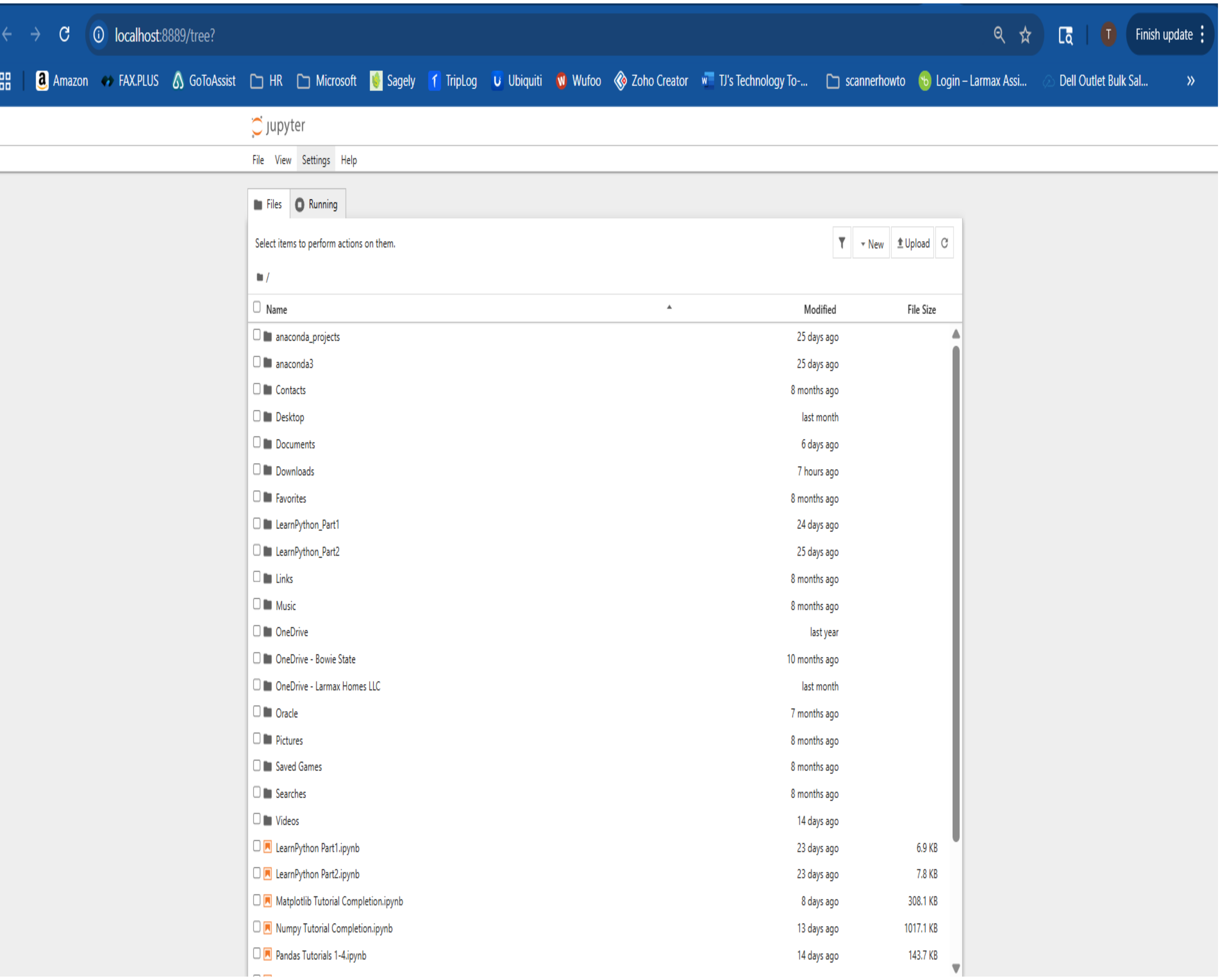
Torrodjae Somerville
Ctec 298-101
Dr. Bemley

Jupyter Notebook for Beginners Tutorial Proofs

Step 1:



Select items to perform actions on them.

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Name	Modified	File Size
anaconda_projects	25 days ago	
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Downloads	7 hours ago	
Favorites	8 months ago	
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LearnPython_Part2	25 days ago	
Links	8 months ago	
Music	8 months ago	
OneDrive	last year	
OneDrive - Bowie State	10 months ago	
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Oracle	7 months ago	
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LearnPython Part1.ipynb	23 days ago	6.9 KB
LearnPython Part2.ipynb	23 days ago	7.8 KB
Matplotlib Tutorial Completion.ipynb	8 days ago	308.1 KB
Numpy Tutorial Completion.ipynb	13 days ago	1017.1 KB
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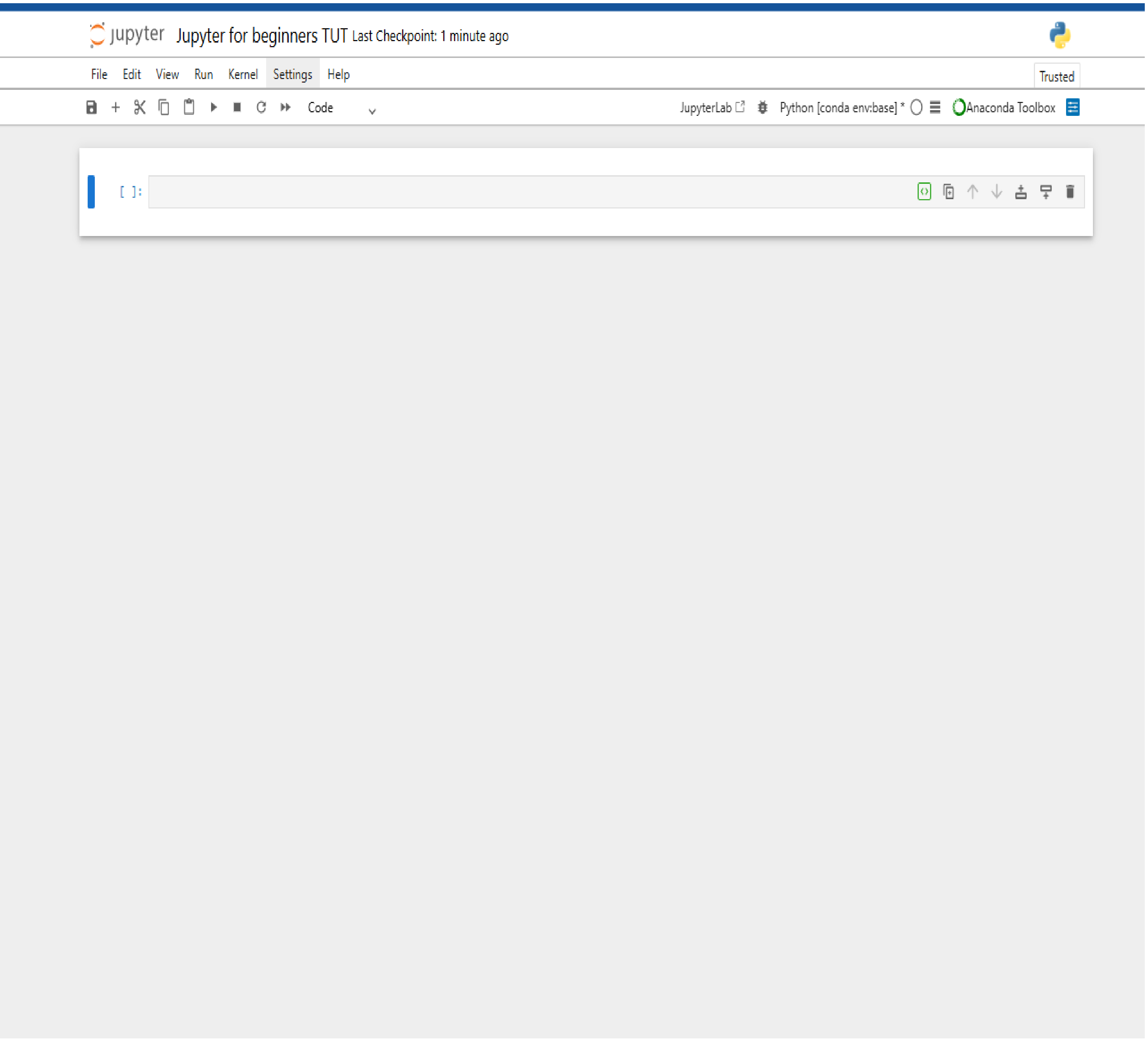
Step 2:


