

## Scala Reference Guide

### Packages

`import scala.collection._` wildcard to import everything from the collection library

`import scala.collection.Vector` specific import for the Vector class

`import scala.collection.{Vector, Sequence}` import multiple classes

`package pkgname` declare a package

### Operators

`x op y` is `x.op(y)` infix notation where `op` can be `+`, `-`, `*`, `/`, `%`

`x op` is `x.op()` postfix notation

`x == y` compares two objects (calls `equals` method)

There is no `++`, `--` in Scala

### Symbols

`;` optional end of line

`->` returns a two element tuple for a key, value pair

`<-` assign to in a for comprehension

`=>` used in function literals to separate arguments from the function body

`::` cons operator

`//` single-line comment

`/*...*/` multiline comment

### Relational Operators

`||` or

`&&` and

`!` not

### Comparison

`==` equals

`<` less than

`>` greater than

`<=` less than or equal to

`>=` greater than or equal to

## Lambda Expression

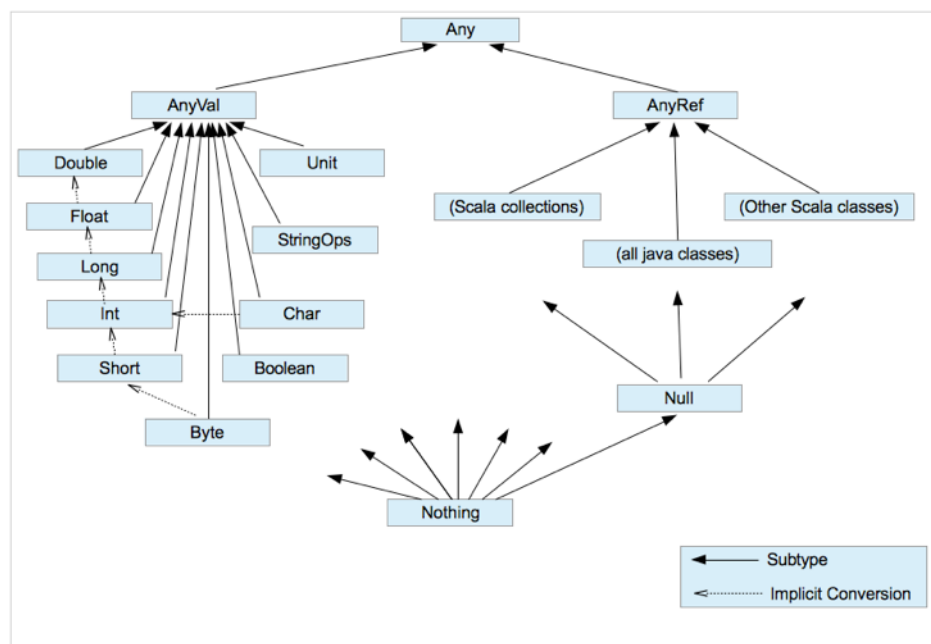
<code>(x:Int) =&gt; x * x</code>	anonymous function to square x
<code>(1 to 5).map(2 * _)</code>	anonymous function using bound infix method, multiplies 1,2,3,4,5 by 2
<code>val x = (1 to 5).map {2 * _                   println(x)                   x }</code>	multiplies each value by 2 print x returns x (Vector (2, 4, 6, 8, 10))
<code>(1 to 10) filter { _ % 2==0}</code>	only returns even numbers; creates vector (2, 4, 6, 8, 10)
<code>(1 to 10) filter { _ % 2==0} map { _ * 2}</code>	multiplies all even values by 2; creates vector (4, 8, 12, 16, 20)

## Variables

<code>var</code>	creates a mutable variable
<code>var myVar:Int</code>	creates a mutable integer variable
<code>val</code>	creates an immutable variable
<code>val myVal:String</code>	creates an immutable String variable ( or <code>val myVal = "Monday"</code> )

## Data Types

Byte  
Short  
Int  
Long  
Float  
Double  
Boolean  
String  
Char  
Unit  
Null  
Nothing  
Any  
AnyRef



## Functions

```
def f(x:Int) = {...}      define function f, with parameter x, an integer; no return type specified
def times3(x:Int) = 3 * x
val f = (x:Int) => 3 * x   anonymous function call
def message(x:Int){      //function returns unit since it has no = sign; prints Hello world x times
  for(i<-(1 to x)) println("Hello World")}
def message(x:String, intro:String ="Dear") { //use a default value for intro
  println(intro + "," + x) }
def f(x: R)              call by value
def f(x: => R)            call by name (reference)
def sum(xs:Int*):Int = {  //return type required for recursive functions
  // * indicates variable number of args
  var r = 0
  for(x <- xs) r += x
  r }
def sum(xs:Int*):Int =    //same results as above
  if(xs.length == 0) 0 else xs.head + sum(xs.tail : _*)
```

## Data Structures

```
(1,2,3)                  tuple literal
var(a,b,c) = (1,2,3)     tuple unpacking via pattern matching
var xs = List(1,2,3)     creates an immutable list called xs
xs(0)                   access the element at location zero, indexing
4::List(3,2,1)          adds 4 to the front of the list creating List(4,3,2,1)
1 to 10                 range of numbers from 1 to 10 inclusive
1 until 10              range of numbers from 1 to 9, excludes upper bound
val list = List.range(1,11) creates a List of values excluding the upper bounds
```

## Decision Statements

If(expr that evaluates to true/false) println("true") else println("false")

## Loops

while(expr) {...}	execute a body of code while the expr is true
do{...} while(expr)	execute a body of code at least once, continue while expr is true
for(x <- myList) println(x)	print all values of x from the List called myList
for(x <- myList if x%2 == 0) yield x*10	for comprehension
for(x <- 1 to 10) {...}	

## Pattern Matching

```
val x = r match {  
  case '0' => ...           //match a value  
  case ch if someProperty(ch) => ... //add a guard to the match criteria  
  case e: Employee => ...    //match runtime type  
  case (x,y) => ...          //destructures pairs  
  case Some(v) => ...        //case classes have extractors  
  case 0 :: tail => ...      //infix notation for extractors yielding a pair  
  case _ => ...              //default case
```

## Escape Sequences

\b	backspace
\t	tab
\n	newline
\r	carriage return
\"	double quote
'	single quote
\\	backslash

