

## Introduction

You are expected to complete the following task within 72 hours of receiving the assignment.

## Plan Generator

In order to inform borrowers about the final repayment schedule, we need to have pre-calculated repayment plans throughout the lifetime of a loan.

To be able to calculate a repayment plan specific input parameters are necessary:

- duration (number of instalments in months)
- nominal interest rate
- total loan amount ("total principal amount")
- Date of Disbursement/Payout

These four parameters need to be input parameters.

The goal is to calculate a repayment plan for an annuity loan. Therefore the amount that the borrower has to pay back every month, consisting of principal and interest repayments, does not change (the last instalment might be an exception).

The annuity amount has to be derived from three of the input parameters (duration, nominal interest rate, total loan amount) before starting the plan calculation.

(use [http://financeformulas.net/Annuity\\_Payment\\_Formula.html](http://financeformulas.net/Annuity_Payment_Formula.html) as reference)

### Example Loan Details after annuity calculation:

Loan Amount	5000 €
Nominal Interest Rate	5.00 %
Duration	2 years
Annuity	219.36 €
Start-Date	01.01.2018

Based on this information we are able to create a repayment plan for the borrower:

Date	Annuity (Borrower Payment Amount)	Principal	Interest	Initial Outstanding Principal	Remaining Outstanding Principal
01.01.2018	219.36 €	198.53 €	20.83 €	5000 €	4801.47 €
01.02.2018	219.36 €	199.35	20.01 €	4801.47 €	4602.12 €
...	...	...	...	...	...
01.12.2019	219.28 €	218.37 €	0.91 €	218.37 €	0 €

## Calculation Basics:

1. For simplicity, we will have the following day convention: each month has 30 days, a year has 360 days.
2. Interest calculation;  $\text{Interest} = (\text{Nominal-Rate} * \text{Days in Month} * \text{Initial Outstanding Principal}) / \text{days in year}$   
e.g. first installment Interest =  $(5.00 * 30 * 5000 / 360) = 2083.33333333$  cents
3. Principal = Annuity - Interest (if, calculated interest amount exceeds the initial outstanding principal amount, take initial outstanding principal amount instead)
4. Borrower Payment Amount (Annuity) = Principal + Interest

## Output:

The application shall print the plan in the format you feel most comfortable with (CSV, JSON,...).

## Optional:

If you still have time, feel free to add the following additional functionality:

Implement a web service that has one endpoint to generate a borrower plan via HTTP in JSON.

Feel free to use any web service you are most comfortable with.

e.g. <http://localhost:8080/generate-plan> (POST)

## payload:

```
{
  "loanAmount": "5000",
  "nominalRate": "5.0",
  "duration": 24,
  "startDate": "2018-01-01T00:00:01Z"
}
```

## response:

```
{
  [
    {
      "borrowerPaymentAmount": "219.36",
      "date": "2018-01-01T00:00:00Z",
      "initialOutstandingPrincipal": "5000.00",
      "interest": "20.83",
      "principal": "198.53",
      "remainingOutstandingPrincipal": "4801.47",
    },
    {
      "borrowerPaymentAmount": "219.36",
      "date": "2018-02-01T00:00:00Z",
      "initialOutstandingPrincipal": "4801.47",
      "interest": "20.01",
      "principal": "199.35",
      "remainingOutstandingPrincipal": "4602.12",
    },
    ...
    {
      "borrowerPaymentAmount": "219.28",
      "date": "2020-01-01T00:00:00Z",
      "initialOutstandingPrincipal": "218.37",
      "interest": "0.91",
      "principal": "218.37",
      "remainingOutstandingPrincipal": "0",
    }
  ]
}
```

## Closing Remarks:

Please design and implement the task in Java 8 as a Maven project. The usage of any third-party libraries to complete the core functionality is not allowed - we do not want to introduce additional

transitive dependencies. This rule does not apply if third-party tools or libraries are a core foundation of the solution (might apply for test automation). Together with the implementation please provide a short description for other developers on how to integrate and use this tool. Please, upload your project to <https://github.com/> and provide us with the link to the repository.