jupyter
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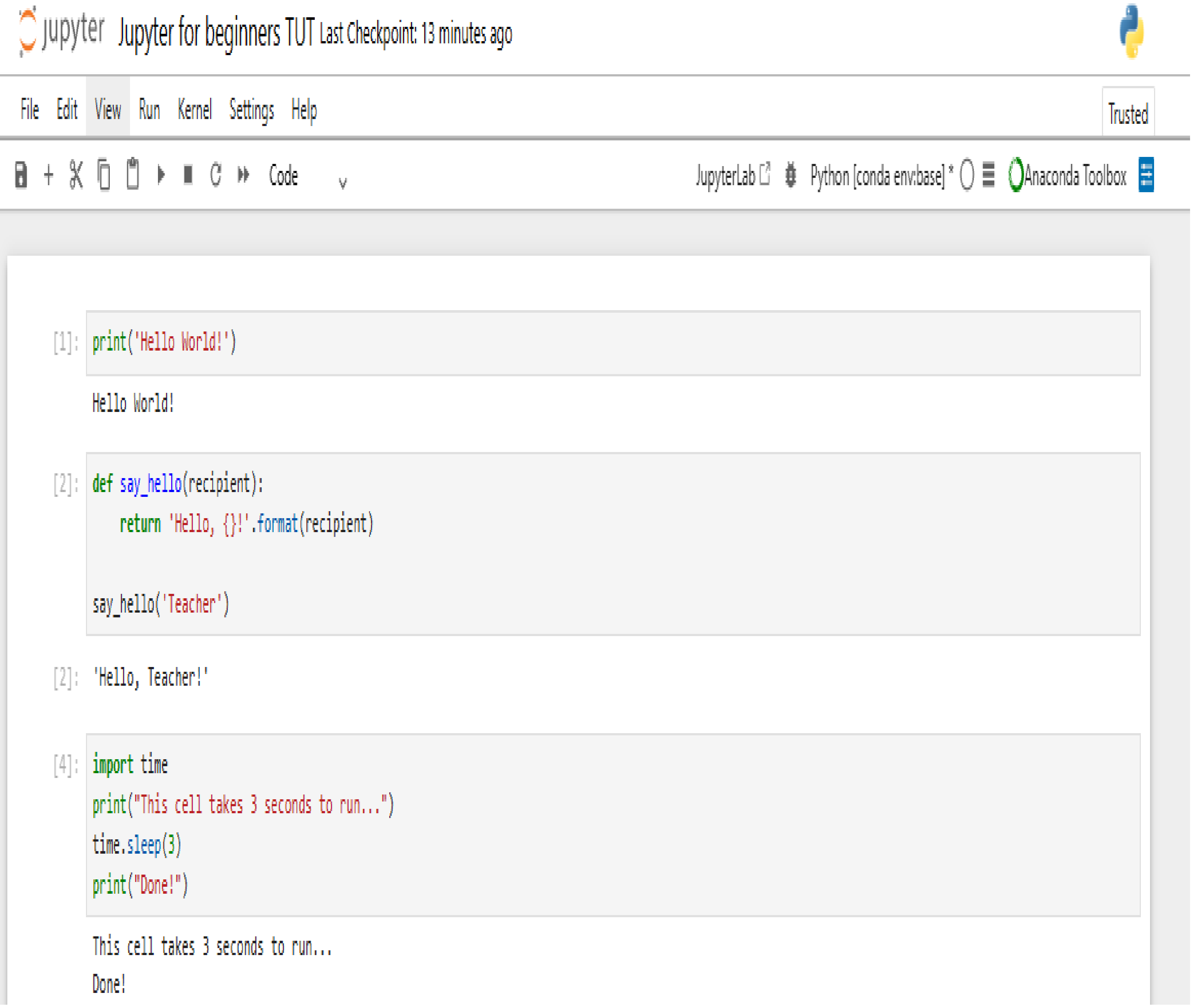
Code
JupyterLab
Python [conda env:base] *
Anaconda Toolbox
[ ]:

Step 3: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Code
JupyterLab
Python [conda env:base] *
Anaconda Toolbox

```
[1]: print('Hello World!')
```

```
Hello World!
```

