Part 3: Practice Expressions

Exercise Instructions

This challenge is all about coding up some simple expressions which will calculate the loan amount repayable.

Step 1: Update the Code

Add code to work out the total amount repayable just using expressions.

The first thing we'll do is modify the values of the variables that we have so far, so that they're easier to think about and 'see' with each expression that's evaluated that we're getting the right result *(we'll step through with the debugger in the end step, so choosing sensible 'easier' values should make it easy to see if we're on the right track)*:

- Adjust your input variables to take the following simpler values:

Variable Description	New Value
loan amount	100
number of years	5
interest rate	10.0

We're now going to calculate how much it costs a 5 year loan for $100 at 10% interest per year.

The math is straightforward enough: after year 1, we owe the original $100 borrowed, plus interest at 10%.

A way of calculating a value with interest added is:

(amount) x (interest rate multiplier)

e.g. $100 x 1.1 = $110

So how do we work out the interest rate multiplier?

Well, look at the number 10 which represents 10%. To get the decimalised version of this, just divide by 100:

10% = 10 / 100 = 0.1 as a decimalized version

So for example, 10% of $100 = $100 x 0.1 = $10

Now, to 'scale up' a value to add interest, we just add 1.0 to the decimalised interest value:

So for example, $100 increased by 10% = $100 x 1+0.1 = $100 x 1.1 = $110

This means that we can calculate the amount owed for each year by scaling up the preceding years amount by the interest rate:

Year	Calculation
End of Year 1	loan amount, scaled up by 10% (= loan amount x 1.1)
End of Year 2	end of year 1 amount, scaled up by 10%
End of Year 3	end of year 2 amount, scaled up by 10%
End of Year 4	end of year 3 amount, scaled up by 10%
End of Year 5	end of year 4 amount, scaled up by 10%

- Under the variable definitions:
    - Add an expression to calculate the **interest rate multiplier** (the value you can 'scale' an amount by to increase it by the interest rate
    - Add an expression to calculate the **year 1 amount repayable**.
    - Add further expressions to calculate the **amounts repayable at years 2 through 5** (the year 5 value is now the final total repayable amount due)

Step 2: Debug the Program

Debug the program to ensure that the expressions evaluate to calculate the result.

Just like in the last challenge, it's always good to check our work:

- Set a breakpoint at the point where you create the first expression.
- Right-click the `main` method and select **Debug > App.main()**.
- While looking at the debug window, press F8 (or select **Run > Step Over** from IDEA's menu) and observe the expressions as they're being evaluated, validating mentally that they look right as you do so.