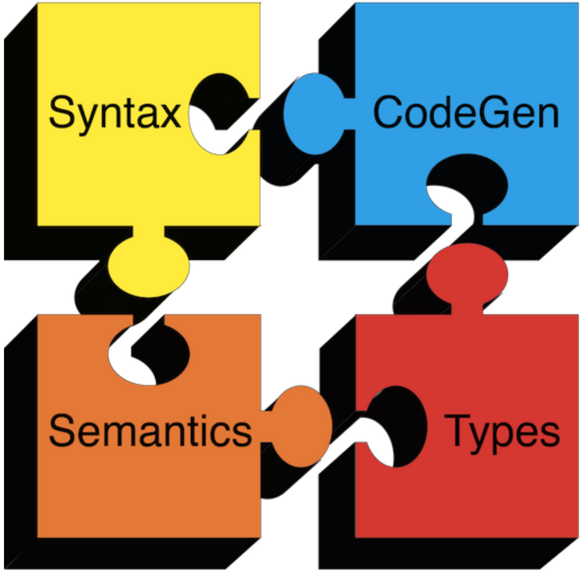


Compilers

Java Arrays

Alex Aiken

Java Arrays

Assume B < A. What happens in the following?

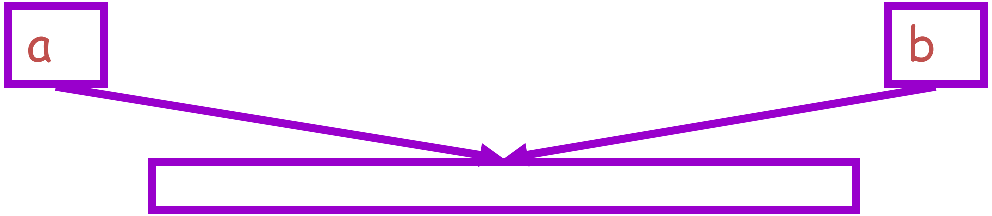
```
B[] b = new B[10];
A[] a = b;

a[0] = new A();
b[0].aMethodNotDeclaredInA();
```

Java Arrays

B < A	if B inherits from A	as in Cool
C < A	if C < B and B < A	as in Cool
B[] < A[]	if B < A	not as in Cool

Java Arrays

```
B[] b = new B[10];
A[] a = b;
a[0] = new A();
b[0].aMethodNotDeclaredInA();
```



Having multiple aliases to updateable locations with different types is unsound!

Java Arrays

- Standard solution
  - Disallow subtyping through arrays

$B < A$ if B inherits from A

$C < A$ if $C < B$ and $B < A$

$B[\,] < A[\,]$ if $B = A$

Java Arrays

- Java fixes the problem by checking each array assignment at runtime for type correctness
  - Is the type of the object being assigned compatible with the type of the array?

- Adds overhead on array computations

- But note: arrays of primitive types unaffected
  - Primitive types are not classes