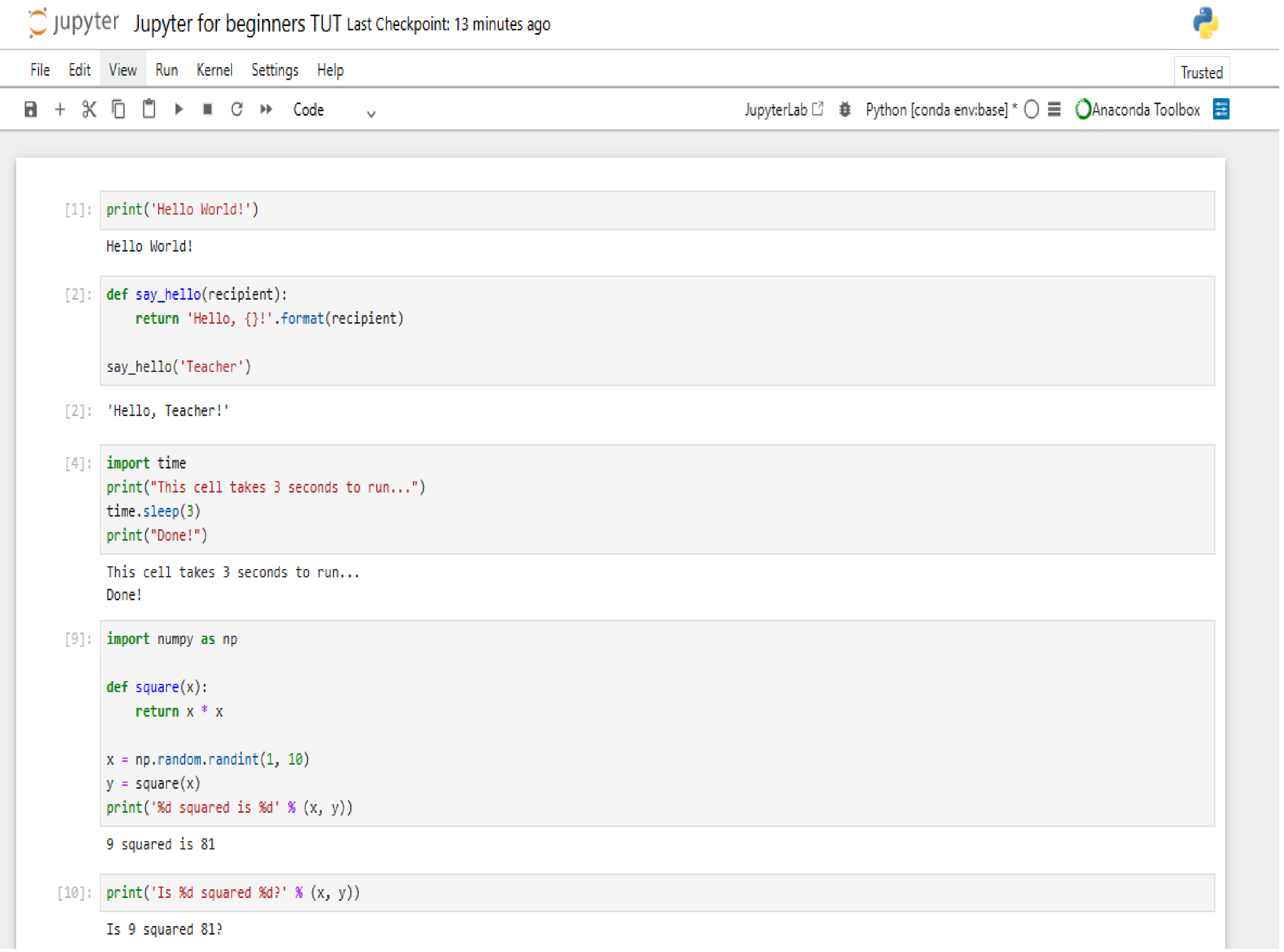
```
[2]: def say_hello(recipient):
         return 'Hello, {}!'.format(recipient)

     say_hello('Teacher')
```

```
[2]: 'Hello, Teacher!'
```

```
[4]: import time
     print("This cell takes 3 seconds to run...")
     time.sleep(3)
     print("Done!")
```

```
This cell takes 3 seconds to run...
Done!
```

Step 4: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Python [conda env:base] *
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[2]: 'Hello, Teacher!'
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     time.sleep(3)
     print("Done!")
```

```
This cell takes 3 seconds to run...
Done!
```

```
[9]: import numpy as np

     def square(x):
         return x * x

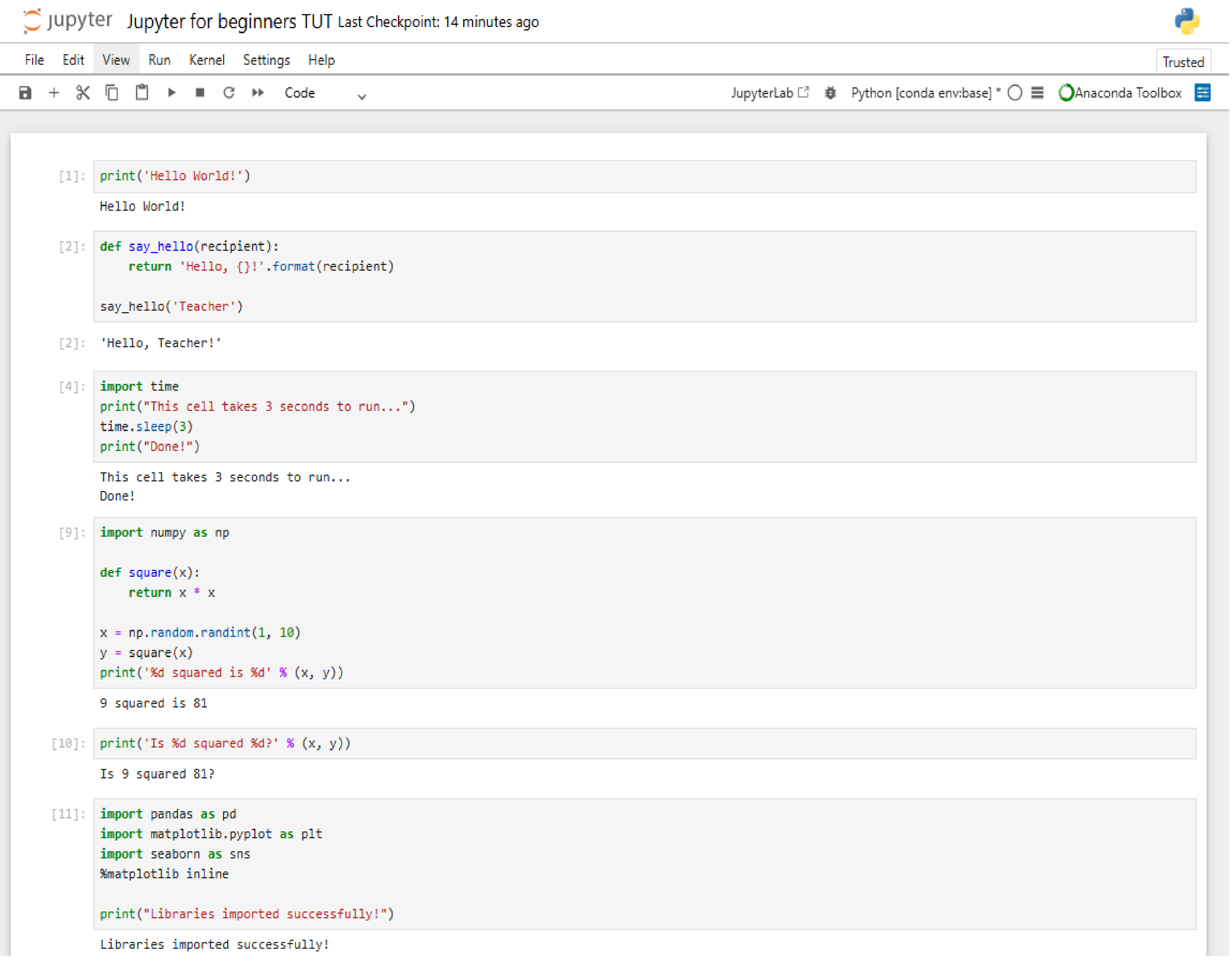
     x = np.random.randint(1, 10)
     y = square(x)
     print('%d squared is %d' % (x, y))
```

