

## Q1

My 3 major helper functions were going to be `computeEnv`, `computeColumn` and `findAndComputeColumn`.

### **`computeEnv`**

`computeEnv` is supposed to take the first list of the input spreadsheet of all definitions and return an environment. According to `P1Types.hs` a definition will contain a key and `DeerLang` expression. `computeEnv` recurses through the list of definitions and uses its own helper function to evaluate all the `DeerLang` expressions and insert it into an environment.

### **`computeColumn`**

`computeColumn` is supposed to take the list of columns that Spreadsheet inputs and return a list of `ValCol`. This function recurses through the list of columns and stores all the `ValCol` in a pseudo environment (because an actual environment takes a `Value` as data). All the `ComputedCol` is passed to `findAndComputeColumn` to be calculated using the expression provided.

### **`findAndComputeColumn`**

`findAndComputeColumn` is supposed to take in a `computeColumn` and a list of `ValCol` and an environment from `computeEnv` to use this data to compute the values that are supposed to be in the `ComputedCol`. I didn't have time to finish this function because this is the fifth assignment I have to hand in 2 weeks.

## Q2

Being able to split input data into sub variables (`Builtin str expr`) is quite useful because Haskell does not allow `builtin.str` or `builtin.expr` also type based pattern matching is quite useful. The challenges with using Haskell is mainly not having access to loops and not being able to easily check a variable inside a piece of data. For example if I had a list of classes in Python and in those classes there is a variable named `var`. If I wanted to find the class where `var` equal to some value, I could simply iterate through it and check it. But Haskell doesn't have either functionality. I have to write a recursive function that recurses through it and return if the value matches. This is a lot of work that I'm not used to doing for a simple task.

## Q3

I wrote all the code by myself, no one that cheats would have a quarter of an assignment written.