

## CS\_191 Functional Programming I

# Programming Laboratory 3

### Pairs and lists

In this Programming Laboratory session at least **two** out of the three Exercises must be solved. As always, you may work in pairs.

When your solutions are complete, please show them to a lab supervisor for assessment. You are expected to be able to explain your solutions and run the functions you defined with some test data.

**Exercise 1** Suppose we represent a point in the two-dimensional plane by a pair of floats

```
type Point = (Float,Float)
```

Define the following operation:

- (a) The distance of two points.
- (b) Reflection of a point at the
  - $x$ -axis,
  - $y$ -axis,
  - diagonal,
  - origin.
- (c) scaling a point by a factor.

**Exercise 2** Define a function `move` that takes a list and moves its first element to the end of the list. If the given list is empty, an error should be raised.

For example, `move [1,2,3,4]` should evaluate to `[2,3,4,1]`.

**Exercise 3** Define a function `mkindex` that takes a list and computes the list of the elements of the list paired with their positions in the list.

For example, `mkindex "hello"` should evaluate to `[('h',0),('e',1),('l',2),('l',3),('o',4)]`.