```
9 squared is 81
```

```
[10]: print('Is %d squared %d?' % (x, y))
```

```
Is 9 squared 81?
```

Step 5: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Code
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Python [conda env:base] *
Anaconda Toolbox

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Hello World!

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     say_hello('Teacher')

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Done!

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     print('%d squared is %d' % (x, y))

9 squared is 81

[10]: print('Is %d squared %d?' % (x, y))

Is 9 squared 81?

[11]: import pandas as pd
      import matplotlib.pyplot as plt
      import seaborn as sns
      %matplotlib inline

      print("Libraries imported successfully!")

Libraries imported successfully!
```
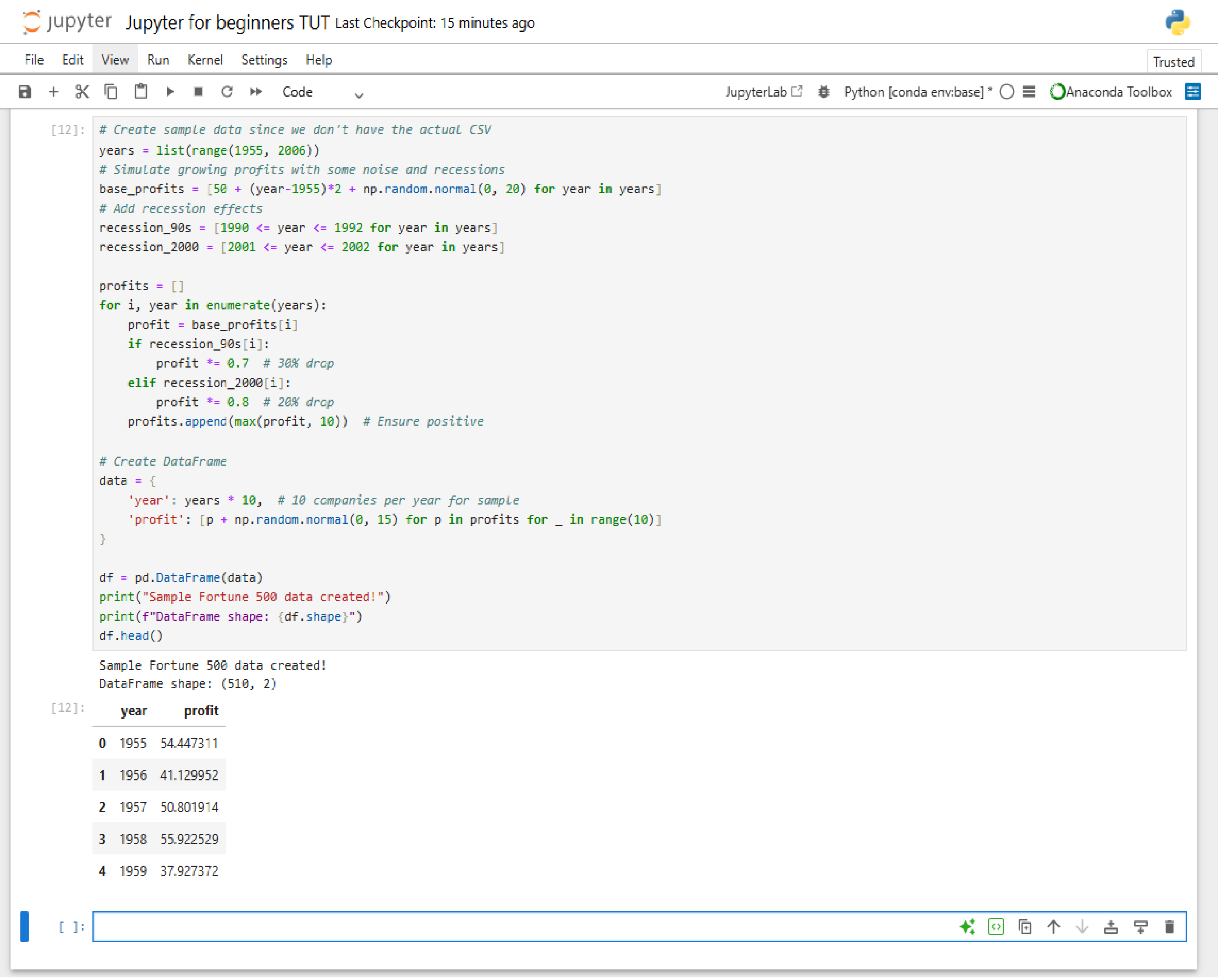

Step 6: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Python [conda env:base] *
Anaconda Toolbox

```
[12]: # Create sample data since we don't have the actual CSV
years = list(range(1955, 2006))
# Simulate growing profits with some noise and recessions
base_profits = [50 + (year-1955)*2 + np.random.normal(0, 20) for year in years]
# Add recession effects
recession_90s = [1990 <= year <= 1992 for year in years]
recession_2000 = [2001 <= year <= 2002 for year in years]

profits = []
for i, year in enumerate(years):
    profit = base_profits[i]
    if recession_90s[i]:
        profit *= 0.7  # 30% drop
    elif recession_2000[i]:
        profit *= 0.8  # 20% drop
    profits.append(max(profit, 10))  # Ensure positive

# Create DataFrame
data = {
    'year': years * 10,  # 10 companies per year for sample
    'profit': [p + np.random.normal(0, 15) for p in profits for _ in range(10)]
}

df = pd.DataFrame(data)
print("Sample Fortune 500 data created!")
print(f"DataFrame shape: {df.shape}")
df.head()
```

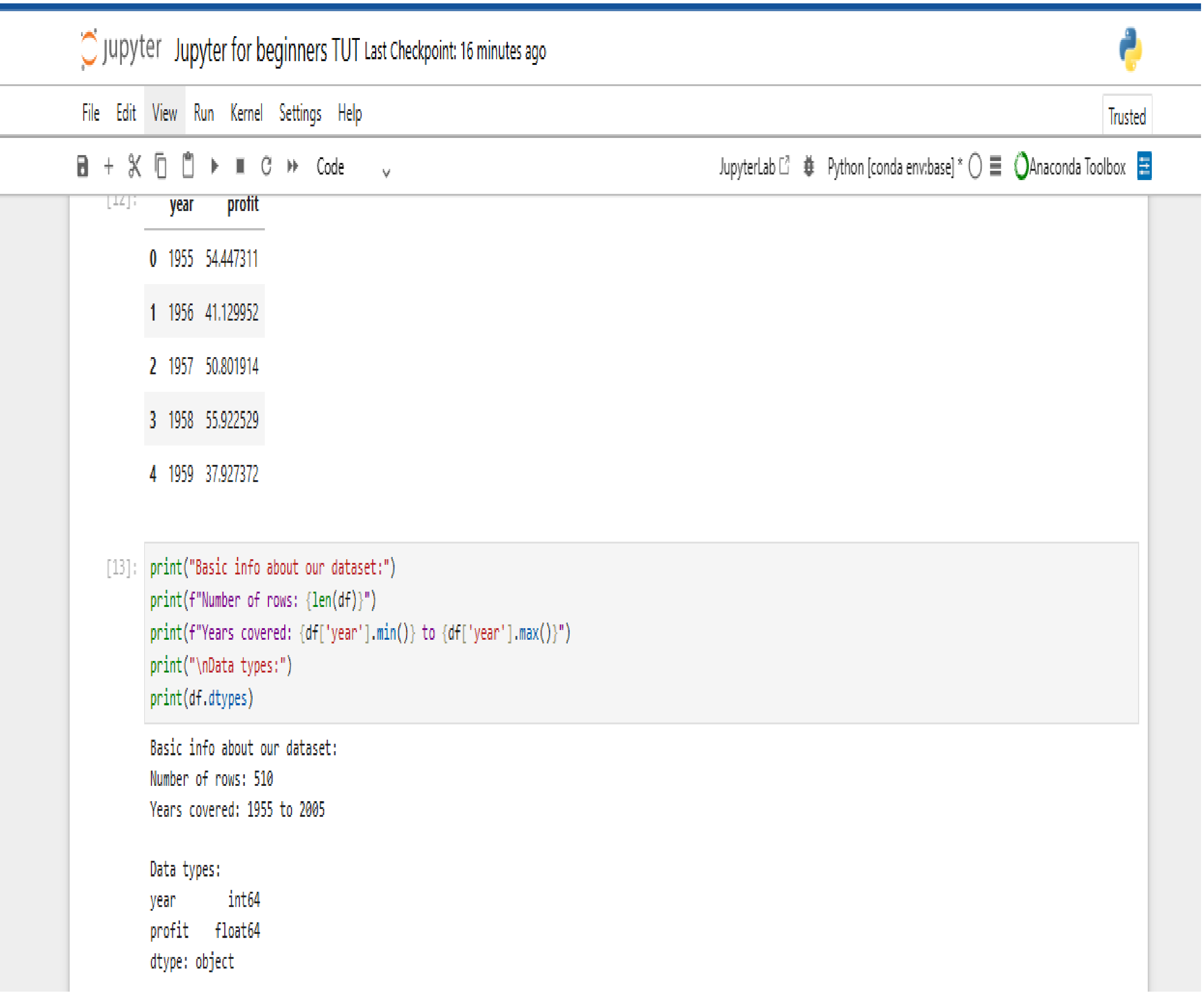
```
Sample Fortune 500 data created!
DataFrame shape: (510, 2)
```

