Coding Projects - Part 1

Retirement Plans (Annuity)

Assume a 30-year-old investor wants to retire in 35 years at the age of 65. He will earn 4.0% p.a. on his Investment during the Funding Phase (already fixed) and he expects to earn 3.0% p.a. on his Investment during the Payout Phase (fixed upon retirement).

How much does he have to save at the end of each month for the next 35 years in order to be able to withdraw 2,500 USD per month (at the beginning of each month) for 25 years during retirement? The Annuity Contract´s final Value shall be 100,000 USD when he is 90 years old (to cover some more years).

Amortizing Mortgage Loans

You consider to buy a new home for a Purchase Price of 400,000 USD. You have 150,000 USD in your savings account. Therefore, you require another 250,000 USD from a Bank (Amortizing Mortgage) to realize the Deal. Your local Bank quotes the following Mortgage terms:

- Initial Loan Amount shall not exceed 75% of Purchase Price.
- Fixed interest rate: 5.0% p.a. (compounded monthly)
- Initial Term with fixed interest rate is 30 years
- Outstanding Loan Amount after 30 Years shall not exceed 100,000 USD
- Loan payments (interest & amortization) shall be made monthly in arrears
- Monthly loan payments shall not exceed 1/3 of your current available monthly income of 4,800 USD.

Maximize the Loan Amount (and minimize the funding required from your savings account)!

Calculate interest component, amortization component and outstanding loan balance throughout the term and visualize!

YTM of Corporate Bonds

The XYZ Company issued a 10Y Senior Unsecured Bond one year ago with a Coupon Rate of 5.0% (annual payments in arrears). Today´s Bond Price is 107.5 (per 100 par Value).

Calculate the Bond´s current Yield-to-Maturity (YTM).

Capital Budgeting – mutually exclusive Investment Projects

Company XYZ evaluates two mutually exclusive Investment Projects (A and B) that lead to the following (estimated) increases in company cashflows/profits (in MUSD):

Project	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Project A	20	30	40	50	100	200
Project B	50	75	100	75	50	10

Both projects require an initial Investment of 200 Million USD. (to buy Machinery and Plant).

The projects are mutually exclusive. Which project should XYZ realize? Assume a company-wide required rate of return of 6.0% p.a. for comparable projects.

Calculate the (hypothetical) required rate of return where your decision would change (crossover rate). Visualize!