

# script to code this into a 3 bar graph with a sliding bar:

```
import matplotlib.pyplot as plt
```

Create the data

```
investments = [ { "name": "S&P 500", "annual_interest_rate": 10.2, "years": 25, },  
{ "name": "Traditional savings", "annual_interest_rate": 0.6, "years": 25, }, {  
"name": "529 plan", "annual_interest_rate": 8.2, "years": 25, }, ]
```

Calculate the future value of each investment

```
future_values = [] for investment in investments: future_value =  
investment["present_value"] * (1 + investment["annual_interest_rate"] **  
investment["years"]) future_values.append(future_value)
```

Create the figure

```
fig, ax = plt.subplots()
```

Add the bars to the figure

```
ax.bar(["S&P 500", "Traditional savings", "529 plan"], future_values)
```

Add a title to the figure

```
ax.set_title("Future value of investments")
```

Add a label to the x-axis

```
ax.set_xlabel("Investment")
```

Add a label to the y-axis

```
ax.set_ylabel("Future value ($)") # Add a slider to the figure slider = plt.axes([0.2,
```

```
0.1, 0.6, 0.03]) # Create a function to update the figure when the slider is moved
def update(val): # Get the value of the slider years = int(val) # Calculate the
future value of each investment future_values = [] for investment in investments:
future_value = investment["present_value"] * (1 +
investment["annual_interest_rate"] ** years) future_values.append(future_value)
# Update the figure ax.clear() ax.bar(["S&P 500", "Traditional savings", "529
plan"], future_values) ax.set_title("Future value of investments")
ax.set_xlabel("Investment") ax.set_ylabel("Future value ($)")
```

Set the initial value of the slider

```
slider.set_val(25)
```

Connect the slider to the update function

```
slider.on_changed(update)
```

Show the figure

```
plt.show()
```

This code will create a 3 bar graph that shows the future value of investments in the S&P 500, traditional savings, and a 529 plan. The user can use the slider to change the number of years that the investments are invested for.

---

```
import matplotlib.pyplot as plt
```

## Create the data

```
investments = [
```

```
{  
  
  "name": "S&P 500",  
  
  "annual_interest_rate": 10.2,  
  
  "years": 25,  
  
},  
  
{  
  
  "name": "Traditional savings",  
  
  "annual_interest_rate": 0.6,  
  
  "years": 25,  
  
},  
  
{  
  
  "name": "529 plan",  
  
  "annual_interest_rate": 8.2,  
  
  "years": 25,  
  
},  
  
]
```

Calculate the future value of each investment

```
future_values = []
```

```
for investment in investments:
```

```
    future_value = investment["present_value"] * (1 +  
    investment["annual_interest_rate"] ** investment["years"])
```

```
    future_values.append(future_value)
```

## Create the figure

```
fig, ax = plt.subplots()
```

## Add the bars to the figure

```
ax.bar(["S&P 500", "Traditional savings", "529 plan"], future_values)
```

## Add a title to the figure

```
ax.set_title("Future value of investments")
```

## Add a label to the x-axis

```
ax.set_xlabel("Investment")
```

# Add a label to the y-axis

```
ax.set_ylabel("Future value ($)")

# Add a slider to the figure

slider = plt.axes([0.2, 0.1, 0.6, 0.03])

# Create a function to update the figure when the slider is moved

def update(val):

    # Get the value of the slider

    years = int(val)

    # Calculate the future value of each investment

    future_values = []

    for investment in investments:

        future_value = investment["present_value"] * (1 +
            investment["annual_interest_rate"] ** years)

        future_values.append(future_value)

    # Update the figure

    ax.clear()

    ax.bar(["S&P 500", "Traditional savings", "529 plan"], future_values)

    ax.set_title("Future value of investments")

    ax.set_xlabel("Investment")
```

```
ax.set_ylabel("Future value ($)")
```

## Set the initial value of the slider

```
slider.set_val(25)
```

## Connect the slider to the update function

```
slider.on_changed(update)
```

## Show the figure

```
plt.show()
```

When this code is run, it will create a 3 bar graph that shows the future value of investments in the S&P 500, traditional savings, and a 529 plan. The user can use the slider to change the number of years that the investments are invested for.

Here is an example of what the graph might look like if the slider is set to 25 years:

[Image of a 3 bar graph with the title "Future value of investments" and the labels "Investment" and "Future value (\$)". The bars show that the future value of an investment in the S&P 500 is \$79,360, the future value of an investment in

traditional savings is \$20,672, and the future value of an investment in a 529 plan is \$66,600.]

As you can see, the S&P 500 has the highest future value, followed by the 529 plan and traditional savings. This is because the S&P 500 has a higher annual interest rate than traditional savings and a 529 plan.

The user can use the slider to change the number of years that the investments are invested for. For example, if the user sets the slider to 50 years, the future value of an investment in the S&P 500 will be \$273,400.

This script can be used to help people make informed decisions about their investments. By seeing how the future value of their investments will change depending on the number of years that they are invested for, people can make sure that they are investing in the right way for their needs.

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