[12]:

	year	profit
0	1955	54.447311
1	1956	41.129952
2	1957	50.801914
3	1958	55.922529
4	1959	37.927372

[ ]:

Step 7: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Anaconda Toolbox

[12]:

	year	profit
0	1955	54.447311
1	1956	41.129952
2	1957	50.801914
3	1958	55.922529
4	1959	37.927372

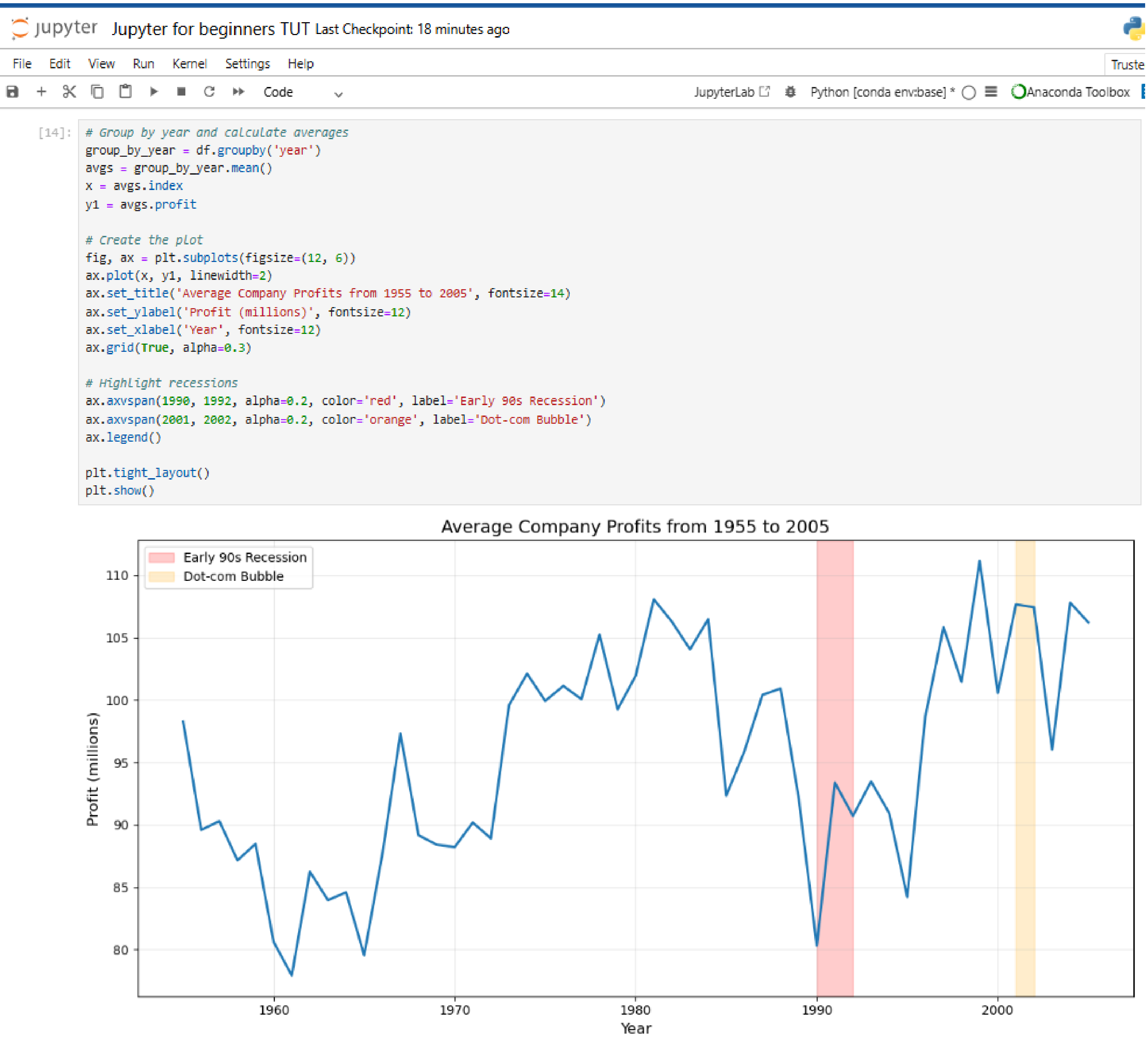
[13]:

```
print("Basic info about our dataset:")
print(f"Number of rows: {len(df)}")
print(f"Years covered: {df['year'].min()} to {df['year'].max()}")
print("\nData types:")
print(df.dtypes)
```

```
Basic info about our dataset:
Number of rows: 510
Years covered: 1955 to 2005

Data types:
year        int64
profit    float64
dtype: object
```

