INTRO TO FINANCIAL CONCEPTS USING PYTHON

Budgeting Project Proposal

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Project Proposal

Your budget will have to take into account the following:

- Rent
- Food expenses
- Entertainment expenses
- Emergency fund

You will have to adjust for the following:

- Taxes
- Salary growth
- Inflation (for all expenses)

Constant Cumulative Growth Forecast

What is the cumulative growth of an investment that grows by 3% per year for 3 years?

```
In  [1]: import numpy as np
In  [2]: np.cumprod(1 + np.repeat(0.03, 3)) - 1
Out [2]: array([ 0.03, 0.0609, 0.0927])
```

Forecasting Values from Growth Rates

Compute the value at each point in time of an initial $100 investment that grows by 3% per year for 3 years?

```
In  [1]: import numpy as np
In  [2]: 100*np.cumprod(1 + np.repeat(0.03, 3))
Out [2]: array([ 103, 106.09, 109.27])
```

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Let's build it!

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Net Worth and Valuation in Your Personal Financial Life

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Net Worth

- Net Worth = Assets - Liabilities = Equity
- This is the basis of modern accounting
- A point in time measurement

Valuation

- NPV(discount rate, cash flows)
- Take into account future cash flows, salary and expenses
- Adjust for inflation

Reaching Financial Goals

- Saving will only earn you a low rate of return
- Inflation will destroy most of your savings over time if you let it
- The best way to combat inflation is to invest

The Basics of Investing

- Investing is a risk-reward tradeoff
- Diversify
- Plan for the worst
- Invest as early as possible
- Invest continuously over time

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Let's simulate it!

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The Power of Time and Compound Interest

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The Power of Time

Goal: Save $1.0 million over 40 years. Assume an average 7% rate of return per year.

```
In  [1]: import numpy as np
In  [2]: np.pmt(rate=((1+0.07)**1/12 - 1), nper=12*40, pv=0, fv=1000000)
Out [2]: -404.61
```

What if your investments only returned 5% on average?

```
In  [1]: import numpy as np
In  [2]: np.pmt(rate=((1+0.05)**1/12 - 1), nper=12*40, pv=0, fv=1000000)
Out [2]: -674.53
```

The Power of Time

Goal: Save $1.0 million over 25 years. Assume an average 7% rate of return per year.

```
In  [1]: import numpy as np
In  [2]: np.pmt(rate=((1+0.07)**1/12 - 1), nper=12*25, pv=0, fv=1000000)
Out [2]: -1277.07
```

What if your investments only returned 5% on average?

```
In  [1]: import numpy as np
In  [2]: np.pmt(rate=((1+0.05)**1/12 - 1), nper=12*40, pv=0, fv=1000000)
Out [2]: -1707.26
```

Inflation Adjusting

Assume an average rate of inflation of 3% per year

```
In  [1]: import numpy as np
In  [2]: np.fv(rate=-0.03, nper=25, pv=-1000000, pmt=0)
Out [2]: 466974.70
```

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Let's practice!

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Financial Concepts in Your Daily Life

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Congratulations

- The Time Value of Money
- Compound Interest
- Discounting and Projecting Cash Flows
- Making Rational Economic Decisions
- Mortgage Structures
- Interest and Equity
- The Cost of Capital
- Wealth Accumulation

INTRO TO FINANCIAL CONCEPTS USING PYTHON

Congratulations!