Boolean Expressions and if

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Opening Discussion

- Minute essay comments
  - Change a val. REPL vs. Script
  - Hex and colors.
  - Being proficient/fluent in a language.
  - Hex letters are for when 4-bits gives a value above 9.
  - Hex vs. octal this semester.
  - 10.0/3
  - What types of programs will we write?
  - Getting rid of a val.

More

- Limit on number of variables?
- Limit on tuples.
- How to get practice.
- Tuples vs. arrays.
- Saving REPL sessions.
- Pipe line in REPL. How it comes about.
- Matrices in Scala.
- Endangered species keyword was related to jobs.
- Effect of automation on 3rd world workers.

Scripts

- We have spent most of our time in the REPL entering one statement at a time.
- When we want to do things repeatedly it is nice to put the commands in a file called a script.
- We can use vi to write a script and put Scala commands in the file.
- We can run it by specifying the file name after the command scala.
- Alternately, we can load it into the REPL.

Sequential Execution

- When you put commands into a script, they are normally executed one after the other from top to bottom.
- This is what we call sequential execution and it is the default way things happen.
- Order can be very significant for the instructions in a program.

Standard Input

- Scala provides a whole set of functions you can call to read from standard input.
  - readInt()
  - readDouble()
  - readLine()
  - And many more
- This can make your scripts far more useful as they can be used with different values each time you run them.

Some Problems

- We are still a little limited in that we can only do simple math and formatting, but let's try to do some things with that in scripts.
- We'll start with formatting money.
- Calculating hourly wages?
- Taking averages of grades?
- Suggestions?

Motivating Conditional Execution

- For my roller skating class I have a component of the grade based on an endurance test where you have to skate for 12 minutes. This component is worth 20 points. The grade you get is 0 for 20 or fewer laps and 20 for 40 or more laps. Between those extremes you get one point for every lap over 20.
- Calculating this value requires that we do different things in different situations. This is called conditional execution.

if

- The most basic form of conditional execution is the if.
- The syntax is as follows:
  - if(*condition*) *expr* else *expr*
- When Scala gets to an if, it evaluates the condition. The condition is an expression of type Boolean.
- If the condition is true it evaluates the first expression, otherwise it evaluates the second expression.

Expression or Statement

- In Scala you can use if as an expression, so it returns a value, or just as a statement where you ignore the value.
- When used as a statement, the else is optional.

Code Blocks

- In Scala you can make complex statements or expressions by putting multiple statements inside of curly braces.
- If it is used as an expression, the value of the expression will be the value of the last expression in it.

Comparisons

- The condition needs to be a Boolean expression.
- The most common basic forms of these are comparisons.
- Use == and != for equality and non-equality.
- The ordering comparison operators are <, >, <=, and >=.

Coding the Example

- Let's write the code for the skating problem example.
- Guarding division is another example.
- What are some other simple examples of places where conditional execution would be helpful?

Minute Essay

- When might you want to use conditional execution? (Hint: any time you would use if in a sentence probably works.)
- Quiz next class.