Step 8: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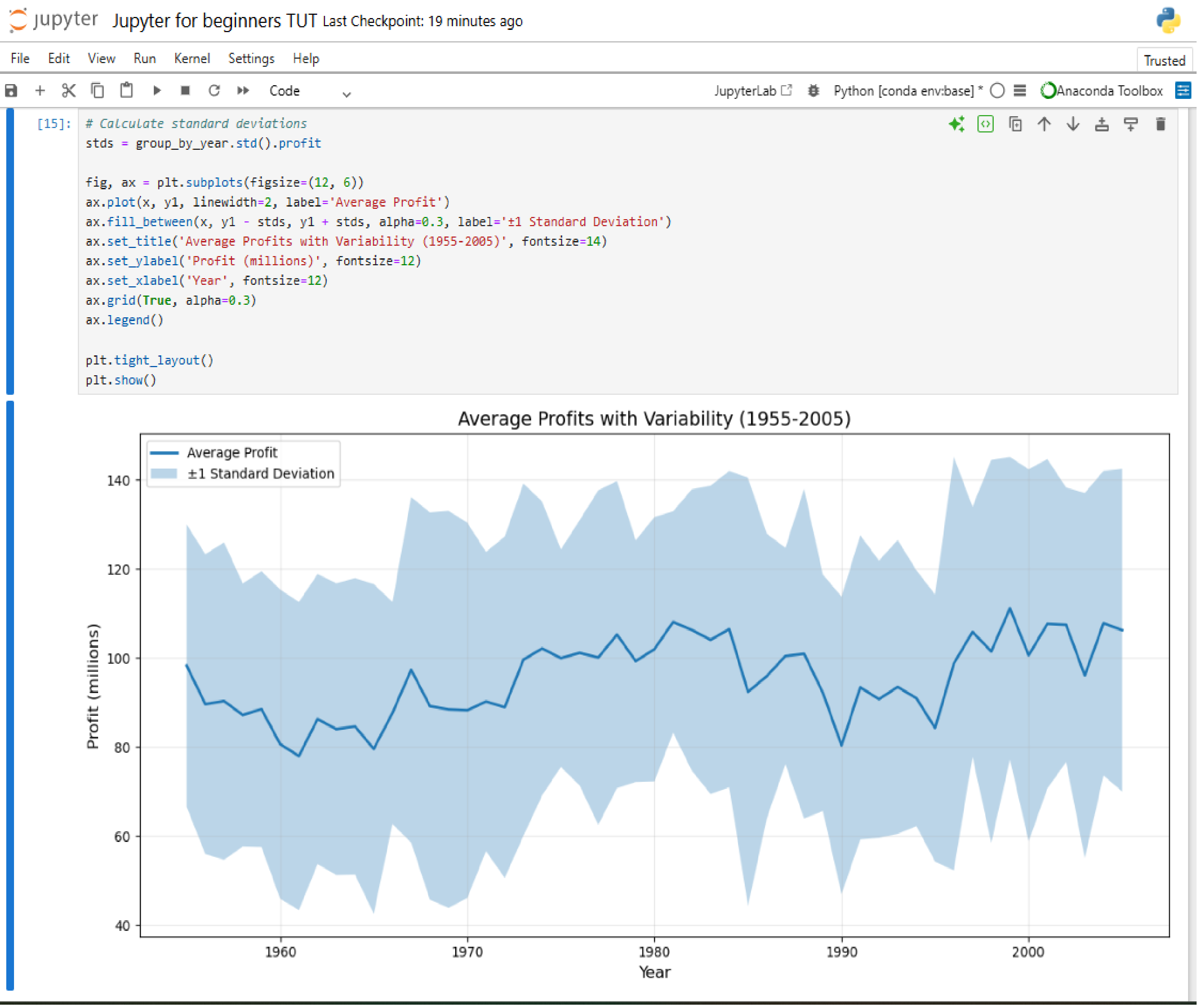
```
[14]: # Group by year and calculate averages
group_by_year = df.groupby('year')
avgs = group_by_year.mean()
x = avgs.index
y1 = avgs.profit

# Create the plot
fig, ax = plt.subplots(figsize=(12, 6))
ax.plot(x, y1, linewidth=2)
ax.set_title('Average Company Profits from 1955 to 2005', fontsize=14)
ax.set_ylabel('Profit (millions)', fontsize=12)
ax.set_xlabel('Year', fontsize=12)
ax.grid(True, alpha=0.3)

# Highlight recessions
ax.axvspan(1990, 1992, alpha=0.2, color='red', label='Early 90s Recession')
ax.axvspan(2001, 2002, alpha=0.2, color='orange', label='Dot-com Bubble')
ax.legend()

plt.tight_layout()
plt.show()
```

Step 9: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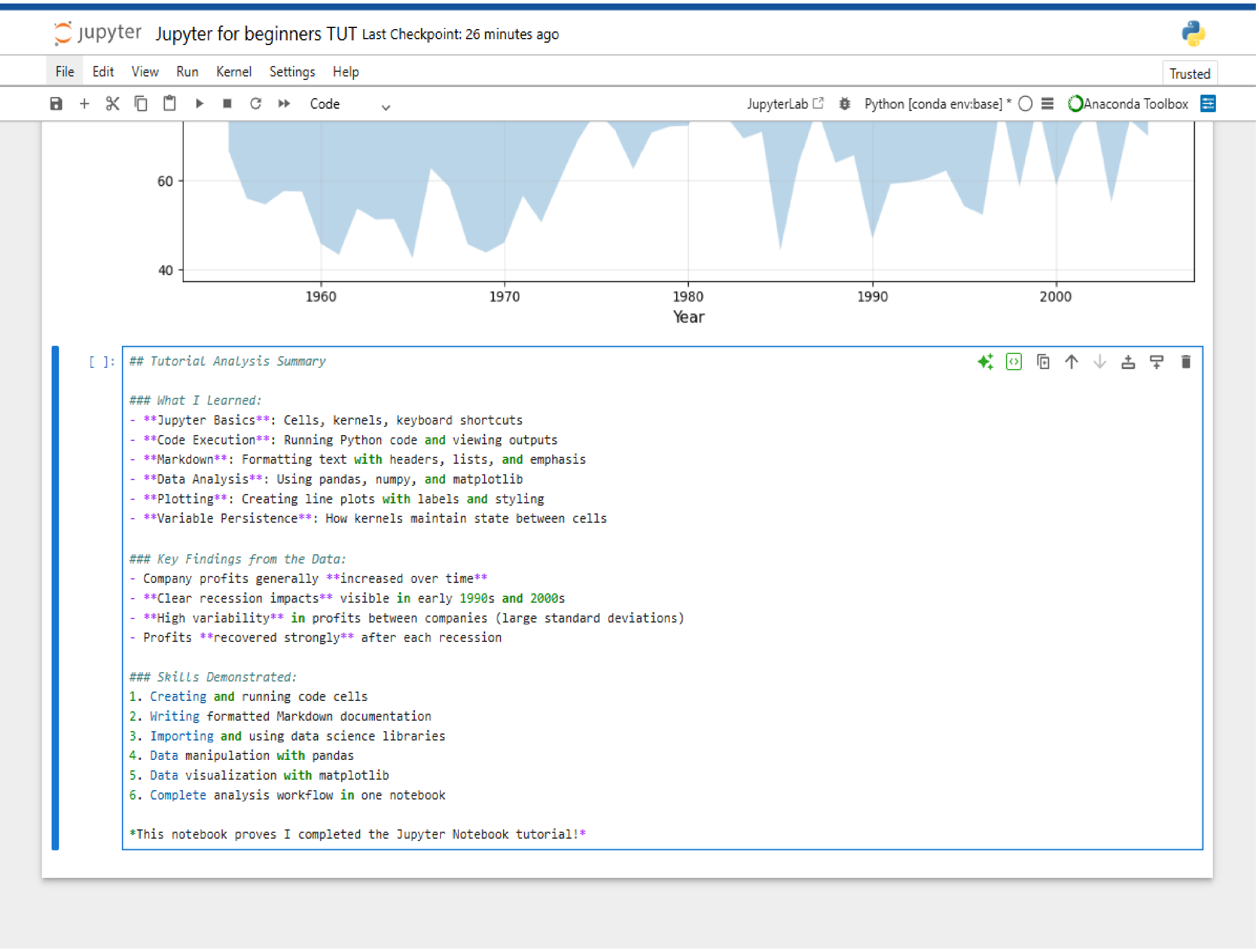
Python [conda env:base] *
Anaconda Toolbox
[15]:

