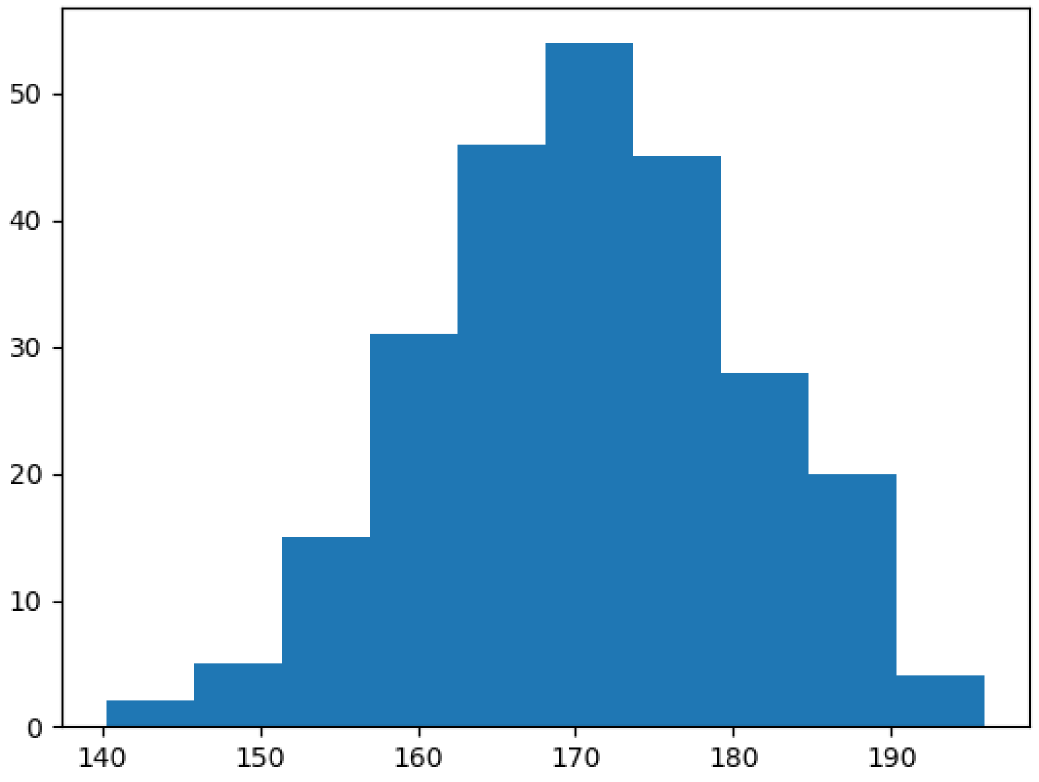
Pandas Histogram

Pandas histograms is a graphical representation of the distribution of numerical data. In Pandas, using the `hist()` function, we can create and plot histograms.

A histogram is a graph showing frequency distributions.

It is a graph showing the number of observations within each given interval.

Example: Say you ask for the height of 250 people, you might end up with a histogram like this:



!

You can read from the histogram that there are approximately:

- 2 people from 140 to 145cm
- 5 people from 145 to 150cm
- 15 people from 151 to 156cm
- 31 people from 157 to 162cm
- 46 people from 163 to 168cm
- 53 people from 168 to 173cm

- 45 people from 173 to 178cm
- 28 people from 179 to 184cm
- 21 people from 185 to 190cm
- 4 people from 190 to 195cm

Pandas Histogram

Pandas has a built-in function `hist()` that takes an array of data as a parameter.

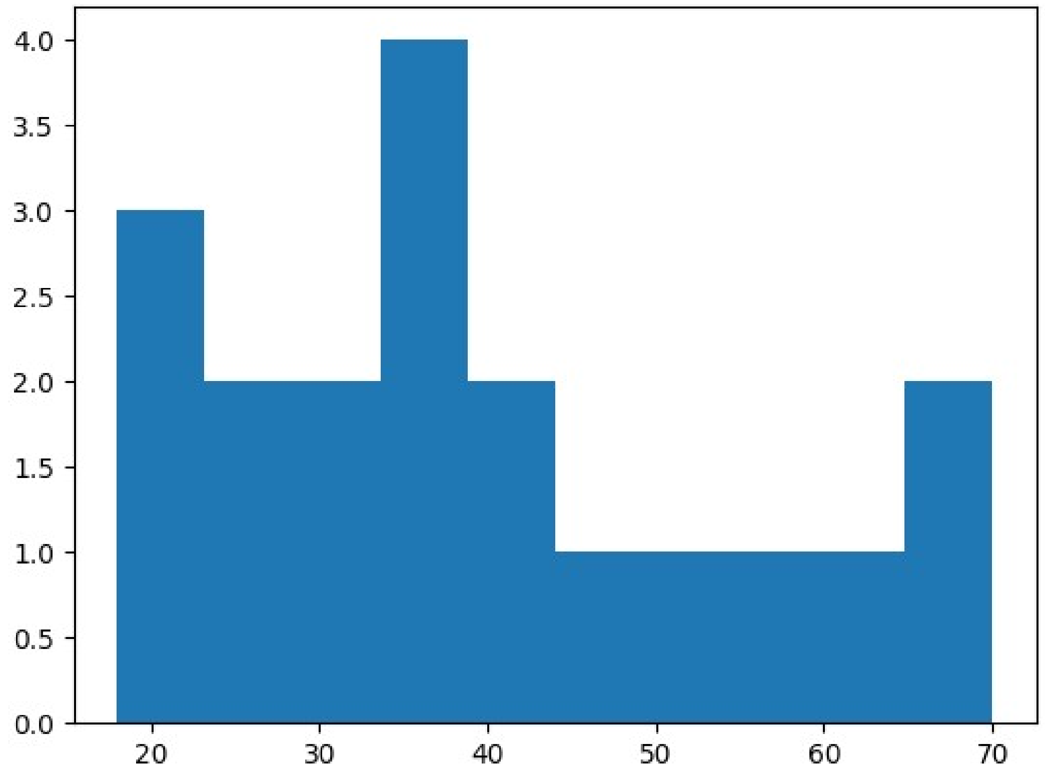
In histogram, a bin is a range of values that represents a group of data. `bin` is an optional parameter.

