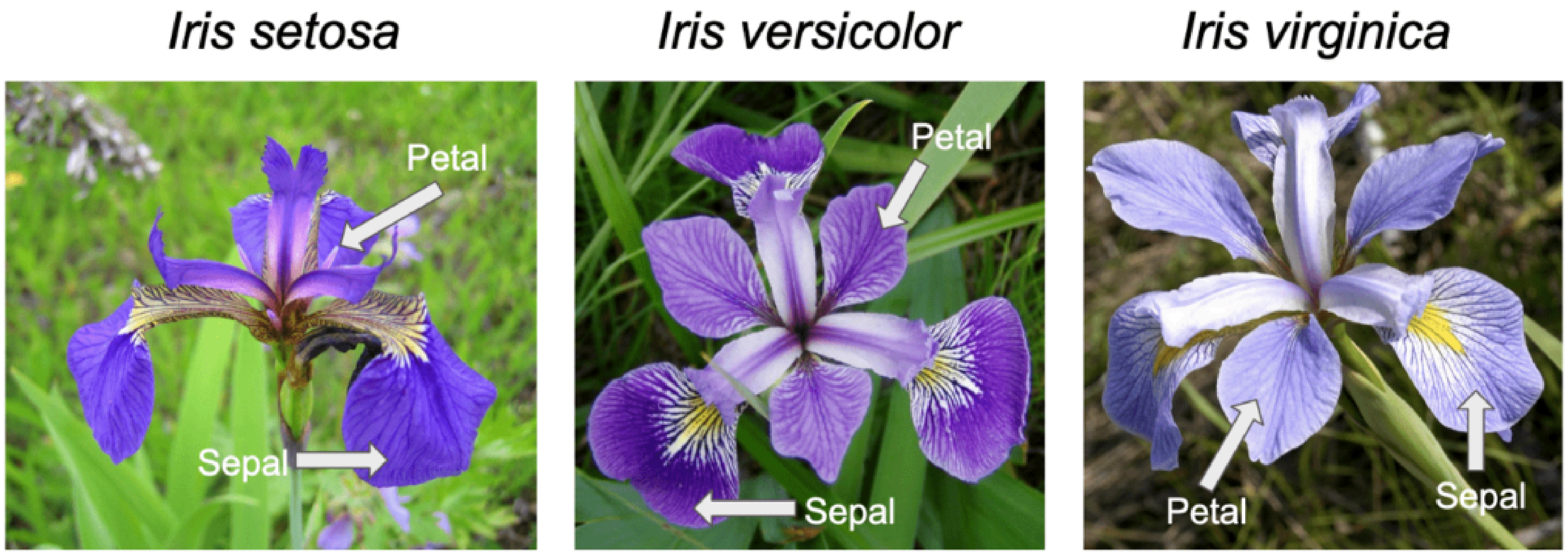
IRIS Flower Prediction - LogisticRegresssion : ML (MultiClass Classification)

In [536]:

```
# Designed By : ALTAF HUSAIN DATA ANALYST
```



Step 1 : load important modules

In [537]:

```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn.linear_model import LogisticRegression
from sklearn.model_selection import train_test_split
from sklearn.metrics import confusion_matrix,classification_report
from sklearn.datasets import load_iris
import warnings
```

```
warnings.filterwarnings('ignore')
print("All modules loaded succesfully")
```

```
All modules loaded succesfully
```

Step 2 : load data

In [538]:

```
iris = load_iris()
```

In [539]:

```
df = pd.DataFrame(iris.data,columns=iris.feature_names)
df['target'] = iris.target
df['target_name'] = df['target'].map(dict(zip(range(0,3),iris.target_names)))
df
```

Out[539]:

	sepal length (cm)	sepal width (cm)	petal length (cm)	petal width (cm)	target	target_name
0	5.1	3.5	1.4	0.2	0	setosa
1	4.9	3.0	1.4	0.2	0	setosa
2	4.7	3.2	1.3	0.2	0	setosa
3	4.6	3.1	1.5	0.2	0	setosa
4	5.0	3.6	1.4	0.2	0	setosa
...	...	...	...	...	...	...
145	6.7	3.0	5.2	2.3	2	virginica
146	6.3	2.5	5.0	1.9	2	virginica
147	6.5	3.0	5.2	2.0	2	virginica
148	6.2	3.4	5.4	2.3	2	virginica
149	5.9	3.0	5.1	1.8	2	virginica

