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

In [2]:
```
df=pd.read_csv('Iris.csv')
df
```

Out[2]:

	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
...	...	...	...	...	...	...
145	146	6.7	3.0	5.2	2.3	Iris-virginica
146	147	6.3	2.5	5.0	1.9	Iris-virginica
147	148	6.5	3.0	5.2	2.0	Iris-virginica
148	149	6.2	3.4	5.4	2.3	Iris-virginica
149	150	5.9	3.0	5.1	1.8	Iris-virginica

150 rows × 6 columns

In [3]:
```
df=df.drop('Id',axis=1)
df
```

Out[3]:

	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
...	...	...	...	...	...
145	6.7	3.0	5.2	2.3	Iris-virginica
146	6.3	2.5	5.0	1.9	Iris-virginica
147	6.5	3.0	5.2	2.0	Iris-virginica
148	6.2	3.4	5.4	2.3	Iris-virginica
149	5.9	3.0	5.1	1.8	Iris-virginica

150 rows × 5 columns

In [4]:
```
df.describe()
```

Out[4]:

	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 [5]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 5 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   SepalLengthCm  150 non-null    float64
 1   SepalWidthCm   150 non-null    float64
 2   PetalLengthCm  150 non-null    float64
 3   PetalWidthCm   150 non-null    float64
 4   Species        150 non-null    object 
dtypes: float64(4), object(1)
memory usage: 6.0+ KB
```

In [7]:
```
from sklearn.preprocessing import LabelEncoder
```

In [8]:
```
from sklearn.compose import ColumnTransformer
```

In [9]:
```
LE=LabelEncoder()
```

In [10]:
```
df.iloc[:,-1]=LE.fit_transform(df.iloc[:,-1])
```

In [11]:
```
df
```

Out[11]:

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	5.1	3.5	1.4	0.2	0
1	4.9	3.0	1.4	0.2	0
2	4.7	3.2	1.3	0.2	0
3	4.6	3.1	1.5	0.2	0
4	5.0	3.6	1.4	0.2	0
...	...	...	...	...	...
145	6.7	3.0	5.2	2.3	2
146	6.3	2.5	5.0	1.9	2
147	6.5	3.0	5.2	2.0	2
148	6.2	3.4	5.4	2.3	2
149	5.9	3.0	5.1	1.8	2

150 rows × 5 columns

In [12]:
```
x=df.iloc[:,:-1]
x.head()
```

Out[12]:

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

In [13]:
```
y=df.iloc[:,-1]
y.head()
```

Out[13]:
```
0    0
1    0
2    0
3    0
4    0
Name: Species, dtype: int32
```

In [15]:
```
from sklearn.model_selection import train_test_split
```

In [17]:
```
X_train,X_test,y_train,y_test=train_test_split(x,y,test_size=0.20,random_state=50)
```

In [18]:
```
X_train.head()
```

Out[18]:

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm
125	7.2	3.2	6.0	1.8
98	5.1	2.5	3.0	1.1
73	6.1	2.8	4.7	1.2
144	6.7	3.3	5.7	2.5
21	5.1	3.7	1.5	0.4

In [19]:
```
X_train.shape
```

Out[19]:
```
(120, 4)
```

In [20]:
```
y_train.shape
```

Out[20]:
```
(120,)
```

In [21]:
```
from sklearn.tree import DecisionTreeClassifier
```

In [22]:
```
dt=DecisionTreeClassifier()
```

In [23]:
```
dt.fit(X_train,y_train)
```

Out[23]:
```
DecisionTreeClassifier()
```

In [24]:
```
y_pred=dt.predict(X_test)
y_pred
```

Out[24]:
```
array([1, 1, 0, 0, 2, 2, 2, 0, 0, 1, 0, 2, 0, 2, 1, 0, 1, 0, 1, 2, 2, 1,
       0, 2, 1, 2, 1, 1, 1, 2])
```

In [25]:
```
y_test=np.array(y_test)
y_test
```

Out[25]:
```
array([1, 1, 0, 0, 2, 2, 2, 0, 0, 1, 0, 2, 0, 2, 1, 0, 1, 0, 1, 1, 2, 1,
       0, 2, 1, 2, 1, 1, 1, 2])
```

In [26]:
```
from sklearn.metrics import accuracy_score
```

In [27]:
```
accuracy_score(y_pred,y_test)
```

Out[27]:
```
0.9666666666666667
```

In [28]:
```
from sklearn.metrics import confusion_matrix
```

In [29]:
```
confusion_matrix(y_pred,y_test)
```

Out[29]:
```
array([[ 9,  0,  0],
       [ 0, 11,  0],
       [ 0,  1,  9]], dtype=int64)
```

In [30]:
```
from sklearn.metrics import classification_report
```

In [31]:
```
print(classification_report(y_pred,y_test))
```

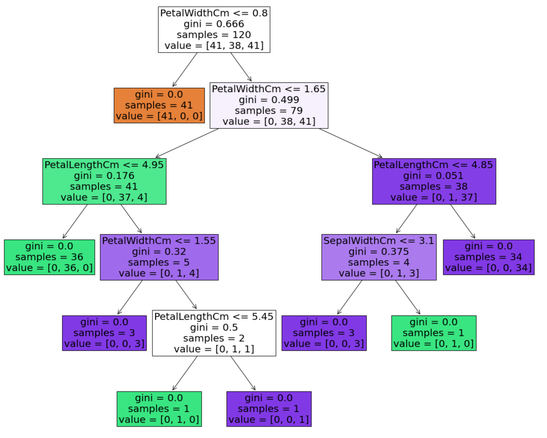
```
              precision    recall  f1-score   support

           0       1.00      1.00      1.00         9
           1       0.92      1.00      0.96        11
           2       1.00      0.90      0.95        10

    accuracy                           0.97        30
   macro avg       0.97      0.97      0.97        30
weighted avg       0.97      0.97      0.97        30
```

In [32]:
```
from sklearn import tree
```

In [34]:
```
from matplotlib import pyplot as plt
plt.figure(figsize=(20,17))
dtviz=tree.plot_tree(dt,feature_names=x.columns,filled=True,fontsize=20)
```



In [ ]:
```

```