TASK 1 : PREDICTION USING SUPERVISED ML

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Predict the percentage of an student based on the no. of study hours

In [1]:
```
# IMPORTED NECESSARY LIBRARIES

import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_absolute_error, mean_squared_error
```

In [2]:
```
# LOADING THE DATASET

df = pd.read_csv("http://bit.ly/w-data")
print("------ Data Loaded Successfully -----")
```

```
------ Data Loaded Successfully -----
```

In [3]:
```
# PREVIEW OF THE DATASET

df.head(10)
```

Out[3]:

	Hours	Scores
0	2.5	21
1	5.1	47
2	3.2	27
3	8.5	75
4	3.5	30
5	1.5	20
6	9.2	88
7	5.5	60
8	8.3	81
9	2.7	25

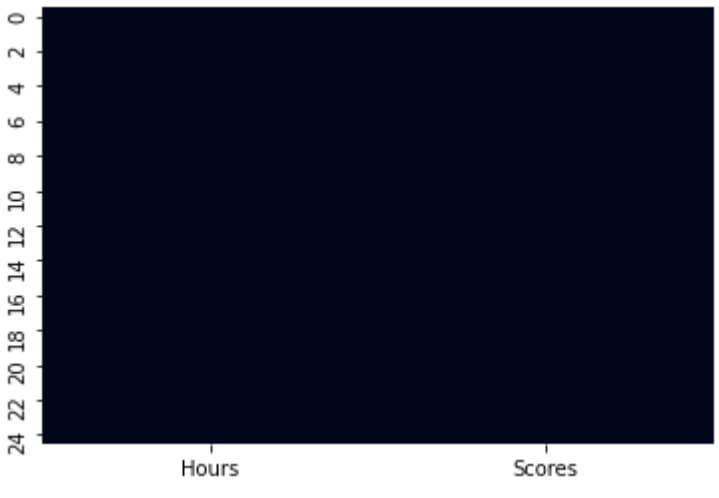
In [4]:
```
# DIMENSION OF THE DATASET

df.shape
```

Out[4]:
```
(25, 2)
```

In [5]:
```
#CHECK THE MISSING VALUES

print(df.isnull().sum())

sns.heatmap(df.isnull(),cbar=False)
```

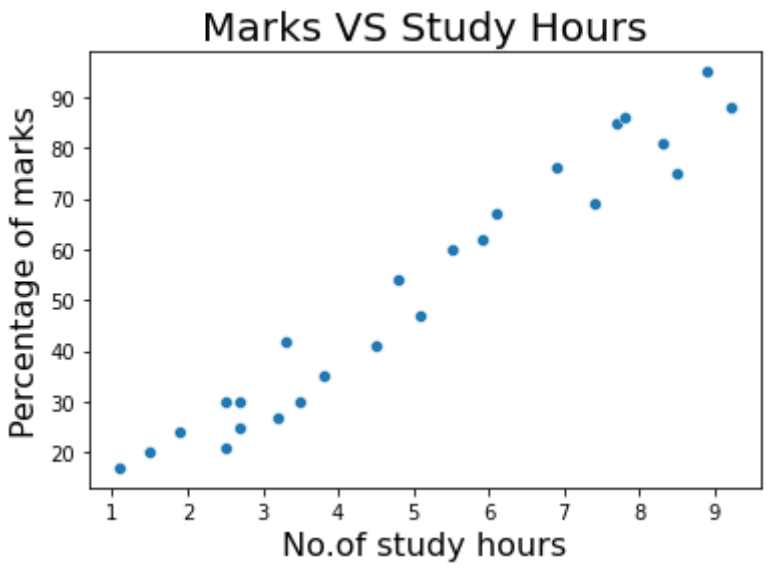
```
Hours     0
Scores    0
dtype: int64
```

Out[5]:
```
<AxesSubplot:>
```



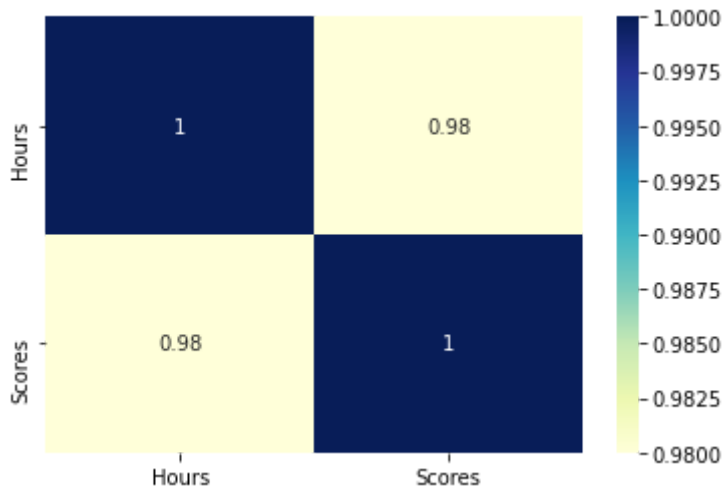
It shows that the dataset does not contains any missing values