150 rows × 6 columns

In [540]:

```
X = df.iloc[:,:-2]
```

In [541]:
```
y = df['target']
```

In [542]:
```
X.shape
```

Out[542]:
```
(150, 4)
```

In [543]:
```
y.shape
```

Out[543]:
```
(150,)
```

In [544]:
```
df.sample(150)
```

Out[544]:

	sepal length (cm)	sepal width (cm)	petal length (cm)	petal width (cm)	target	target_name
58	6.6	2.9	4.6	1.3	1	versicolor
44	5.1	3.8	1.9	0.4	0	setosa
132	6.4	2.8	5.6	2.2	2	virginica
130	7.4	2.8	6.1	1.9	2	virginica
122	7.7	2.8	6.7	2.0	2	virginica
...	...	...	...	...	...	...
93	5.0	2.3	3.3	1.0	1	versicolor
46	5.1	3.8	1.6	0.2	0	setosa
68	6.2	2.2	4.5	1.5	1	versicolor
28	5.2	3.4	1.4	0.2	0	setosa
85	6.0	3.4	4.5	1.6	1	versicolor

150 rows × 6 columns

In [545]:
```
print(iris.target_names)
```

```
['setosa' 'versicolor' 'virginica']
```

In [546]:

```
df.columns
```

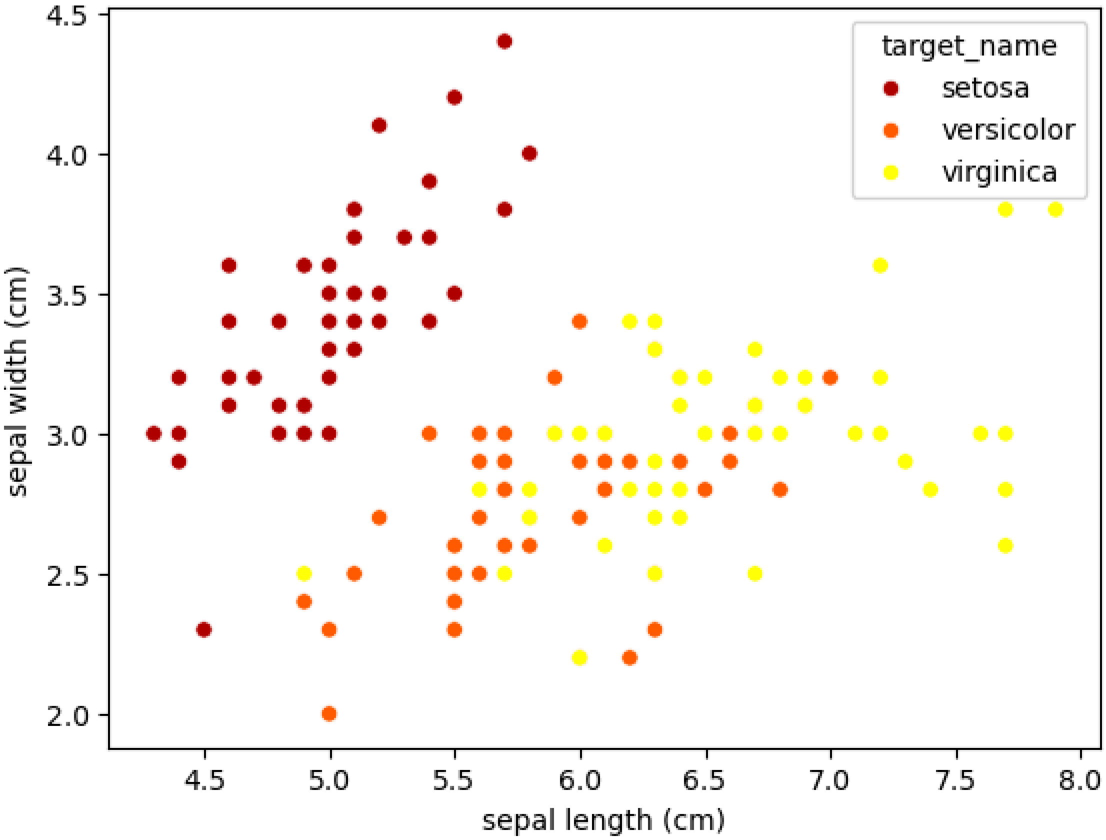
Out[546]:

```
Index(['sepal length (cm)', 'sepal width (cm)', 'petal length (cm)',
       'petal width (cm)', 'target', 'target_name'],
      dtype='object')
```

