

FP Lab 6

1 Getting started with Scala

- The `scala` command starts an interactive shell where Scala expressions are interpreted interactively.

```
$ scala
Picked up _JAVA_OPTIONS: -Xmx1g
Welcome to Scala version 2.10.2 (OpenJDK 64-Bit Server VM, Java 1.7.0_51).
Type in expressions to have them evaluated.
Type :help for more information.
```

```
scala>
```

- The `scalac` command compiles a Scala source file (eg, `HelloWorld.scala`, available from Moodle) and generates Java bytecode which can be executed (eg, `HelloWorld.class`). The Scala compiler works similarly to `javac`.

```
$ scalac HelloWorld.scala
$ scala HelloWorld
Hello, world!
```

- You may also consult the following documents which can be helpful (links available from Moodle):
 - ‘Getting started’ with Scala
 - Scala ‘cheatsheet’
 - Scala tutorial for Java programmers

2 Exercises

1. (a) Make a class `Employee` with a name and salary. Override the `toString` method so that, when applied to an object `e` of `Employee`, it returns the string

```
Employee[name=#1, salary=#2]
```

where `#1` and `#2` are the name and the salary of `e`, respectively.

- (b) Make a class `Manager` that extends `Employee`. Add an instance field, named `department`, of type `String`. Supply a method `toString` that prints the manager's name, department, and salary.
 - (c) Make a class `Executive` that extends `Manager`. Supply the appropriate `toString` method.
 - (d) Supply a test program that tests these classes and methods.
2. Define the following functions in Scala and use its interpreter to test that each of them is well-defined.
- (a) `factors : (n:Int)List[Int]` that, for any `n`, returns the list of factors of `n`.
 - (b) `prime : (n:Int)Boolean` that decides whether the input is a prime number.
 - (c) `primes : (n:Int)List[Int]` that, for any `n`, returns the list of the prime numbers that are less than or equal to `n`.
- (Hint: Use for-comprehension to define (2a) and (2c).)
3. Write a program that prompts the user for an integer, reads it, and then prints out all prime numbers up to that integer. (Hint: You may use `readInt` and `println` to read an integer and print a line, respectively.)