Let's look at an example.

```
import pandas as pd
import matplotlib.pyplot as plt

# create a DataFrame
data = {'values': [18, 21, 22, 25, 28, 30, 32, 34, 35, 36, 38, 40, 42,
45, 50, 55, 60, 65, 70]}
df = pd.DataFrame(data)

# plot a histogram
plt.hist(df['values'], bins=10)
plt.show()
```



In this example, we have used the `hist()` function to create a histogram.

Inside the `hist()` funcion,

`df['values']` creates a histogram from the `values` column of the DataFrame `bins=10` specifies that the data should be divided into **10** bins or intervals.

Pandas Customized Histogram

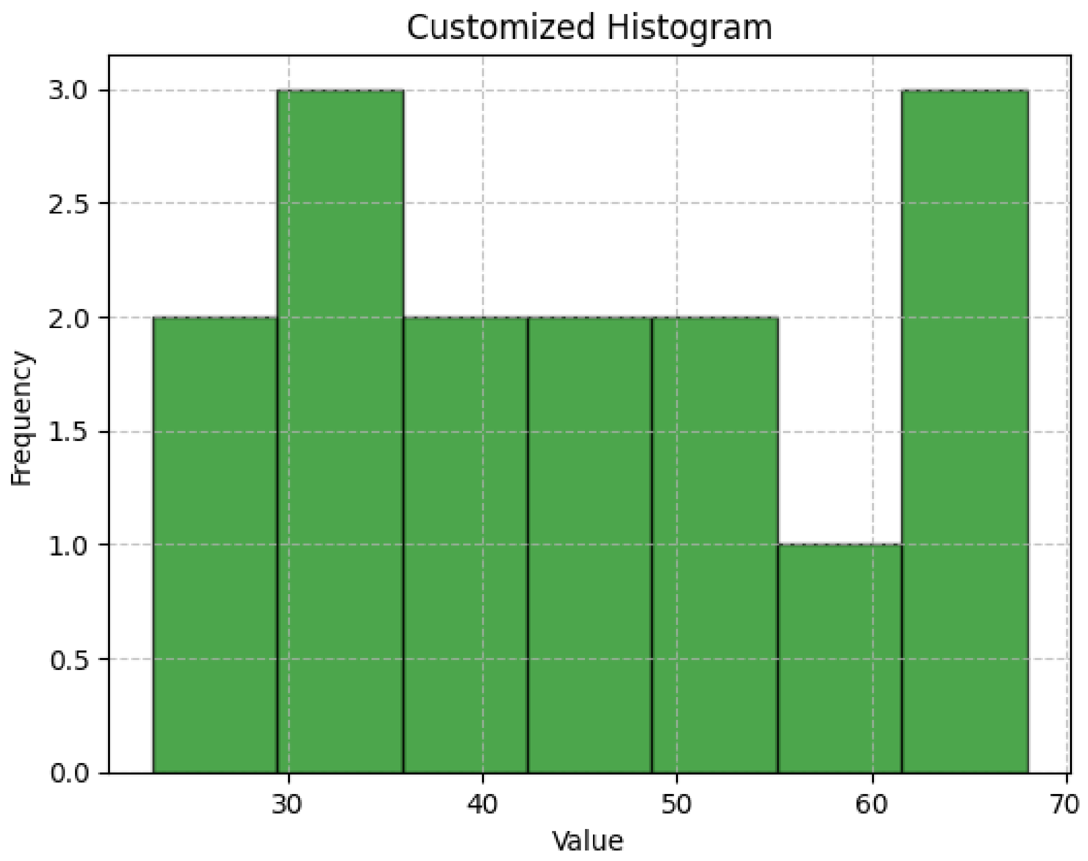
A customized histogram is a type of histogram with specific visual characteristics that effectively communicate information about the data being displayed.

