Software Homework Exercise

Question 1

Suppose you had a program as follows:

```
>>> def f(x, y):
...     return x * 2 + y
```

that was represented by instructions as follows:

```
        LOAD_VARIABLE x
        LOAD_CONSTANT 2
        MULTIPLY
        LOAD_VARIABLE y
        ADD
        RETURN
```

How could you best represent instructions such as this as a set of python data structures? Try representing the above list of instructions using your newly defined data structure.

Question 2

Can you write a function `evaluate` that takes instructions as input, and evaluates them on some data? Try running your `evaluate` function with x=2 and y=3.

Question 3

How could you represent conditionals like `if` statements with instructions?

Write down a possible set of instructions for:

```
        >>> def f(x, y):
        ...     if x < 0:
        ...         return 0
        ...     return x * 2 + y
```

Question 4

Update your interpreter (as a separate copy below) to support conditionals and try it out on the instructions for the example above.

Question 5

Describe at a high level what amendments would be needed in terms of instructions and interpreter support if your language were to support `while` loops.

Question 6

Describe at a high level how your language and interpreter could support function calls.