Collection Types

Arrays and Lists (Sequences)

2-14-2011

Opening Discussion

- Turning in assignments.

- Minute essay comments
  - Can recursion be used in non-mathematical applications?
  - What would happen if we used ! for factorial?
  - What other types are there?
  - How do our recursive functions know to keep going instead of just doing one call?
  - Why not to use BigInt for everything.

Need for Collections

- Computers are good at dealing a lot of data. So far we can only store one value in each variable. This is a significant limitation.

- Collections are types that can store multiple data values.

- Allow us to remember many things to work on.

- The collection libraries in a language are very significant.

- Scala has great collections.

Basic Arrays and Lists

- The two most basic collection types in Scala are arrays and lists.

- We can make either by following the type name with a parenthesized list of elements.

- Can create an "empty" array using new.

- Can build Lists with :: operator. Nil is empty.

- Comparison

  - Arrays are mutable, but fixed in size.

  - Lists are immutable, but it is easy to add an element and get a new list.

Parametric Types

- You should notice that when we make an array or a list, the type is followed by square brackets.

- These types are parametric. So they take type arguments.

- In Scala, type parameters are placed in square brackets.

Using Arrays

- We can get to the elements in an array by putting an index in parentheses. The index is 0-referenced.

  - arr(5)

- This syntax can be used in expressions to read values.

- It can also be used in assignments to store values in the array. This is what it means to be mutable.

- Let's look at some examples of this.

Using Lists

- You can do direct access on lists, but it is inefficient.

- The better method is to use the head and tail methods.

- The elements in a list can't be changed. However, you can efficiently add new elements at the front of the list.

Minute Essay

- What are some examples of uses of arrays or lists?

- Remember to turn in assignment #1 by midnight.

- The third quiz is on Wednesday.