Step 3 :EDA

In [547]:

```
sns.scatterplot(df,x = 'sepal length (cm)',y = 'sepal width (cm)',hue = 'target_name',palette=sns.color_palette('hot',3
plt.show()
```



In [548]:

```
df.columns[:-2]
```

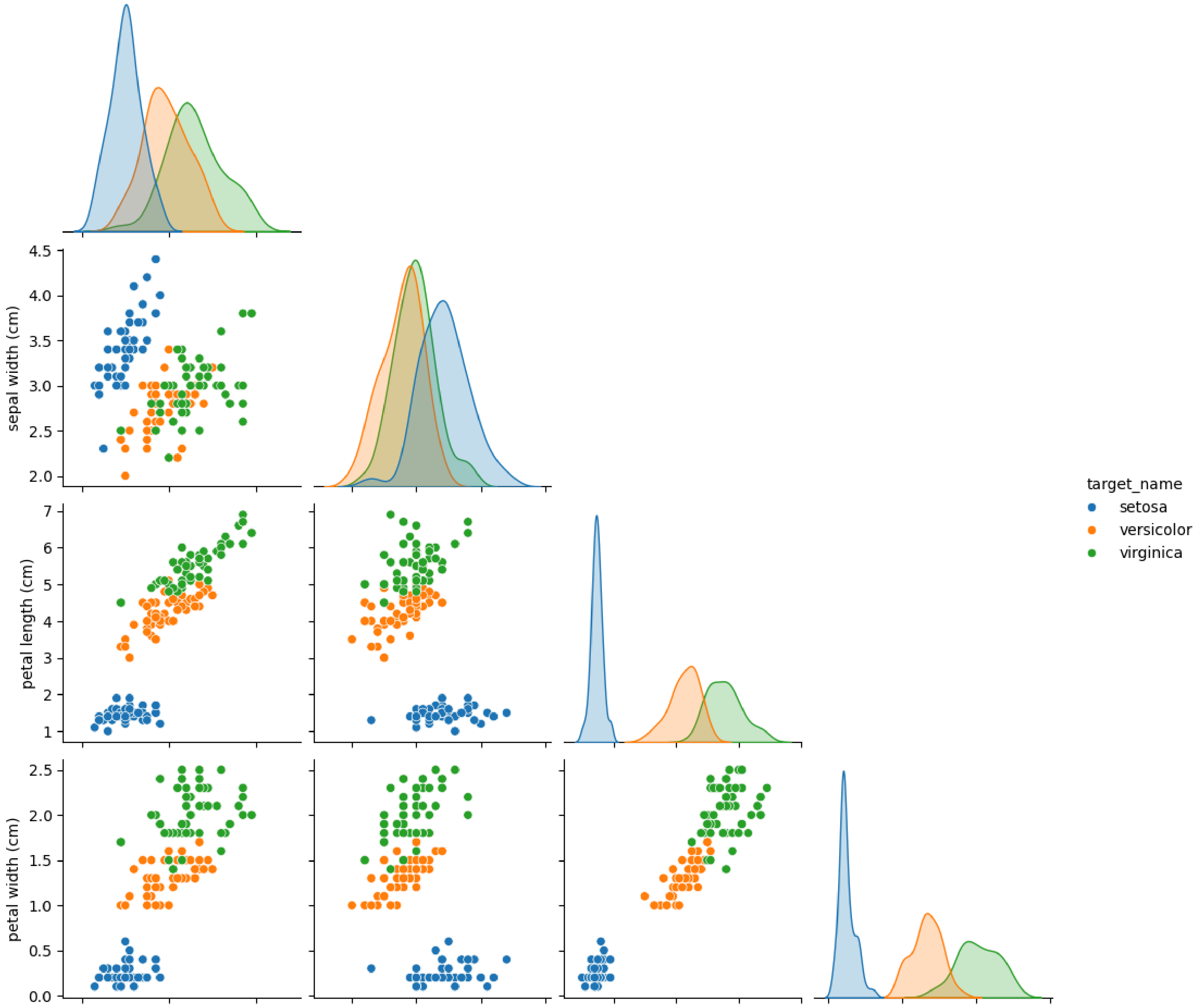
```
Out[548]: Index(['sepal length (cm)', 'sepal width (cm)', 'petal length (cm)',
                 'petal width (cm)'],
                dtype='object')
```

In [549]:

```
scatter_col = list(df.columns)
scatter_col.remove('target')
```

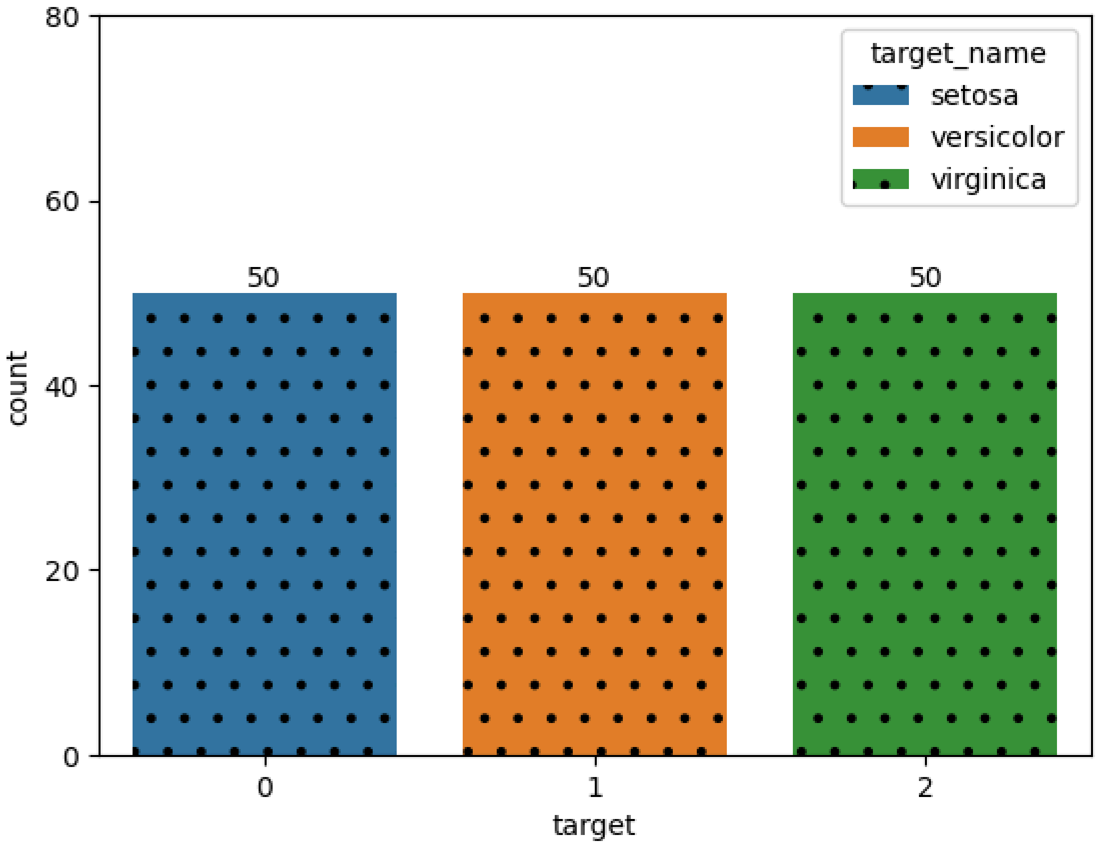
In [550]:

```
sns.pairplot(data = df[scatter_col],hue = 'target_name',corner=True)
plt.show()
```


