Finding Unique IP Addresses

Equality

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ArrayList: Had Strings

```
public int countUniqueIPs() {
    ArrayList<String> uniqueIps = new ArrayList<String>();
    for (LogEntry le : records) {
        String ipAddr = le.getIpAddress();
        if (!uniqueIps.contains(ipAddr)) {
            uniqueIps.add(ipAddr);
        }
    }
    return uniqueIps.size();
}
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What If: ArrayList<LogEntry>?

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Gives wrong answer:

- Tells total entries, not **unique** IPs
- Why?

How Does contains Check Equality?

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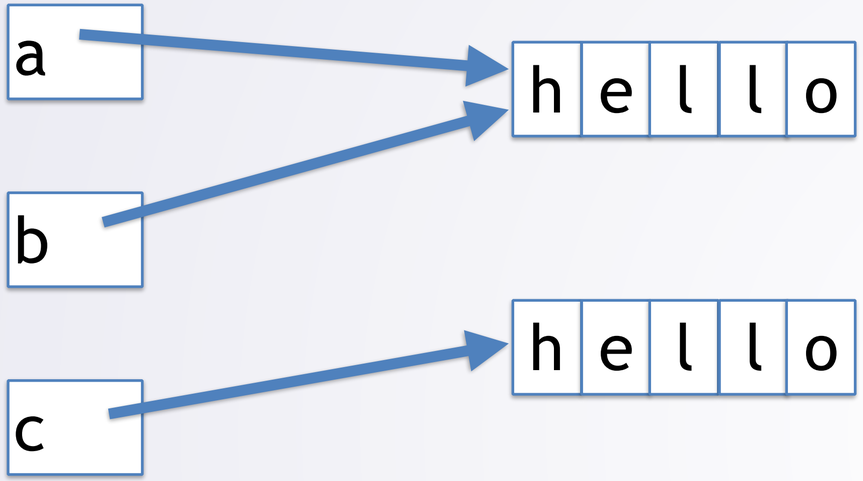
}
```

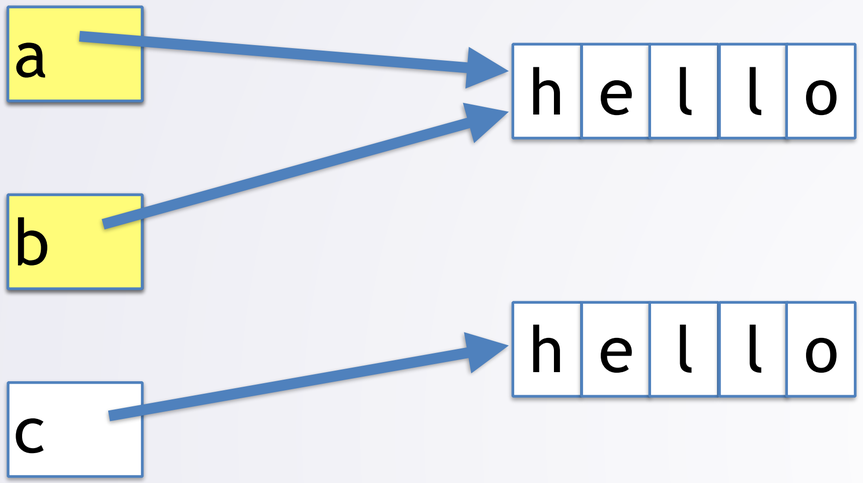
== vs .equals



- Two different kinds of equality:
  - ==: same exact object

== vs .equals

```
a == b
```



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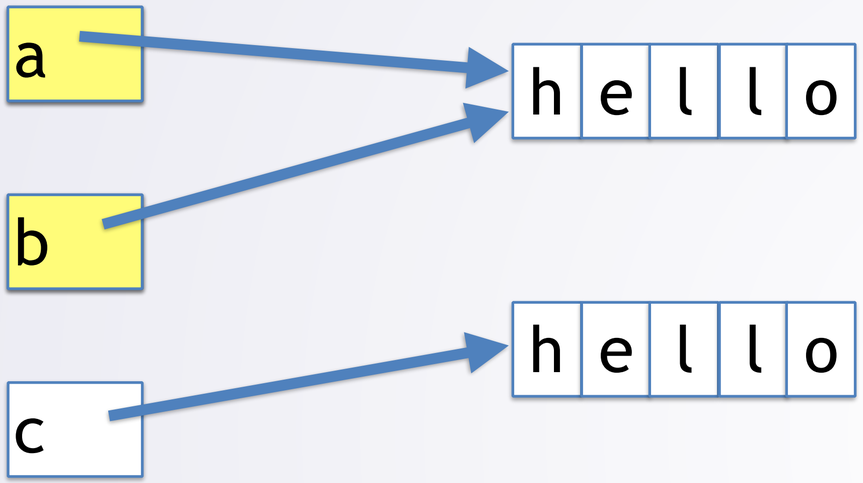


```
a == b
```
True

