10.3 Casting

Dynamic Method Selection and Type Checking Puzzle

Static vs. Dynamic Type Reminder: Every variable in Java has a static type. This is the type specified when the variable is declared, and is checked at compile time. Every variable also has a dynamic type; this type is specified when the variable is instantiated, and is checked at runtime.

Compile-Time Type Checking and Expressions

Compiler allows method calls based on compile-time type of variable. The compiler also allows assignments based on compile-time types.

Expressions have compile-time types:

- An expression using the new keyword has the specified compile-time type. Example:

```
SLList<Integer> sl = new VengefulSLList<Integer>();
```

- Compile-time type of right hand side (RHS) expression is VengefulSLList.
- A VengefulSLList is-an SLList, so assignment is allowed.

```
VengefulSLList<Integer> vsl = new SLList<Integer>();
```

- Compile-time type of RHS expression is SLList.
- An SLList is not necessarily a VengefulSLList, so compilation error results.

Expressions have compile-time types:

- Method calls have compile-time type equal to their declared type.

```
public static Dog maxDog(Dog d1, Dog d2) { … }
```

- Any call to maxDog will have compile-time type Dog!

Example:

```
Poodle frank  = new Poodle("Frank", 5);
Poodle frankJr = new Poodle("Frank Jr.", 15);

Dog largerDog = maxDog(frank, frankJr);
Poodle largerPoodle = maxDog(frank, frankJr);
```

- Compilation error! RHS has compile-time type Dog

Casting

Java has a special syntax for specifying the compile-time type of any expression.

- Put desired type in parenthesis before the expression.
- Tells compiler to pretend it sees a particular type.

Casting is a powerful but dangerous tool.

- Tells Java to treat an expression as having a different compile-time type.
- In example below, effectively tells the compiler to ignore its type checking duties.
- Does not actually change anything: sunglasses don't make the world dark.

Previous
10.2 Encapsulation

Next
10.4 Higher Order Functions in Java

Last updated 7 months ago