

Extended Static Checking for Java

ESC/Java finds common errors in Java programs:
null dereferences, array index bounds errors,
type cast errors, race conditions, violations of
annotations (e.g., preconditions, object invariants),
etc.

Annotation language is a subset of JML

Powered by program verification technology

Has been applied to 10,000's of lines of Java
and has found real errors

<http://research.compaq.com/SRC/esc/>

A simple example input:

```
1: class Bag {
2:   int[] a; //@ invariant a != null;
3:   int n; //@ invariant 0 <= n && n <= a.length;
   ...
215: int min( ) {
216:   int m = Integer.MAX_VALUE;
217:   for (int i = 0; i <= n; i++) {
218:     if (a[i] < m) {
219:       m = a[i];
220:     }
221:   }
222:   return m;
223: }
```

Output:

Bag.java:218: Warning: Array
index possibly too large

```
if (a[i] < m) {
    ^
```

Execution trace information:
Reached top of loop after 0
iterations, line 217, col 4.

ESC/Java annotations are
given in Java comments

This error may lead to an
array index bounds error
here, as detected by ESC/Java

ESC/Java tool architecture