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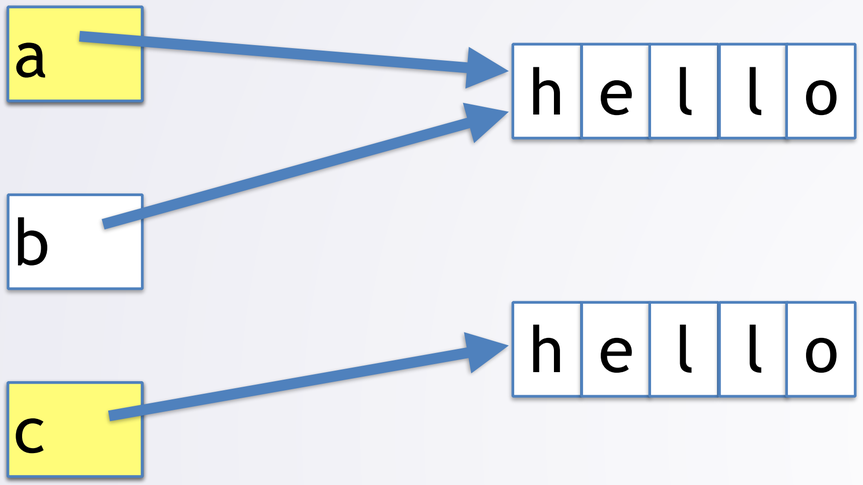
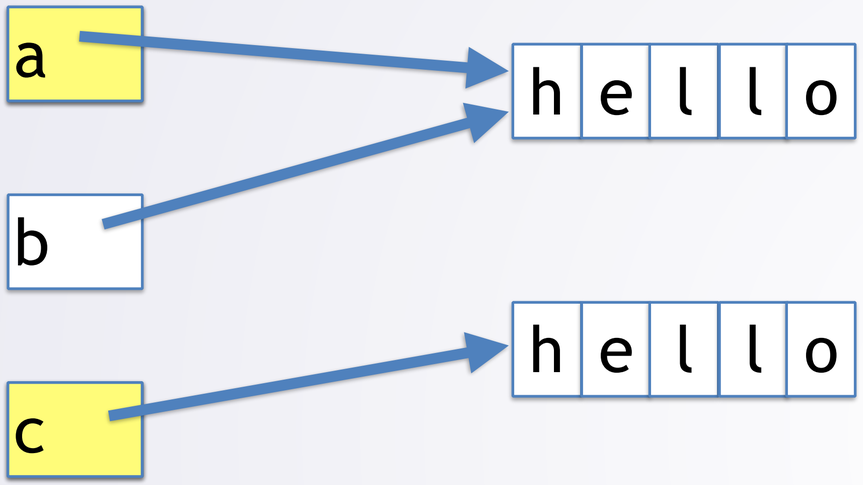



```
a == b   True

a == c
```

- Two different kinds of equality:
  - ==: same exact object

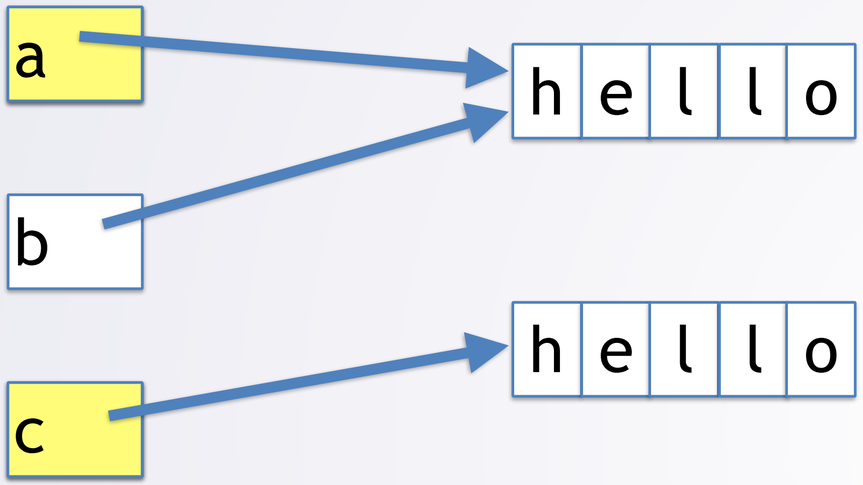
== vs .equals




```
a == b   True
a == c   False
```

