

CS 94SI Assignment #1 – Pure Functional Programming

Due: Before class on Wednesday, April 9, 2008

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Exercise 0 – Setting up Scala

1. Installing Scala

Instructions for Mac, Linux, Unix:

- Visit: <http://www.scala-lang.org/downloads/index.html>
- Download the Unix tarball
- Unpack into /usr/local (or directory of your choice)
- Add /usr/local/scala-2.7.0-final/bin to your PATH

Instructions for Windows:

- Visit: <http://www.scala-lang.org/downloads/index.html>
- Download the Java Installer
- Users of Windows Vista must run the Installer as Administrator; right-click the "Command Prompt" application and select "Run as administrator". Navigate to the directory containing the jar-installer, and type "java -jar scala-2.7.0-final-installer.jar".
- Run the Java Installer

2. Running Scala

Run “scala-2.7.0-final/bin/scala” (scala.bat if you’re on Windows) to start the Scala interpreter. Try some basic expressions:

```
jorge-ortizs-macbook-pro-2:~ jeortiz$ scala
```

```
Welcome to Scala version 2.7.0-final (Java HotSpot(TM) Client VM, Java 1.5.0_13).
```

```
Type in expressions to have them evaluated.
```

```
Type :help for more information.
```

```
scala> 1 + 1
```

```
res0: Int = 2
```

```
scala> 1 < 0
```

```
res1: Boolean = false
```

```
scala> 10 * 10
```

```
res2: Int = 100
```

```
scala> val timesTwo = (x: Int) => x * 2  
timesTwo: (Int) => Int = <function>
```

```
scala> timesTwo(10)  
res3: Int = 20
```

Nothing needs to be turned in for this exercise.

Exercise 1 – Sets as Functions

You can work directly in the Scala interpreter. When you are done, you can paste your code into a file called “assignment1.scala” to e-mail to us. We will cover compiling Scala programs next week.

In this exercise we will represent sets as functions from Ints to Booleans:

```
type Set = Int => Boolean
```

The "type" keyword in Scala defines an alias for a specific type. Here, the Set type is defined to be the type of functions from Int to Boolean.

- a) Write a function "set" that takes an Int parameter and returns a Set containing that Int.
- b) Write a function "contains" that takes a Set and an Int as parameters and returns true if the Int is in the Set and false otherwise.
- c) Write the functions "union", "intersect", and "minus" that take two Sets as parameters and return a Set.
- d) Can you write a function "subset" which takes two Sets as parameters and returns true if the first is a subset of the second and false otherwise?

Exercise 2 – The Scala Language Specification (SLS)

The Scala Language Specification (SLS) (<http://www.scala-lang.org/docu/files/ScalaReference.pdf>) is the definitive reference for the Scala language. We don't expect you to understand everything in the document at this point, but knowing how to consult a language reference when necessary is an important skill. Skim through the SLS, find one thing that you think is *interesting*, e-mail it to us with your answers to Exercise 1, and be prepared to discuss it in class next week.