SCALA CHEAT SHEET

functional programming

1. functions are first-class values
2. immutable data, no side effects

variables

```
var x = 1      // mutable
val x = 1      // immutable
val s = “foo”  // implicit type
val i:Int = 1  // explicit type
```

loops

```
while (i < foo) {
  println(i)
}

do {
  // stuff
} while (condition)

for (arg <- args) println(arg)
for (i <- 0 to 5) println(i)
for (i <- 0 until 10 by 2)
  println(i)

for (
  file <- files
  if file.isFile
  if file.getName.endsWith(“.a”)
) doSomething(file)

args.foreach(arg => println(arg))
args.foreach(println(_))
args.foreach(println)
```

control structures

```
if (a == b) foo()
if (a == b) foo else bar
if (a == b) {
  foo
} else if (a == c) {
  bar
} else {
  baz
}

‘==’ is not reference equality

foo match {
  case “a” => doA()
  case “b” => doB()
  case _   => doDefault
}
```

functions

```
def hello(s: String): Unit = {
  println(“Hello “ + s)
}
def hello: Unit = println(“Hello”)
def hello = println(“Hello”)
// not recommended
def hello { println(“Hello”) }

// variable length args
def foo(args: String*) = {
  args.foreach(...)

// named args
point(x=10, y=20)

// can call without a dot or parens if
// it takes only one param
var x = f.add(10)
var x = f add 10

// function literal syntax
(x: Int, y:Int) => x + y

- functions return last value computed
  by method
- if name ends in ‘:’, invoke on right
  operand
- ‘+’ is a method on Int, String
- apply(), update()
```

data types

```
val names = Array(“Al”, “Bob”)
val names = new Array[String](5)
val names = Map(99676 -> “AK”)

val names = List(“Al”, “Bob”)
val names2 = “Joe” :: names

// tuples
val things = (100, “Foo”)
println(things._1)
println(things._2)
```

collections

```
Sequence, List, Array, ListBuffer,
ArrayBuffer, StringOps, Set, Map,
TreeSet, Stream, Vector, Stack,
Queue, Range, BitSet, ListMap, more

- Tuples can hold different objects
- Mutable and immutable collections
- traits: Traversable, Iterable, Seq,
  IndexedSeq, LinearSeq, Buffer
```

try, catch, finally

```
try {
  something
} catch {
  case ex: IOException => // handle
  case ex: FileNotFoundException =>
    // handle
} finally { doStuff }
```

classes and objects

```
package foo.bar

import java.io.File
import java.io._
import java.io.{Foo, File => Bar}

class A { ... }
class A (s: String) { ... }
class A (val s: String) { ... }
class A (private val s: String) { ... }
class A (var s: String) { ... }

class Person (s: String) {
  require(name != “Joe”)
  val name: String = s
  private val a = “foo”
}
class Bird extends Animal with Wings {
  override val foo = true
}

// singleton objects
object Foo {
  def main(args: Array[String]) = {
    args.foreach(println)
  }
}
object Bob extends Person { ... }

// abstract class
abstract class Person {
  // method with no implementation
  def walk: Unit
}

class Employee(name: String)
extends Person {
  ...
}

// sealed class - no new subclasses
// unless defined in current file
sealed sbstract class Foo { ... }
case class Bar(s: String) extends Foo
```

traits

```
traits like class except:
1 - no class params
2 - super dynamically bound

trait Talks {
  def speak() {
    println(“Yada yada yada...”)
  }
}

class A { ... }
trait T1 { ... }
trait T2 { ... }
class B extends T1 { ... }
class C extends A with T1 with T2
```

scripts

```
println(args(0))
println(args.toList)
args.foreach(println)
scala foo.scala

#!/bin/sh
exec scala "$0" "$@"
!#
object Hello {
  def main(args: Array[String]) {
    args.foreach(println)
  }
}

// Application trait
object Hello extends Application {
  args.foreach(println)
}
```

underscore

```
“think of _ as a blank that needs
to be filled in”

strings.map(_.toUpperCase())
(1 to 10).map(_*2)

args.foreach(println(_))
args.foreach(println)

numbers.filter(_ < 10)

// for each element in the array
println(array: _*)
```

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scala cheat sheet

case classes

```
abstract class Expr
case class Var(name: String) extends Expr
case class Num(num: Double) extends Expr
```

scala adds syntactic conveniences:

