Exercises for
Database Implementation
TUM

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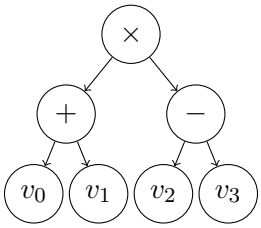
Assignment 6 (Optional)

Excercise 1 (LLVM Code Generation, 10 Bonus Points)

Based on the simple LLVM example program (`fibonacci.cpp`, see our class website), create an LLVM-based "subscript"-compiler for simple binary arithmetic expressions. Example: $(v_0 + v_1) \times (v_2 - v_3)$, in tree representation:



Write a function similar to `CreateFibFunction` that takes an `llvm::Module` (like `fibonacci.cpp`), an `llvm::LLVMContext` (like `fibonacci.cpp`) and the root of a binary arithmetic expression tree as parameters. The tree's nodes contain the operators $\times$,$\div$,$+$,$-$, constants and variables $(v_0, \ldots, v_{n-1})$.

The function generates a function f that can be called with n integer argments and returns the result of the expression, e.g. in the example above $f(1, 2, 5, 2)$ returns 9 (since $(1 + 2) \times (5 - 2) = 9$).

Your code may be completely independent from your database system's code base.