Exercise 1

Using Python, create your own having columns plant name, sunlight exposure, plant height and answer the following questions:

1. Is there a relationship between the number of hours of sunlight exposure and the height of the plants?
2. Visualize the relationship between sunlight exposure and plant height using a scatterplot.
3. Calculate the correlation coefficient between sunlight exposure and plant height. Is the correlation positive or - negative? Is it strong or weak?
4. Based on the correlation coefficient, can we conclude that there is a significant association between sunlight exposure and plant growth rate?

In [49]:
```
import pandas as pd
import matplotlib.pyplot as plt
```

In [50]:
```
data = {
    'plant_name': ["Tomato", "Lemon", "Capsicum", "Mulberry", "Persimmon", "Passion Frui
    'sunlight_exposure': [20, 56, 18, 98, 34, 95 ],
    'plant_height': [67, 89, 12, 101, 45, 121]
}

df = pd.DataFrame(data)
df.head()
```

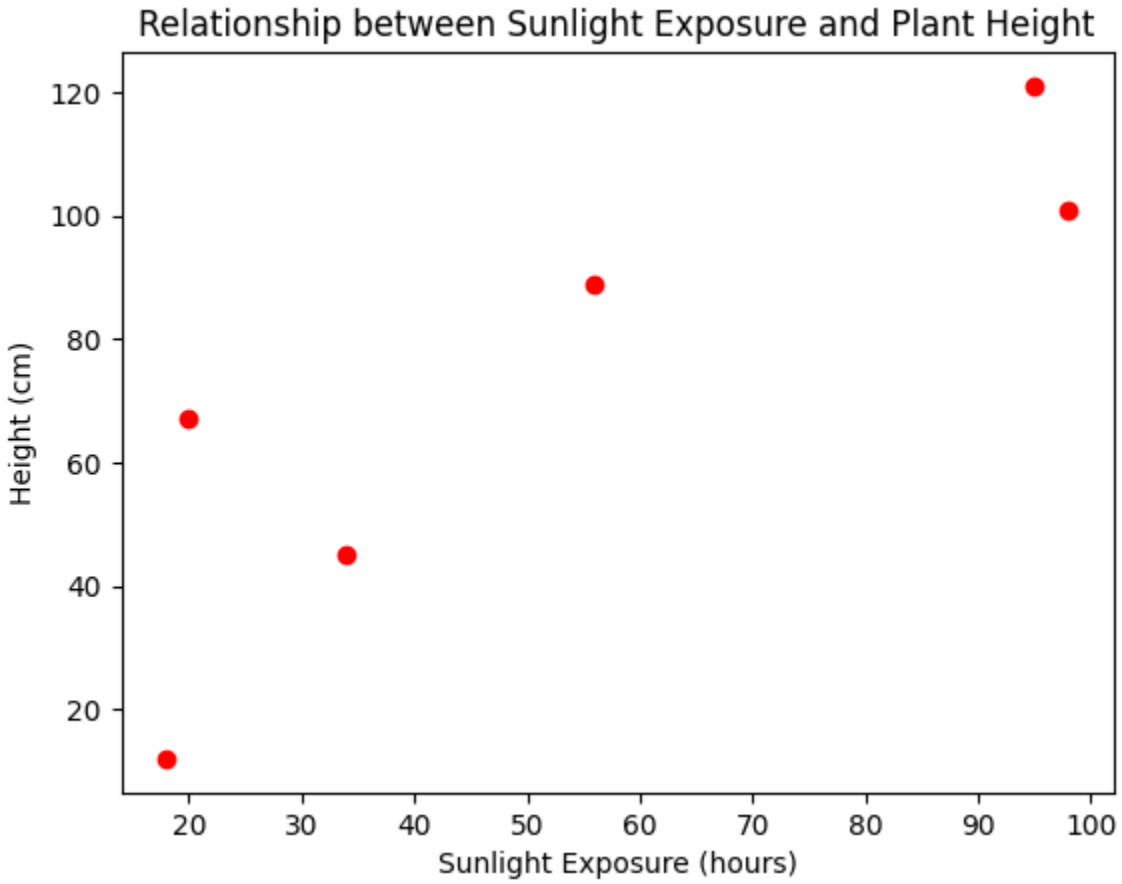
Out[50]:

	plant_name	sunlight_exposure	plant_height
0	Tomato	20	67
1	Lemon	56	89
2	Capsicum	18	12
3	Mulberry	98	101
4	Persimmon	34	45

2. Visualize the relationship between sunlight exposure and plant height using a scatterplot.

In [51]:
```
plt.scatter(df['sunlight_exposure'], df['plant_height'], color="r")
plt.title("Relationship between Sunlight Exposure and Plant Height")
plt.xlabel("Sunlight Exposure (hours)")
plt.ylabel("Height (cm)")
```

Out[51]:
```
Text(0, 0.5, 'Height (cm)')
```



In [52]:
```
reduced_df = df[['sunlight_exposure', 'plant_height']]
reduced_df.corr()
```

Out[52]:

	sunlight_exposure	plant_height
sunlight_exposure	1.00000	0.86669
plant_height	0.86669	1.00000

3. Calculate the correlation coefficient between sunlight exposure and plant height. Is the correlation positive or - negative? Is it strong or weak?

In [53]:
```
corr_coeff = reduced_df['sunlight_exposure'].corr(df['plant_height'])
print(f"Correlation co-efficient: {corr_coeff}")

if corr_coeff < 0:
    sign = "negative"
elif corr_coeff > 0:
    sign = "positive"
else:
    sign = "neither"
print(f"The correlation coefficient is {sign}.")

strength = "strong" if abs(corr_coeff) > 0.5 else "weak"
print(f"The correlation is {strength}.")
```

```
Correlation co-efficient: 0.8666898574354881
The correlation coefficient is positive.
The correlation is strong.
```

1. Is there a relationship between the number of hours of sunlight exposure and the height of the plants?

In [54]:
```
if abs(corr_coeff) > 0:
    print(f"Yes, there is a {strength} {sign} linear relationship between Sunlight Expos
else:
    print("There is no relationship between Sunlight Exposure and Plant Height.")
```

```
Yes, there is a strong positive linear relationship between Sunlight Exposure and Plant H
eight.
```

4. Based on the correlation coefficient, can we conclude that there is a significant association between sunlight exposure and plant growth rate?

In [55]:
```
if strength == "strong":
    print("Yes, we can conclude that there is significant association between Sunlight E
elif strength == "weak":
    print("The association between Sunlight Exposure and Plant Height is not significant
elif sign == "neither":
    print("There is no association between Sunlight Exposure and Plant Height.")
```

```
Yes, we can conclude that there is significant association between Sunlight Exposure and
Plant Height.
```