In [6]:
```
# SCATTER PLOT FOR MARKS VS STUDY HOURS

sns.scatterplot(data=df, x='Hours', y='Scores')
plt.title("Marks VS Study Hours",size=20)
plt.xlabel("No.of study hours",size=16)
plt.ylabel("Percentage of marks",size=16)
plt.show()
```



In [7]:
```
corr= df.corr().round(2)
sns.heatmap(data=corr, annot=True,cmap="YlGnBu")
print(df.corr())
```

```
            Hours    Scores
Hours    1.000000  0.976191
Scores   0.976191  1.000000
```



Heat map shows that the data was highly correlated

In [8]:
```
# DEFINING X AND Y FROM THE DATA

X = df.iloc[:, :-1].values
y = df.iloc[:, 1].values
```

In [9]:
```
# SPLITTING THE DATA INTO TRAIN AND TEST SETS

X_train,X_test,Y_train,Y_test=train_test_split(X,y,random_state=0)
```

In [10]:
```
# SIMPLE LINEAR REGRESSION MODEL

linreg=LinearRegression()

# FITTING TRAINING DATA

linreg.fit(X_train,Y_train)
print("----- Model Trained -----")
```

```
----- Model Trained -----
```

In [11]:
```
# PREDICTION ON TEST DATA

Y_pred=linreg.predict(X_test)
Y_pred
```

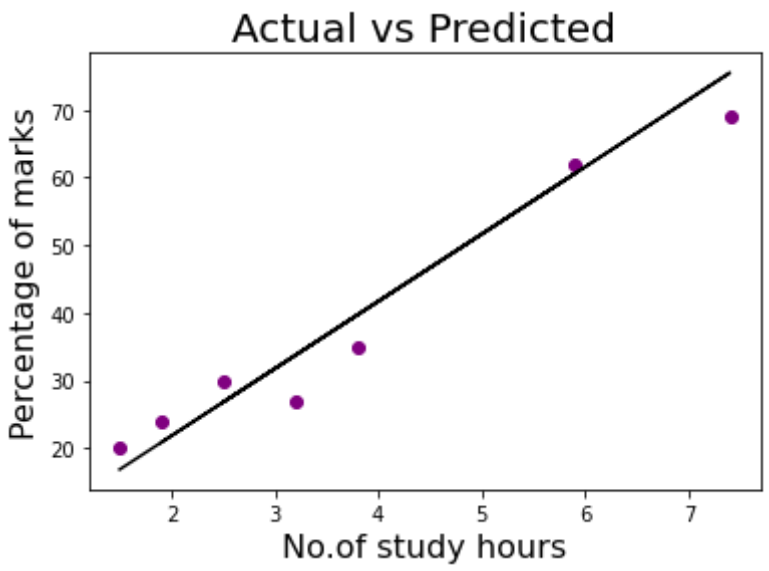
Out[11]:
```
array([16.84472176, 33.74557494, 75.50062397, 26.7864001 , 60.58810646,
       39.71058194, 20.8213931 ])
```

In [12]:
```
# COMPARING THE ACTUAL AND PREDICTED SCORES

compare_scores = pd.DataFrame({'Actual Marks': Y_test, 'Predicted Marks': Y_pred})
compare_scores
```

Out[12]:

	Actual Marks	Predicted Marks
0	20	16.844722
1	27	33.745575
2	69	75.500624
3	30	26.786400
4	62	60.588106
5	35	39.710582
6	24	20.821393

In [13]:
```
# VISUALIZE THE ACTUAL AND PREDICTED SCORES

plt.scatter(x=X_test, y=Y_test, color='purple')
plt.plot(X_test, Y_pred, color='black')
plt.title('Actual vs Predicted', size=20)
plt.xlabel("No.of study hours",size=16)
plt.ylabel("Percentage of marks",size=16)
plt.show()
```



In [14]:
```
# EVALUATION OF METRICS

print("Mean absolute error =",mean_absolute_error(Y_test, Y_pred))
print("Mean squared error =",mean_squared_error(Y_test, Y_pred))
```

```
Mean absolute error = 4.130879918502486
Mean squared error = 20.33292367497997
```

What will be the predicted score of a student if he/she studies for 9.25 hrs/ day?

In [15]:
```
hours = [9.25]
answer = linreg.predict([hours])
print("Score = {}".format(round(answer[0],3)))
```

```
Score = 93.893
```

According to the regression model if a student studies for 9.25 hours a day he/she is likely to score 93.89 marks.

THANK YOU :)

In [ ]: