Conditions and Boolean logic

# TODO

# Lesson Notes

## Which grade has more students?

* Which has more students: upper school or lower school?
* Need the ability to compare two numbers

## Comparison expressions

* <, >, <=, >=
* Show equivalent math symbols
* ==, != (equals was already taken by assignment!)
* Result in a Boolean value (true, false)
* George Boolean (Boole), English mathematician
* Examples

## Exercise

* Update your program to calculate the following boolean values
* Upper school larger than lower school
* Same number of students in sixth and seventh?
* Different number of freshmen and seniors?

## Boolean logic

* George Boole
* Three basic boolean operators in Boolean algebra:
  + And (x and y)
  + Or (x or y)
  + Not (not x)
* How these are written
  + &&
  + ||
  + !
  + Examples
* Short circuit
  + Examples for AND (everyone)
  + Examples for OR (anyone)

## Exercises

* Sentences that need to be turned into words.
  + Seniors <= juniors && juniors <= sophomores && sophomores <= freshmen;
  + Seniors <= juniors || juniors <= sophomores || sophomores <= freshmen;
  + !(seniors <= freshmen)

## Which is bigger, upper or lower school?

* If upper school has more students, upper school value
* If middle school has more students, middle school value

## If statement

* Based on the value of a boolean expression (condition), do some statements
* Syntax: show syntax
* Example:
  + Assume middle school has more students
  + See if upper school has more students
  + Change variable if true

## Adding an else

* If the if condition is not true, execute these statements
* “Otherwise”
* Syntax: show syntax
* Example:
  + If upper school has more students, use upper school
  + else use middle school

## What size is the high school?

* A, AA, or AAA
* A: < 700
* AA: 700 to 1500
* AAA: above 1500
* We want to test multiple conditions
* Show the code
* Write a function that calculates the rating (number of A’s)
  + 1 for A
  + 2 for AA
  + 3 for AAA

## Exercise

* Turn this into a function that returns the rating
* Add this to the statistics you calculate for your school
* Step your code to make sure it works

## Exercise

* Want the larger of two numbers
* Want the smaller of two numbers
* Write functions for each of these