[0:03](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[Now that you have written code to find the unique IP addresses in a web server log,](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [let us take a brief look at something very close that would not have worked.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[0:13](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[Here is the code that you just wrote for the unique IP addresses problem.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [Remember that you have an array list of strings and](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [that you put the string for each log entries IP address into that array list.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

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[But what if you had written this code instead?](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [This code is the same as what you wrote, but the array list holds log entries and](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [the code checks if it has the current log entry, not the LogEntry's IP address.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [Likewise, it adds the entire LogEntry object, if it was not already there.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [If you were to run this code, it would give you the wrong answer.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [In fact, it would tell you how many total LogEntry's there are,](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [not how many unique IP addresses there are in the log file.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [Why is that?](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[1:00](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[To understand this problem, think for a moment about how contains would work.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [In particular, how does contains know if two objects are the same or different?](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [Contains is going to check if they are equal.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [What exactly do we mean by equal?](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[1:16](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[Java has two different notions of equality.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [To illustrate this, consider the situation in which you have three string variables,](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [a,b, and c, which refer to two different string objects.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [a and b refer to the exact same string object, so they are clearly equal.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [a and c however refer to different string objects with the same logical contents.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

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[On the one hand you could say they are equal,](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [because they talk about strings that mean the same thing.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [On the other you could say they are not,](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [because they are talking about different objects.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [These are the two different notions of equality that exist in Java.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

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[The notion of equality meaning the exact same object is what you get](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [when you write, = =.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [If you write, a = = b, then Java checks if a and b refer to the exact same object.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [Since they do, this expression evaluates to true.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [However, if you write a == c, then Java again checks if a and](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [c refer to the exact same object.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [But because they do not, this expression evaluates to false.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [The other notion of equality, do they mean the same thing,](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [is done with a .equals method.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [If you wrote a.equals(c), then Java would call the .equals method in the string](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [class, which checks if the two strings have the same sequence of characters.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [Because these two strings have the same sequence of characters,](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [a.equals(c), would evaluate to true?](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [So how does Java know whether two objects have the same logical meaning?](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [Each class defines .equals to specify what it means for](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [objects of that type to be the same.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[2:56](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[If you do not write one explicitly, the default behavior would be to have](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [the .equals method check if the two objects are = = to each other?](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [That is if they are the exact same objects.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[3:09](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[So know that you know about equals equals and](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [.equals should you write a .equals method for log entry?](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[3:17](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[Well the first thing you should do is think about](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [when 2 log entries are logically the same.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [What about if they have the same IP address?](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [Well that would fix the broken code for](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [this particular problem, it's not a good approach in general.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [It does not actually match with the notion of two log entries meaning the same thing.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[3:36](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[Two different requests are not the same, even if they came from the same computer.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [So what if you checked more information?](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [What if you checked for the same IP address and the same request string?](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

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[Even this would not really mean the two log entries are the same,](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [as the same computer could ask for the same page many times.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[3:55](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[For log entries it makes sense to just say that they are logically the same,](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [only if they are in fact the exact same object.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[4:03](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[Because the behavior you want is the default for .equals,](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [you do not need to explicitly write it.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[4:10](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[Since you do not need to write a .equals method for this class,](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [we're not going to delve into how to do it yet.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[4:16](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[Fully understanding what goes into a .equals method requires a little bit of](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [knowledge that you will not get until the principals of software design course.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[4:26](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)

[However, now that you understand the ideas of equality and that the contains](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [method checks if two objects are the same you can understand why this code](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [did not work and this code where you used the IP addresses did work.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality) [Thanks.](https://www.coursera.org/learn/java-programming-arrays-lists-data/lecture/7wts2/equality)