Let's look at an example.

```python
import pandas as pd
import matplotlib.pyplot as plt

# create a DataFrame with more data
data = {'values': [23, 45, 30, 50, 67, 35, 47, 62, 25, 58, 42, 36, 53,
68, 32]}
df = pd.DataFrame(data)

# plot a customized histogram
plt.hist(df['values'], bins=7, edgecolor='black', color='green',
alpha=0.7)
plt.title('Customized Histogram')
plt.xlabel('Value')
plt.ylabel('Frequency')
plt.grid(True, linestyle='--', alpha=0.7)
plt.show()
```



Here, in the customized histogram, we have used additional visual customizations such as color, transparency, grid lines, making it more visually appealing than the basic one.

Multiple Histograms in Pandas

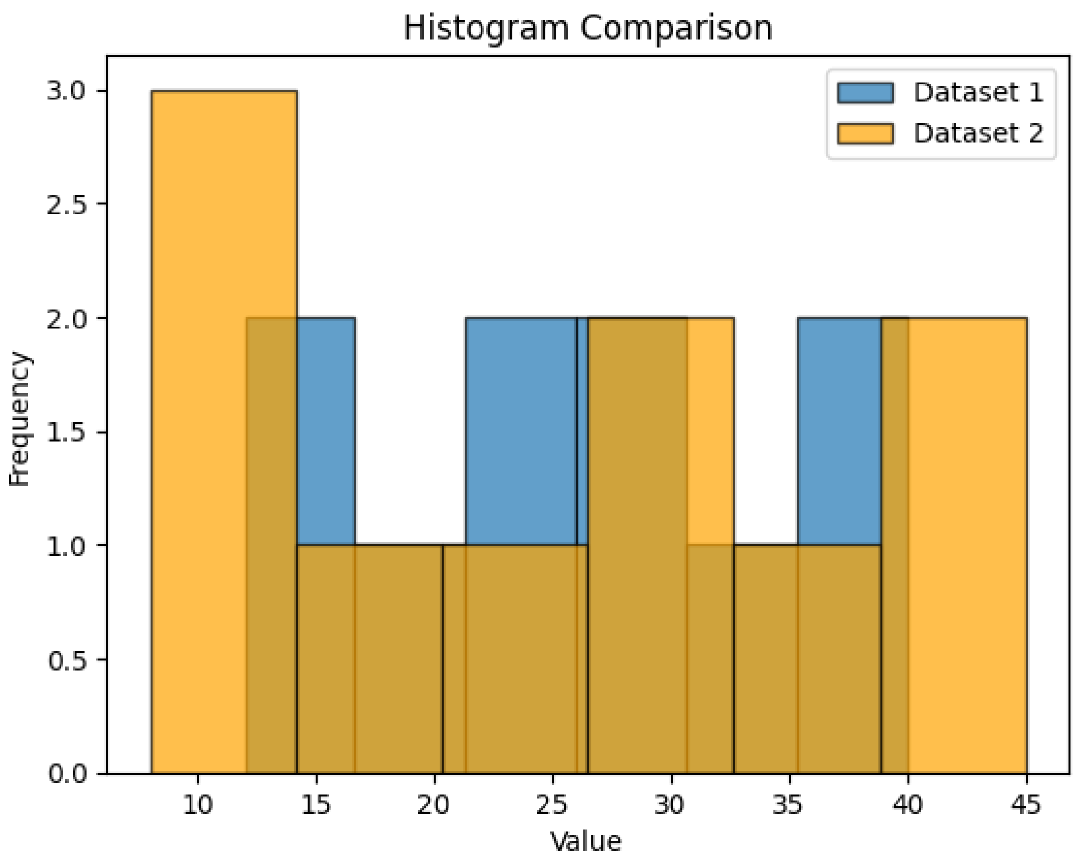
In Pandas, we can create multiple histograms to compare different datasets. For example,

```
import pandas as pd
import matplotlib.pyplot as plt

# Create two DataFrames with different datasets
data1 = {'values': [12, 15, 18, 22, 25, 27, 30, 33, 37, 40]}
data2 = {'values': [8, 10, 14, 20, 24, 28, 32, 36, 42, 45]}
df1 = pd.DataFrame(data1)
df2 = pd.DataFrame(data2)

# Plot two histograms side by side
plt.hist(df1['values'], bins=6, edgecolor='black', alpha=0.7,
label='Dataset 1')
plt.hist(df2['values'], bins=6, edgecolor='black', alpha=0.7,
label='Dataset 2', color='orange')
plt.title('Histogram Comparison')
plt.xlabel('Value')
```

```python
plt.ylabel('Frequency')
plt.legend()
plt.show()
```



In this example, we have compared two histograms side by side, illustrating the frequency distribution of values in two separate datasets.

The first dataset's histogram is labeled `Dataset 1` and uses default colors, while the second dataset's histogram is labeled `Dataset 2`, uses orange bars.