

## TOUR OF SCALA

## PATTERN MATCHING

Pattern matching is a mechanism for checking a value against a pattern. A successful match can also deconstruct a value into its constituent parts. It is a more powerful version of the `switch` statement in Java and it can likewise be used in place of a series of if/else statements.

## Syntax

A match expression has a value, the `match` keyword, and at least one `case` clause.

```
import scala.util.Random

val x: Int = Random.nextInt(10)

x match {
  case 0 => "zero"
  case 1 => "one"
  case 2 => "two"
  case _ => "other"
}
```

The `val x` above is a random integer between 0 and 10. `x` becomes the left operand of the `match` operator and on the right is an expression with four cases. The last case `_` is a “catch all” case for any other possible `Int` values. Cases are also called *alternatives*.

Match expressions have a value.

```
def matchTest(x: Int): String = x match {
  case 1 => "one"
  case 2 => "two"
```

```
    case _ => "other"
  }
  matchTest(3) // prints other
  matchTest(1) // prints one
```

This match expression has a type `String` because all of the cases return `String`. Therefore, the function `matchTest` returns a `String`.

## Matching on case classes

Case classes are especially useful for pattern matching.

```
abstract class Notification

case class Email(sender: String, title: String, body: String) extends Notification

case class SMS(caller: String, message: String) extends Notification

case class VoiceRecording(contactName: String, link: String) extends Notification
```

`Notification` is an abstract super class which has three concrete Notification types implemented with case classes `Email`, `SMS`, and `VoiceRecording`. Now we can do pattern matching on these case classes:

```
def showNotification(notification: Notification): String = {
  notification match {
    case Email(sender, title, _) =>
      s"You got an email from $sender with title: $title"
    case SMS(number, message) =>
      s"You got an SMS from $number! Message: $message"
    case VoiceRecording(name, link) =>
      s"You received a Voice Recording from $name! Click the link to hear it: $link"
  }
}

val someSms = SMS("12345", "Are you there?")
val someVoiceRecording = VoiceRecording("Tom", "voicerecording.org/id/123")

println(showNotification(someSms)) // prints You got an SMS from 12345! Message: Are you there?
println(showNotification(someVoiceRecording)) // prints You received a Voice Recording from Tom! Click the link to hear it: voicerecording.org/id/123
```

The function `showNotification` takes as a parameter the abstract type `Notification` and matches on the type of `Notification` (i.e. it figures out whether it's an `Email`, `SMS`, or `VoiceRecording`). In the case `Email(sender, title, _)` the fields `sender` and `title` are used in the return value but the `body` field is ignored with `_`.

## Pattern guards

Pattern guards are simply boolean expressions which are used to make cases more specific. Just add `if <boolean expression>` after the pattern.

```
def showImportantNotification(notification: Notification, importantPeopleInfo: Seq[String]) {
  notification match {
    case Email(sender, _, _) if importantPeopleInfo.contains(sender) =>
      "You got an email from special someone!"
    case SMS(number, _) if importantPeopleInfo.contains(number) =>
      "You got an SMS from special someone!"
    case other =>
      showNotification(other) // nothing special, delegate to our original showNotification
  }
}

val importantPeopleInfo = Seq("867-5309", "jenny@gmail.com")

val someSms = SMS("123-4567", "Are you there?")
val someVoiceRecording = VoiceRecording("Tom", "voicerecording.org/id/123")
val importantEmail = Email("jenny@gmail.com", "Drinks tonight?", "I'm free after 5!")
val importantSms = SMS("867-5309", "I'm here! Where are you?")

println(showImportantNotification(someSms, importantPeopleInfo)) // prints You got an SMS from special someone!
println(showImportantNotification(someVoiceRecording, importantPeopleInfo)) // prints nothing special, delegate to our original showNotification
println(showImportantNotification(importantEmail, importantPeopleInfo)) // prints You got an email from special someone!
println(showImportantNotification(importantSms, importantPeopleInfo)) // prints You got an SMS from special someone!
```

In the case `Email(sender, _, _) if importantPeopleInfo.contains(sender)`, the pattern is matched only if the `sender` is in the list of important people.

## Matching on type only

You can match on the type like so:



```

abstract class Device
case class Phone(model: String) extends Device {
  def screenOff = "Turning screen off"
}
case class Computer(model: String) extends Device {
  def screenSaverOn = "Turning screen saver on..."
}

def goIdle(device: Device) = device match {
  case p: Phone => p.screenOff
  case c: Computer => c.screenSaverOn
}

```

`def goIdle` has a different behavior depending on the type of `Device`. This is useful when the case needs to call a method on the pattern. It is a convention to use the first letter of the type as the case identifier ( `p` and `c` in this case).

## Sealed classes

Traits and classes can be marked `sealed` which means all subtypes must be declared in the same file. This assures that all subtypes are known.

```

sealed abstract class Furniture
case class Couch() extends Furniture
case class Chair() extends Furniture

def findPlaceToSit(piece: Furniture): String = piece match {
  case a: Couch => "Lie on the couch"
  case b: Chair => "Sit on the chair"
}

```

This is useful for pattern matching because we don't need a "catch all" case.

## Notes

Scala's pattern matching statement is most useful for matching on algebraic types expressed via [case classes](#). Scala also allows the definition of patterns independently of case classes, using `unapply` methods in [extractor objects](#).



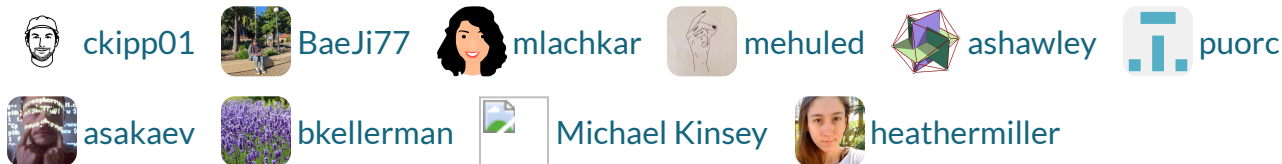
## More resources

- More details on match expressions in the [Scala Book](#)

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