setosa' , '1')
data['Species'] = data['Species'].str.replace('versicolor' , '2')
data['Species'] = data['Species'].str.replace('virginica' , '3')
```

In [31]:

```
data.head()
```

Out[31]:

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	5.1	3.5	1.4	0.2	1
1	4.9	3.0	1.4	0.2	1
2	4.7	3.2	1.3	0.2	1
3	4.6	3.1	1.5	0.2	1
4	5.0	3.6	1.4	0.2	1

In [32]:

```
data["Species"] = pd.to_numeric(data["Species"], downcast = "integer")
```

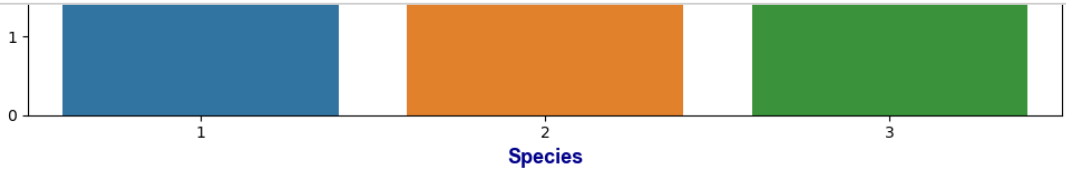
EDA

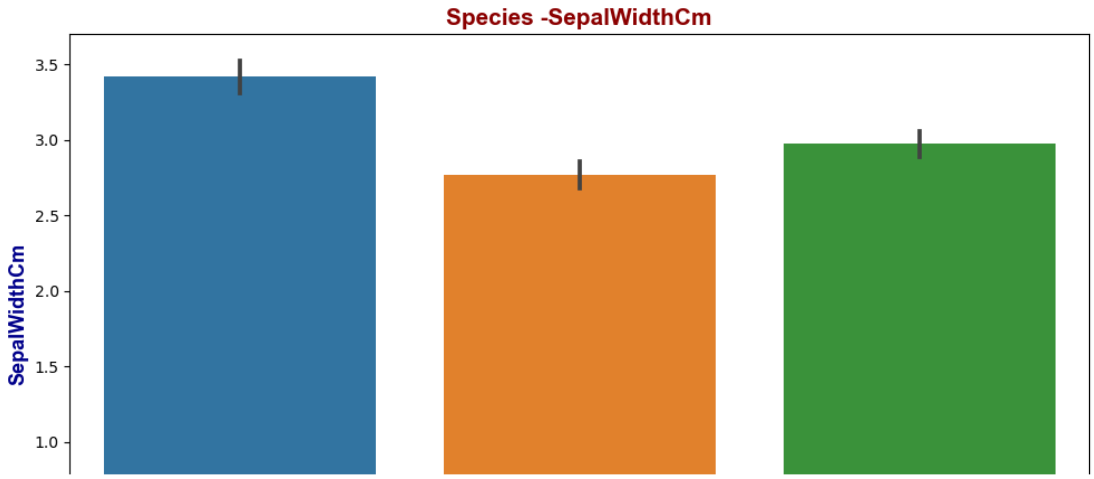
In [33]:

```
title_font = {"family" : "arial", "color" : "darkred", "weight" : "bold", "size" : 15}
axis_font = {"family" : "arial", "color" : "darkblue", "weight" : "bold", "size" : 13}
for i in data.columns[:-1]:
    plt.figure(figsize = (10,6))
    sns.barplot(x = 'Species', y = i, data = data)

    plt.title("Species -" + i , fontdict = title_font)
    plt.xlabel("Species", fontdict = axis_font)
    plt.ylabel(i, fontdict = axis_font)

    plt.tight_layout()
    plt.show()
```





Heatmap

In [34]:

```
plt.figure(figsize = (15,9))
sns.heatmap(data.corr() , annot = True)
plt.show()
```

In [35]:

```
data.drop(['SepalWidthCm'] , axis = 1 , inplace = True)
```

In [36]:

```
data.head()
```

Out[36]:

	SepalLengthCm	PetalLengthCm	PetalWidthCm	Species
0	5.1	1.4	0.2	1
1	4.9	1.4	0.2	1
2	4.7	1.3	0.2	1
3	4.6	1.5	0.2	1
4	5.0	1.4	0.2	1

Modelling

In [37]:

```
X = data.drop(['Species'] , axis = 1)
y = data['Species']
```

In [38]:

```
from sklearn.model_selection import train_test_split
```

In [41]:

```
train , test = train_test_split(data ,  test_size=0.25, random_state=42)
```

Guassian Naive Bayes

In [45]:

```
col_names=list(data.columns)
predictors=col_names[0:3]
target=col_names[3]
```

In [47]:

```
from sklearn.naive_bayes import GaussianNB
Gmodel=GaussianNB()
Gmodel.fit(train[predictors],train[target])
train_Gpred=Gmodel.predict(train[predictors])
test_Gpred=Gmodel.predict(test[predictors])

train_acc_gau=np.mean(train_Gpred==train[target])
test_acc_gau=np.mean(test_Gpred==test[target])
train_acc_gau
```

Out[47]:

```
0.9375
```

In [48]:

```
test_acc_gau
```

Out[48]:

```
1.0
```

Multinomial Naive Bayes

In [50]:

```
from sklearn.naive_bayes import MultinomialNB
Mmodel=MultinomialNB()
Mmodel.fit(train[predictors],train[target])
train_Mpred=Mmodel.predict(train[predictors])
test_Mpred=Mmodel.predict(test[predictors])

train_acc_multi=np.mean(train_Mpred==train[target])
test_acc_multi=np.mean(test_Mpred==test[target])
train_acc_multi
```

Out[50]:

```
0.9017857142857143
```

In [51]:

```
test_acc_multi
```

Out[51]:

```
0.9736842105263158
```

In [ ]:

```

```