

# XML

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# Opening Discussion

- IcP solutions.
- Questions about the assignment?
- Minute essay comments:
  - Requests for more graphics and NBA stats.
- `javax.swing.Timer`
- `getRGB`

# Motivation

- We have been using “flat” text files to store things.
- Advantage: it is human readable and simple.
- Disadvantages: everything else.
  - Slow
  - Large
  - Lacks meaning
  - Hard to edit
  - Hard to debug

# XML

- The eXtensible Markup Language (XML) is a standard for text encoding of data.
- If you have ever done HTML, XML is similar. XHTML is HTML that follows the XML standard.
- The advantage of XML is that it can encode pretty much anything and it is human readable text.
- The downside is that it can be very verbose.
- Composed of markup (between < and > or & and ;) or content (anything not markup).

# Tags

- The primary markup used in XML is the tag.
- A tag begins with a < and ends with a >.
- There are three types of tags.
  - Start-tag: <student>
  - End-tag: </student>
  - Empty-element tag: <quiz/>

# Elements

- The structure of XML documents comes primarily from elements.
- An element is one of the following:
  - Everything from a start-tag to the matching end-tag.
  - An empty-element tag.
- Elements have to be properly nested. The nesting can imply information.

# Attributes

- An attribute is a name value pair.
- They can be put in start-tags or empty-element tags.
- Examples:
  - `<student name="Jason" id="0123456">`
  - `<quiz grade="55"/>`

# XML Declaration

- An XML file can begin with a declaration telling information about it.
  - `<?xml version="1.0" encoding="UTF-8" ?>`
- We won't worry about these in this class.



# XML in Scala

- The Scala language supports XML at the language level.
- Go to the REPL and enter some XML.
- There is a `scala.xml` package that contains the libraries for XML.
  - The `NodeSeq`, `Node`, and `Elem` types are particularly useful. I'll typically just use the word `Node` to describe something from the XML.
  - So is the `XML` object.

# The XML Object

- The loadFile method can be passed a file name and it will read in the file and return a NodeSeq that allows you to get to the contents.
- There is also a save method that takes a file name and an XML node and writes it to file.

# Using \ and \\

- Use the \ operation on a node to search for the occurrences of something at the top level.
- The second argument is a string.
  - Normal string searches for tags with that label.
  - If the string starts with @ it searches for attributes.
- Use \\ to search deeply.

# Minute Essay

- What questions do you have about XML?
- No IcP because of assignment.