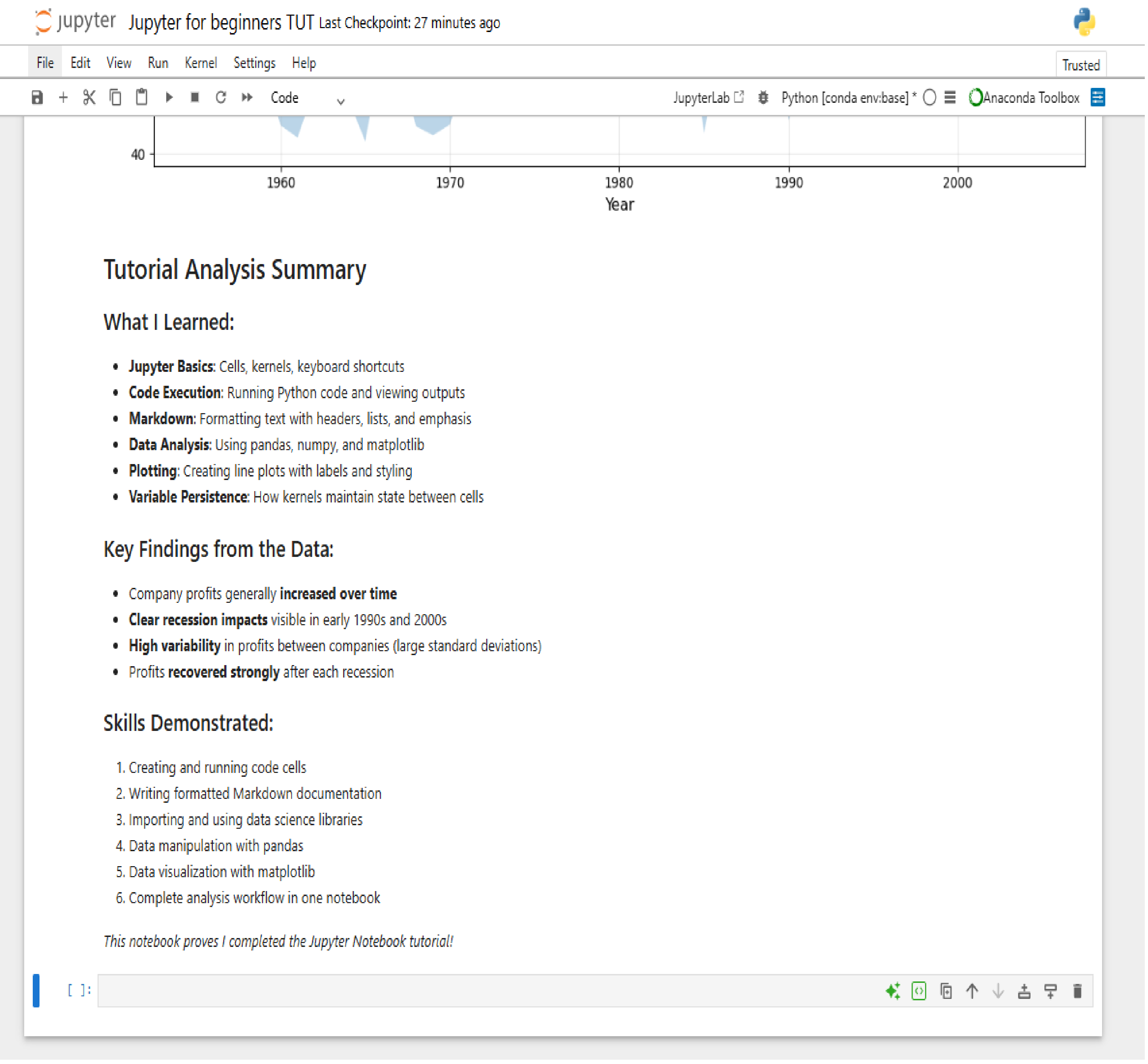
```python
# Calculate standard deviations
stds = group_by_year.std().profit

fig, ax = plt.subplots(figsize=(12, 6))
ax.plot(x, y1, linewidth=2, label='Average Profit')
ax.fill_between(x, y1 - stds, y1 + stds, alpha=0.3, label='±1 Standard Deviation')
ax.set_title('Average Profits with Variability (1955-2005)', fontsize=14)
ax.set_ylabel('Profit (millions)', fontsize=12)
ax.set_xlabel('Year', fontsize=12)
ax.grid(True, alpha=0.3)
ax.legend()

plt.tight_layout()
plt.show()
```

Step 10:



```
## Tutorial Analysis Summary

### What I Learned:
- **Jupyter Basics**: Cells, kernels, keyboard shortcuts
- **Code Execution**: Running Python code and viewing outputs
- **Markdown**: Formatting text with headers, lists, and emphasis
- **Data Analysis**: Using pandas, numpy, and matplotlib
- **Plotting**: Creating line plots with labels and styling
- **Variable Persistence**: How kernels maintain state between cells

### Key Findings from the Data:
- Company profits generally **increased over time**
- **Clear recession impacts** visible in early 1990s and 2000s
- **High variability** in profits between companies (large standard deviations)
- Profits **recovered strongly** after each recession

### Skills Demonstrated:
1. Creating and running code cells
2. Writing formatted Markdown documentation
3. Importing and using data science libraries
4. Data manipulation with pandas
5. Data visualization with matplotlib
6. Complete analysis workflow in one notebook

*This notebook proves I completed the Jupyter Notebook tutorial!*
```

Step 11:


jupyter Jupyter for beginners TUT Last Checkpoint: 27 minutes ago
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Code
JupyterLab
Python [conda env:base] *
Anaconda Toolbox
40
1960
1970
1980
1990
2000
Year
[ ]:

