CS196

#5

CS196

Announcements

Team Meeting 1

Homework 3 :)

Today's Lectures

Programming Languages

Python - Loops and Arrays

CS196

Programming
Languages

"The diversity of languages is not a diversity of signs and sounds but a diversity of views of the world."

Von Humboldt

"[Programming languages] powerfully condition all our thinking about social problems and processes. Human beings ... are very much at the mercy of the particular language which has become the medium of expression for their [codebase]."

Sapir.... paraphrased

Pathfinding: Python vs Prolog

```python
def dfs(graph, start):
    visited, stack = set(), [start]
    while stack:
        vertex = stack.pop()
        if vertex not in visited:
            visited.add(vertex)
            stack.extend(graph[vertex] - visited)
    return visited
```

```prolog
path(X,Y).
path(X,Y) :- connected(X,Z),
             path(Z,Y).
```

Quicksort: C++ vs Haskell

```cpp
template <typename T>
void qsort (T *result, T *list, int n)
{
    if (n == 0) return;
    T *smallerList, *largerList;
    smallerList = new T[n];
    largerList = new T[n];
    T pivot = list[0];
    int numSmaller=0, numLarger=0;
    for (int i = 1; i < n; i++)
        if (list[i] < pivot)
            smallerList[numSmaller++] = list[i];
        else
            largerList[numLarger++] = list[i];

    qsort(smallerList,smallerList,numSmaller);
    qsort(largerList,largerList,numLarger);

    int pos = 0;
    for ( int i = 0; i < numSmaller; i++)
        result[pos++] = smallerList[i];

    result[pos++] = pivot;

    for ( int i = 0; i < numLarger; i++)
        result[pos++] = largerList[i];

    delete [] smallerList;
    delete [] largerList;
};
```

```haskell
qsort :: (Ord a) => [a] -> [a]
qsort []     = []
qsort (x:xs) = qsort less ++ [x] ++ qsort more
    where less = filter (<x)  xs
          more = filter (>=x) xs
```

(via https://wiki.haskell.org/Why_Haskell_matters)

Static Typing
vs
Dynamic Typing

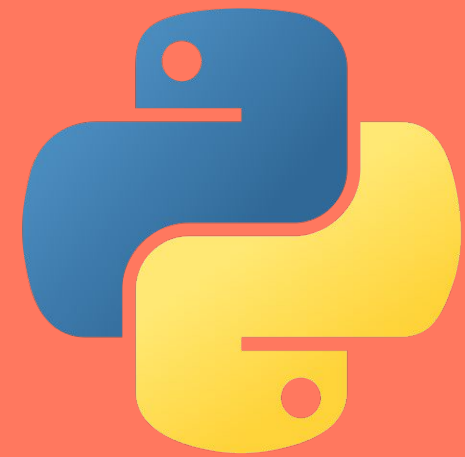# Imperative vs Functional

Low Level
vs
High Level

Compiled vs Interpreted

Object Oriented

"The problem with object-oriented languages is they've got all this implicit environment that they carry around with them. You wanted a banana but what you got was a gorilla holding the banana and the entire jungle."

Joe Armstrong

python™

JS

C

C++

C#

Prolog

Lisp

ERLANG

Rust, Go, Swift