4.5
4.0
3.5
3.0
2.5
2.0
sepal width (cm)
7
6
5
4
3
2
1
petal length (cm)
2.5
2.0
1.5
1.0
0.5
0.0
petal width (cm)
target_name
● setosa
● versicolor
● virginica

In [551]:

```
ax = sns.countplot(df , x = 'target',hue = 'target_name',hatch = '.')
for i in ax.containers:
  plt.bar_label(i)
plt.yticks(range(0,100,20))
plt.show()
```



Step 4 :Train-Test-Split

In [552]:

```
X_train, X_test, y_train, y_test = train_test_split(X,y,test_size = 0.2,random_state = 42,)
```

In [553]:
```
X_train.shape
```

Out[553]:
```
(120, 4)
```

In [554]:
```
X_test.shape
```

Out[554]:
```
(30, 4)
```

In [555]:
```
y_train.shape
```

Out[555]:
```
(120,)
```

In [556]:
```
y_test.shape
```

Out[556]:
```
(30,)
```

step 4 : Model building

In [557]:
```
model_lr = LogisticRegression()
```

In [558]:
```
model_lr.fit(X_train,y_train) # training
```

Out[558]:
```
▾ LogisticRegression
LogisticRegression()
```

In [559]:
```
y_pred = model_lr.predict(X_test)
```

In [560]:
```
y_pred  # model answer
```

Out[560]:
```
array([1, 0, 2, 1, 1, 0, 1, 2, 1, 1, 2, 0, 0, 0, 0, 1, 2, 1, 1, 2, 0, 2,
       0, 2, 2, 2, 2, 2, 0, 0])
```

In [561]:
```
y_test # actual answer
```

```
Out[561]: 73     1
          18     0
          118    2
          78     1
          76     1
          31     0
          64     1
          141    2
          68     1
          82     1
          110    2
          12     0
          36     0
          9      0
          19     0
          56     1
          104    2
          69     1
          55     1
          132    2
          29     0
          127    2
          26     0
          128    2
          131    2
          145    2
          108    2
          143    2
          45     0
          30     0
          Name: target, dtype: int64
```

```
In [562]: compare_df = pd.DataFrame({'Actual_y': y_test,'Model_pred_y': y_pred})
          compare_df['Actual_flower_name'] = compare_df['Actual_y'].map(dict(zip(range(0,3),iris.target_names)))
          compare_df['Predicted_flower_name'] = compare_df['Model_pred_y'].map(dict(zip(range(0,3),iris.target_names)))
          compare_df
```

Out[562]:

	Actual_y	Model_pred_y	Actual_flower_name	Predicted_flower_name
73	1	1	versicolor	versicolor
18	0	0	setosa	setosa
118	2	2	virginica	virginica
78	1	1	versicolor	versicolor
76	1	1	versicolor	versicolor
31	0	0	setosa	setosa
64	1	1	versicolor	versicolor
141	2	2	virginica	virginica
68	1	1	versicolor	versicolor
82	1	1	versicolor	versicolor
110	2	2	virginica	virginica
12	0	0	setosa	setosa
36	0	0	setosa	setosa
9	0	0	setosa	setosa
19	0	0	setosa	setosa
56	1	1	versicolor	versicolor
104	2	2	virginica	virginica
69	1	1	versicolor	versicolor
55	1	1	versicolor	versicolor
132	2	2	virginica	virginica
29	0	0	setosa	setosa
127	2	2	virginica	virginica

	Actual_y	Model_pred_y	Actual_flower_name	Predicted_flower_name
26	0	0	setosa	setosa
128	2	2	virginica	virginica
131	2	2	virginica	virginica
145	2	2	virginica	virginica
108	2	2	virginica	virginica
143	2	2	virginica	virginica
45	0	0	setosa	setosa
30	0	0	setosa	setosa

