• *Classs may extend another class or default to extending Object*
⟨class⟩ ⇒
    class ⟨class id⟩⟨extend⟩ **{** ⟨class section⟩* **}**
⟨extend⟩ ⇒
    ϵ
  | **extends** ⟨class id⟩

• *Sections – private protected public refinements and main*
⟨class section⟩ ⇒
    ⟨refinement⟩
  | ⟨access group⟩
  | ⟨main⟩

• *Refinements are named method dot refinement*
⟨refinement⟩ ⇒
    refinement { ⟨refine⟩* **}**
⟨refine⟩ ⇒
    ⟨return type⟩⟨var id⟩**.**⟨var id⟩⟨params⟩ **{** ⟨statement⟩* **}**

• *Access groups contain all the members of a class*
⟨access group⟩ ⇒
    ⟨access type⟩ **{** ⟨member⟩* **}**
⟨access type⟩ ⇒
    private
  | **protected**
  | **public**
⟨member⟩ ⇒
    ⟨var decl⟩
  | ⟨method⟩
  | ⟨init⟩
⟨method⟩ ⇒
    ⟨return type⟩⟨var id⟩⟨params⟩ **{** ⟨statement⟩* **}**
⟨init⟩ ⇒
    init ⟨params⟩ **{** ⟨statement⟩* **}**

• *Main is special – not instance data starts execution*
⟨main⟩ ⇒
    main (String[] ⟨var id⟩ **) {** ⟨statement⟩* **}**

• *Finally the meat and potatoes*
⟨statement⟩ ⇒
    ⟨var decl⟩ **;**

| ⟨assignment⟩ **;**
| ⟨super⟩ **;**
| ⟨return⟩ **;**
| ⟨conditional⟩
| ⟨loop⟩
| ⟨expression⟩ **;**

• *Accessing a variable possibly by index*
⟨lpiece⟩ ⇒
⟨var id⟩
| ⟨lpiece⟩ **[** ⟨expression⟩ **]**

• *Accessing a member's member's member etc etc*
⟨lvalue⟩ ⇒
⟨lpiece⟩
| ⟨lvalue⟩ **.** ⟨lpiece⟩

• *Assignment – lvalues receive the results of expressions*
⟨assignment⟩ ⇒
⟨lvalue⟩ **:=** ⟨expression⟩

• *Super invocation is so we can do constructor chaining*
⟨super⟩ ⇒
super (⟨args⟩ **)**

• *Methods need to be able to return something too*
⟨return⟩ ⇒
return ⟨expression⟩

• *Basic control structures*
⟨conditional⟩ ⇒
if (⟨expression⟩ **) {** ⟨statement⟩* **} else {** ⟨statement⟩* **}**
⟨loop⟩ ⇒
while (⟨expression⟩ **) {** ⟨statement⟩* **}**

• *Anything that can result in a value*
⟨expression⟩ ⇒
⟨invocation⟩
| ⟨field⟩
| ⟨variable⟩
| ⟨arithmetic⟩
| ⟨test⟩

| ⟨instantiate⟩
| ⟨refine expr⟩
| ⟨literal⟩
| **(** ⟨expression⟩ **)**
| **null**

• *Method invocations always have a receiver*
⟨invocation⟩ ⇒
⟨expression⟩ **.** ⟨invoke⟩
⟨invoke⟩ ⇒
⟨var id⟩ **()**
| ⟨var id⟩ **(** ⟨args⟩ **)**

• *Field of some foreign object (or this)*
⟨field⟩ ⇒
⟨expression⟩ **.** ⟨variable⟩

• *Variable values can be indexed or not*
⟨variable⟩ ⇒
⟨var id⟩
| ⟨variable⟩ [⟨expression⟩]

• *Basic arithmetic can and will be done!*
⟨arithmetic⟩ ⇒
⟨expression⟩⟨bin op⟩⟨expression⟩
| ⟨unary op⟩⟨expression⟩
⟨bin op⟩ ⇒
+
| **-**
| *****
| /
| %
⟨unary op⟩ ⇒
-

• *Common boolean predicates*
⟨test⟩ ⇒
⟨expression⟩⟨bin pred⟩⟨expression⟩
| ⟨unary pred⟩⟨expression⟩
| **refinable (** ⟨var id⟩ **)**
⟨bin pred⟩ ⇒
and

| **or**
| **xor**
| **nand**
| **nor**
| <
| <=
| =
| **!=**
| >=
| >

⟨unary pred⟩ ⇒
!

• *Making something*

⟨instantiate⟩ ⇒
⟨object instantiate⟩
| ⟨array instantiate⟩

⟨object instantiate⟩ ⇒
new ⟨class id⟩
| **new** ⟨class id⟩ **(** ⟨args⟩ **)**

⟨array instantiate⟩ ⇒
new ⟨type⟩ [⟨expression⟩]

• *Refinement takes a specific specialization and notes the required return type*

⟨refine expr⟩ ⇒
refine ⟨specialize⟩ **to** ⟨type⟩

⟨specialize⟩ ⇒
⟨var id⟩ **()**
| ⟨var id⟩ **(** ⟨args⟩ **)**

• *Literally necessary*

⟨literal⟩ ⇒
⟨int lit⟩
| ⟨bool lit⟩
| ⟨float lit⟩
| ⟨string lit⟩

⟨float lit⟩ ⇒
⟨digit⟩+ **.** ⟨digit⟩+

⟨int lit⟩ ⇒
⟨digits⟩+

⟨bool lit⟩ ⇒
true

| **false**
⟨string lit⟩ ⇒
“⟨string escape seq⟩**”**

• *Params and args are as expected*
⟨params⟩ ⇒
(⟨paramlist⟩ **)**
⟨paramlist⟩ ⇒
⟨var decl⟩
| ⟨paramlist⟩ **,** ⟨var decl⟩
⟨args⟩ ⇒
⟨expression⟩
| ⟨args⟩ **,** ⟨expression⟩

• *All the basic stuff we've been saving up until now*
⟨var decl⟩ ⇒
⟨type⟩⟨var id⟩
⟨return type⟩ ⇒
unit
| ⟨type⟩
⟨type⟩ ⇒
⟨class id⟩
| ⟨type⟩[]
⟨class id⟩ ⇒
⟨upper⟩⟨alphanum⟩*
⟨var id⟩ ⇒
⟨lower⟩⟨alphanum⟩*