- Two different kinds of equality:
  - ==: same exact object

== vs .equals

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a == b   True
a == c   False
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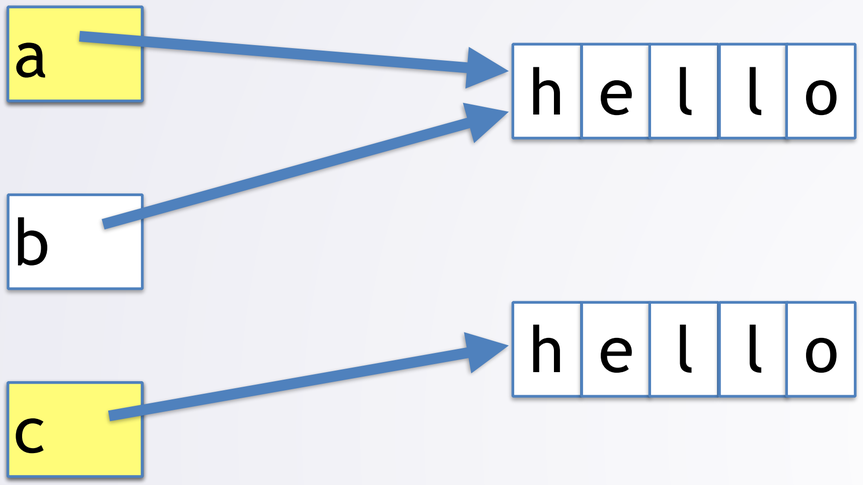
- Two different kinds of equality:
  - ==: same exact object
  - .equals(): same meaning

== vs .equals




```
a == b   True
a == c   False
a.equals(c)
```

- Two different kinds of equality:
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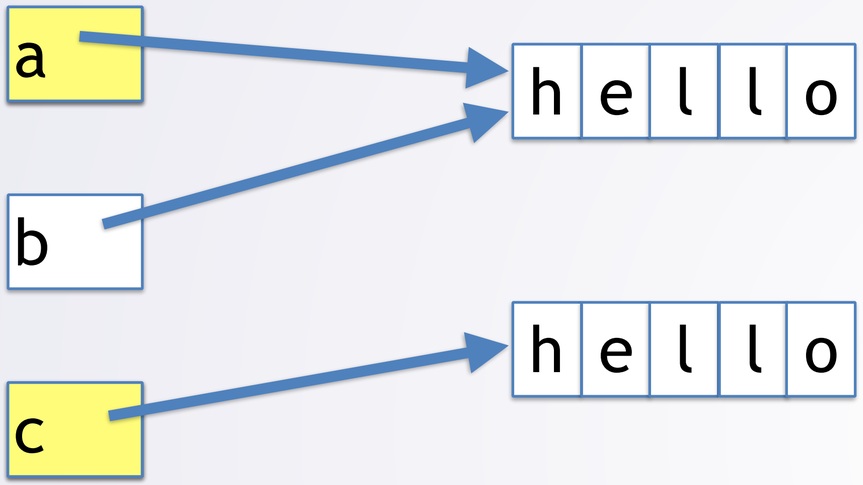
  - .equals(): same meaning

== vs .equals




```
a == b   True
a == c   False
a.equals(c) True
```

- Two different kinds of equality:
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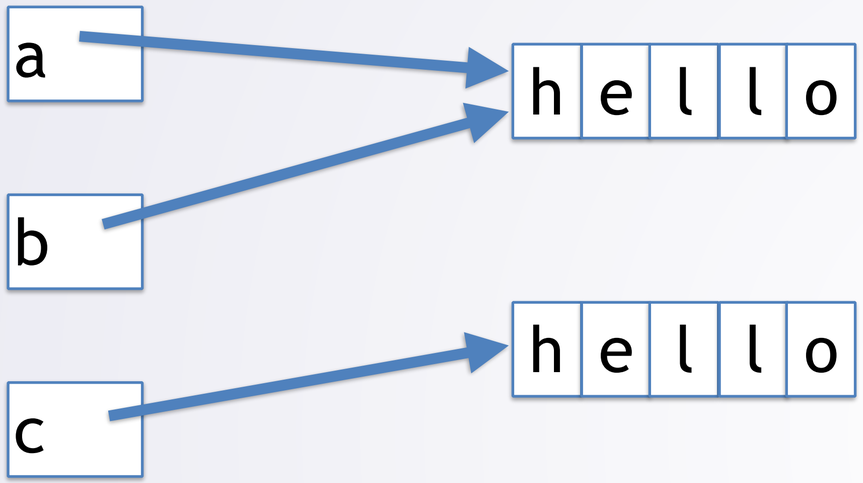
== vs .equals




```
a == b   True
a == c   False
```

`a.equals(c)` **True**

- Two different kinds of equality:
  - ==: same exact object
  - .equals(): same meaning
    - Defined by class: default ==

Equality for LogEntry

- Should we write .equals for LogEntry?
- When are two LogEntries the same?
  - Same IP? **No**
  - Same IP and same request String? **No**
  - Same exact object **Yes**
- Same object is default behavior
  - No need to write .equals()
  - Will learn how to write .equals() later

Understand Why This Is Broken

```
public int countUniqueIPs() {
    ArrayList<LogEntry> uniqueIps = new ArrayList<LogEntry>();
    for (LogEntry le : records) {
        if (!uniqueIps.contains(le)) {
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        }
    }
    return uniqueIps.size();
}
```

…And Why This Worked

```
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