1) adds a factory method with the name of your class
2) all args in param list implicitly get a val, and become fields
3) add implementations of toString, hashCode, and equals
4) adds a copy method

examples:

```
1) val v = Var(“x”)
2) v.name
3) println(v) (shows toString),
   ‘==’ works
4) v.copy
```

see http://www.scala-lang.org/node/107

case, match

selector match { *choices* }

_ is the ‘wildcard pattern’

```
def f(x: Int): String = x match {
  case 1|2|3 => “1-2-3”
  // default
  case _ => “huh?”
}

def f(x: Any): String = x match {
  case 1 => “one”
  case “2” => “two”
  // typed pattern
  case i:Int => “got an int”
  case s:String => “got a string”
  case _ => // do nothing
}
```

pattern matching:

1. constant pattern (“a”, 10)
2. variable pattern (x)
3. wildcard pattern (_)
4. constructor pattern (Foo(“-”, e))
5. typed pattern (see above)

isInstanceOf and asInstanceOf are discouraged

actors

```
import scala.actors._
object Foo extends Actor {
  def act() {
    // your logic here
  }
}

import scala.actors.Actor._
val hiActor = actor {
  while(true) {
    receive {
      case msg =>
        // your logic
    }
  }
}

object Foo extends Actor {
  def act() {
    react {
      case ...
    }
  }
}

// send message
hiActor ! “hello”
```

notes:

1. share-nothing, message-passing model
2. receive, receiveWithin
3. react is more efficient
4. don’t block when processing messages (helper actor)
5. prefer immutable messages
6. make messages self-contained

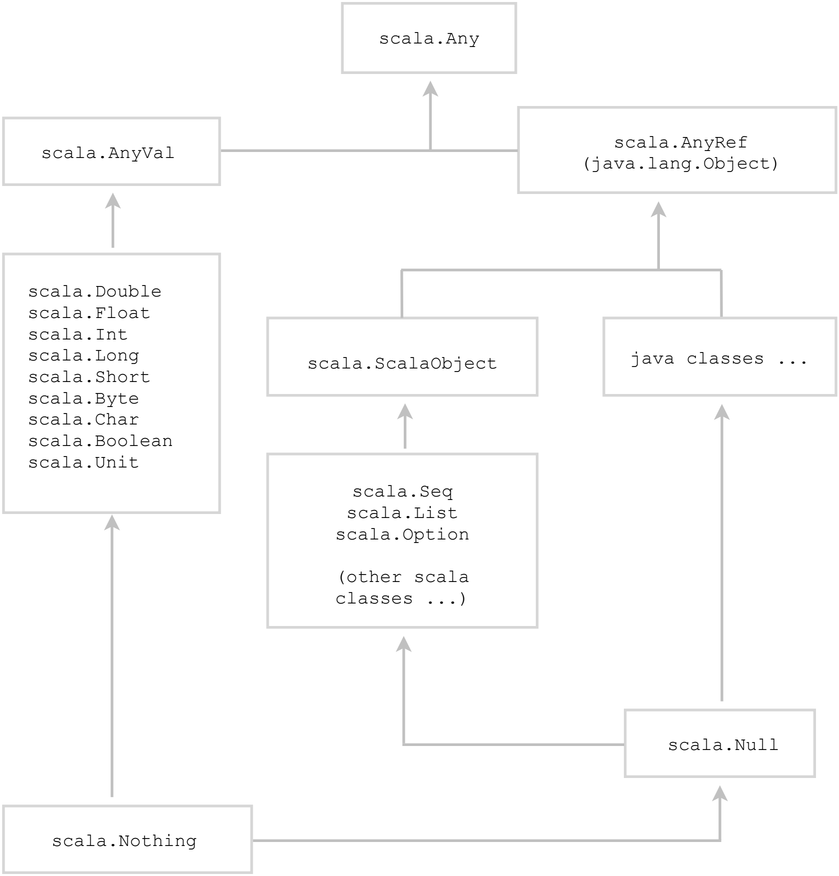
much more

```
// type alias
type D = Double

// anonymous function
(x:D) => x + x

// lisp cons
var x = 1 :: List(2,3)

var(a,b,c) = (1,2,3)
val x = List.range(0,20)
```



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