

Patterns, Set, and Maps

11-17-2010

Opening Discussion

- Do you have any questions about the quiz?
- IC_P solutions.
- Simple description of a pattern. Something you probably did in math in elementary school was looking at repeating patterns.
- A pattern specifies a certain form for something. A match occurs if a value fits the given pattern.

Pattern Matching

- We have used three types of patterns previously:
 - Value literals
 - Tuples
 - Type matches
- The last two start to show the power of pattern matching. In particular, they show that part of a pattern can be a variable name that binds to part of the pattern.

Variable Binding

- When a pattern is matched, any words that start lower case are assumed to be variable names you want bound.
- Use an underscore for anything you want to match stuff, but ignore the value.
- Use `@` to bind a name to a match you are also further specifying.
- To match the value of an outside variable put the variable name in backticks.

XML Patterns

- You can use patterns to pull out parts of XML or match on different types of nodes.
- Simply put the variable names you want inside of curly braces.
 - `val <a>{s} = node`

Case Class Patterns

- The real power of case classes in Scala comes from the fact they can be used in matches.
 - `stu match {`
 - `case Student(n,q,t,a) => ...`
 - `}`
- You can do this type of matching on events to pull out the fields you care about if you don't want the full event.
 - `case MouseMoved(source,point,mod) => ...`

List and Collection Patterns

- You can also make patterns with collections.
 - `case Array(a,b,c) => // use a, b, and c`
- Even more cool is what you can do with Lists.
 - `case h::t => // h is head and t is tail`
 - `case a::b::Nil => // two element List`
- This can be ideal for recursive methods on lists.
 - `def len(lst:List[Int]) = lst match {`
 - `case Nil => 0`
 - `case h::t => 1+len(t)`
 - `}`

Patterns Everywhere

- Patterns are used in a lot of places in Scala, not just cases and matches.
- The initial declaration of variables is a pattern match. That is why we could assign from tuples.
- The “variable name” in a for loop is actually a pattern. If the pattern isn't matched by an element, that element is skipped.

Sets, Maps, and Buffers

- The Scala collections library is a lot richer than just Lists and Arrays.
- I want to introduce three other types of collections to you as they can make your life a lot easier for certain tasks.
- They are all parametric so they can work on a variety of types.

Sets

- This is a collection that isn't ordered and doesn't allow duplicates.
- There are both mutable and immutable sets. By default you get the mutable version.

Buffers

- A buffer is a sequence, like an array or a list, but it is mutable like an array and grows like a list.
- You find these in the `scala.collection.mutable` package.

Maps

- This collection type has two type parameters for a key and a value type.
- You store values and look them up by key.
- The keys are unique.
- There are both mutable and immutable maps. By default you get the mutable version.

Minute Essay

- What questions do you have about stuff?
- Interclass Problem:
 - Use a Scanner to read words from a text file. Add them to a Set to get all the unique words from the page.
 - For more of a challenge use a Map to count how many times each word occurs.