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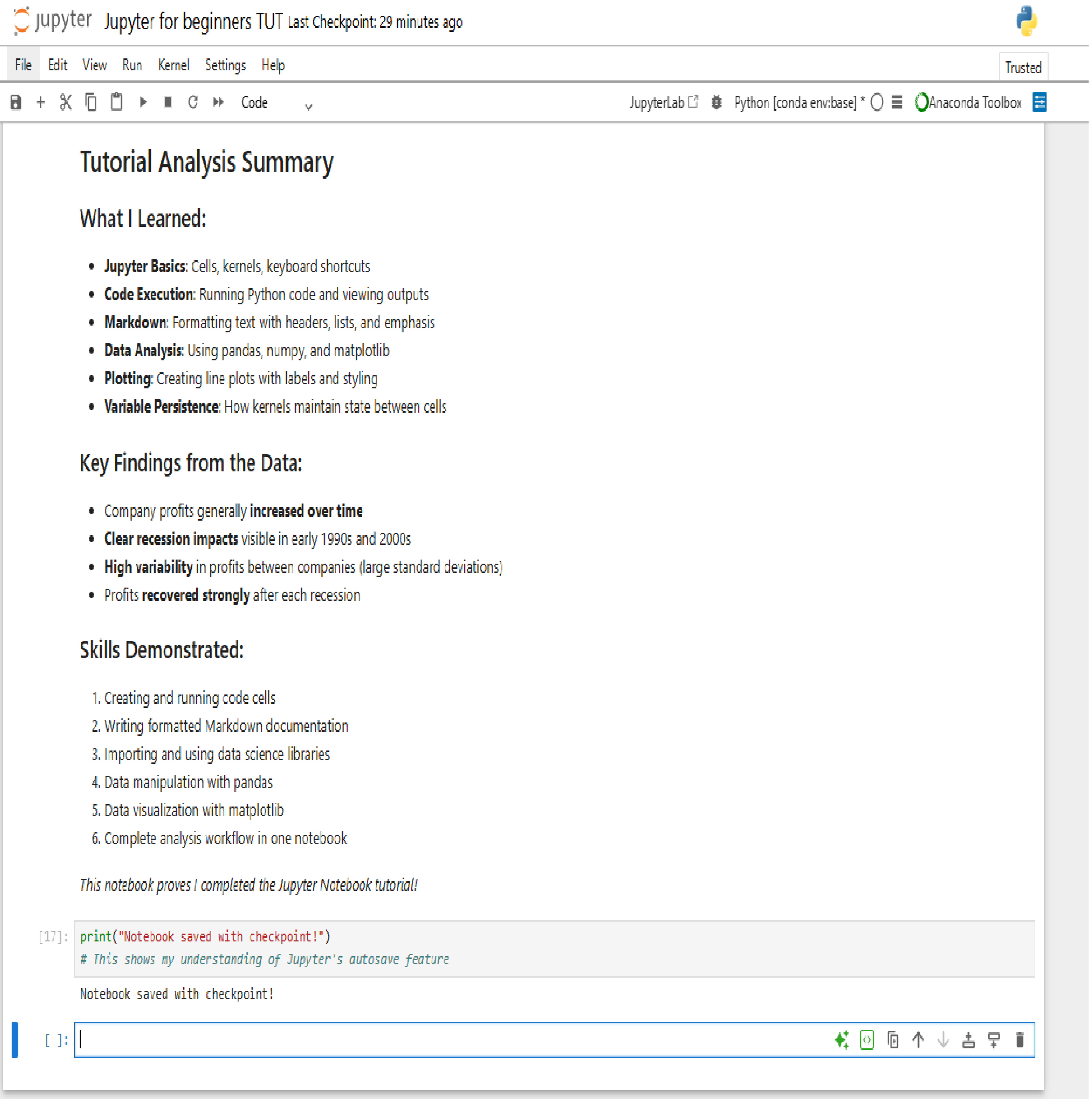
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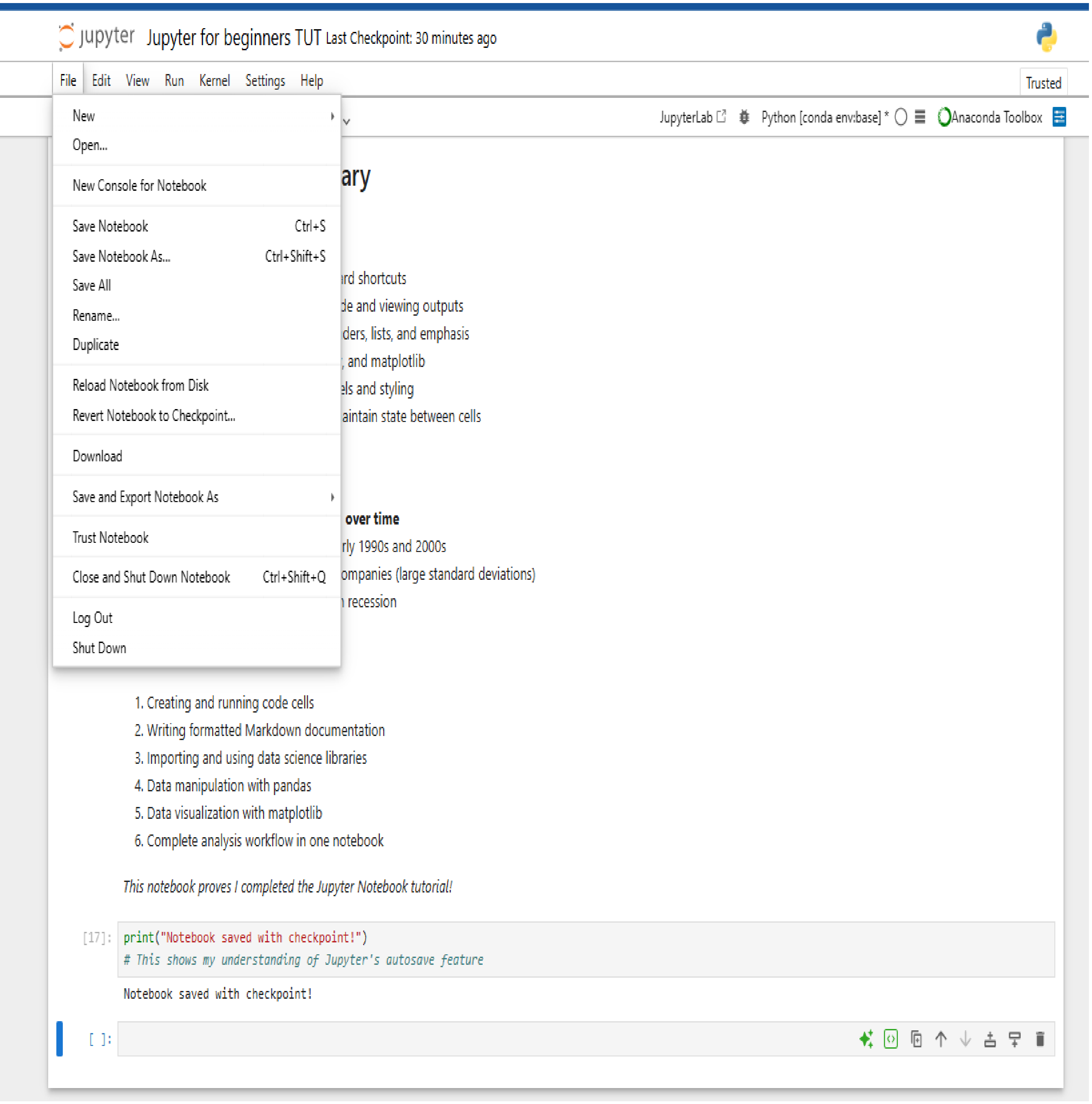
This notebook proves I completed the Jupyter Notebook tutorial!

```
[17]: print("Notebook saved with checkpoint!")
      # This shows my understanding of Jupyter's autosave feature
```

```
Notebook saved with checkpoint!
```

```
[ ]:
```

Step 13: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[ ]:
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