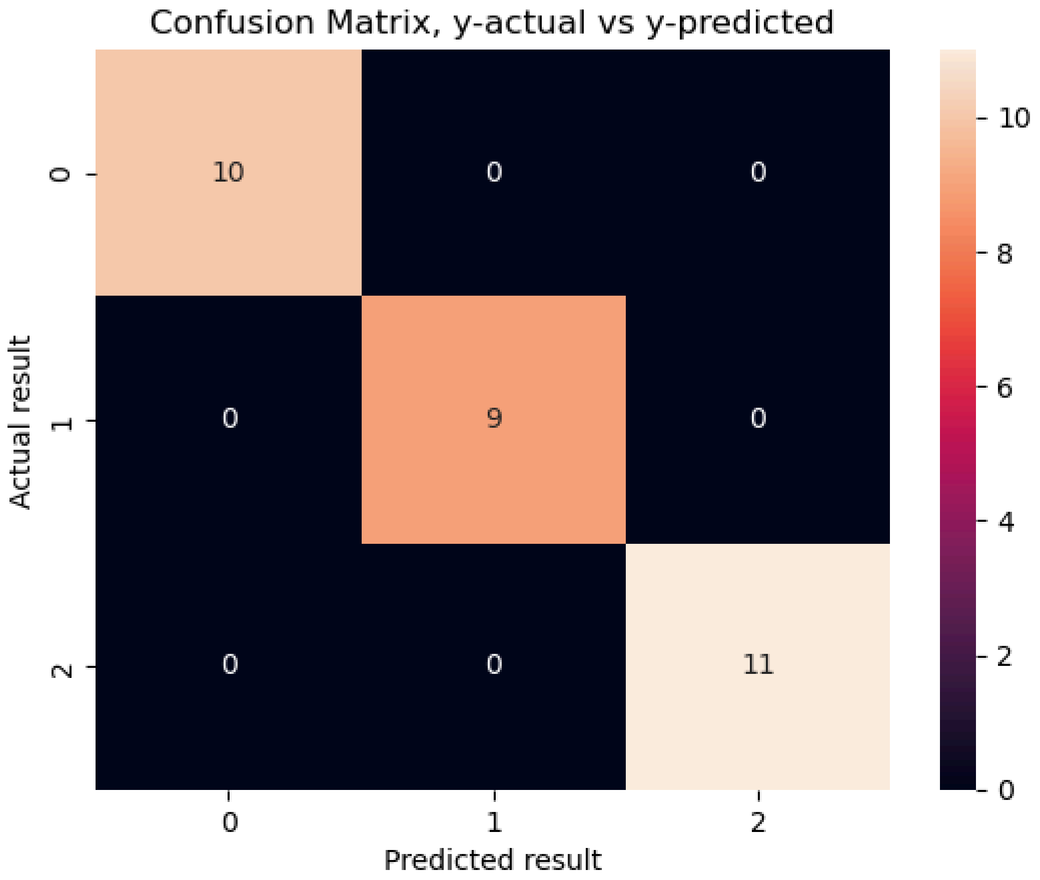
step 5 : Confusion Matrix

In [563]:

```
cm = confusion_matrix(y_test,y_pred)
```

In [564]:

```
plt.title('Confusion Matrix, y-actual vs y-predicted')
sns.heatmap(cm,annot = True,fmt= '')
plt.xlabel('Predicted result')
plt.ylabel('Actual result')
plt.show()
```



In [565]:
```
score  = round(model_lr.score(X_test,y_test)*100,2)
print('Model score is :',score)
```

```
Model score is : 100.0
```

In [566]:
```
print(classification_report(y_test,y_pred))
```

```
              precision    recall  f1-score   support

           0       1.00      1.00      1.00        10
           1       1.00      1.00      1.00         9
           2       1.00      1.00      1.00        11

    accuracy                           1.00        30
   macro avg       1.00      1.00      1.00        30
weighted avg       1.00      1.00      1.00        30
```

In [567]:

```python
df.sample()
```

Out[567]:

	sepal length (cm)	sepal width (cm)	petal length (cm)	petal width (cm)	target	target_name
120	6.9	3.2	5.7	2.3	2	virginica

Step 6 : Predicting the Flower

In [568]:

```python
sepal_length = 3
sepal_width = 4.5
petal_length = 4
petal_width     = 5.3
sample_data = [[sepal_length,sepal_width,petal_length,petal_width]]
ans = model_lr.predict(sample_data)[0]
print('Predicted Flower is : ',iris.target_names[ans])
```

```
Predicted Flower is :  virginica
```

In [569]:

```python
# Designed By : ALTAF HUSAIN DATA ANALYST
```