AspectJ Quick Reference

Aspects *at top-level (or* **static** *in types)*

aspect *A* { … }
defines the aspect *A*
privileged aspect *A* { … }
A can access private fields and methods
aspect *A* **extends** *B* **implements** *I, J* { … }
B is a class or abstract aspect, *I* and *J* are interfaces
aspect *A* **percflow**(*call(void Foo.m())*) { … }
an instance of *A* is instantiated for every control flow through calls to *m()*

general form:
[**privileged**] [*Modifiers*] **aspect** *Id*
[**extends** *Type*] [**implements** *TypeList*] [*PerClause*]
{ *Body* }
where *PerClause* is one of
pertarget (*Pointcut*)
perthis (*Pointcut*)
percflow (*Pointcut*)
percflowbelow (*Pointcut*)
issingleton ()

Pointcut definitions *in types*

private pointcut *pc*() : *call(void Foo.m())* ;
a pointcut visible only from the defining type
pointcut *pc*(*int i*) : *set(int Foo.x) && args(i)* ;
a package-visible pointcut that exposes an *int*.
public abstract pointcut *pc*() ;
an abstract pointcut that can be referred to from anywhere.
abstract pointcut *pc*(*Object o*) ;
an abstract pointcut visible from the defining package. Any pointcut that implements this must expose an *Object*.

general form:
abstract [*Modifiers*] **pointcut** *Id* (*Formals*) ;
[*Modifiers*] **pointcut** *Id* (*Formals*) : *Pointcut* ;

Advice declarations *in aspects*

before () : *get(int Foo.y)* { ... }
runs before reading the field *int Foo.y*
after () **returning** : *call(int Foo.m(int))* { ... }
runs after calls to *int Foo.m(int)* that return normally
after () **returning** (*int x*) : *call(int Foo.m(int))* { ... }
same, but the return value is named *x* in the body
after () **throwing** : *call(int Foo.m(int))* { ... }
runs after calls to *m* that exit abruptly by throwing an exception
after () **throwing** (*NotFoundException e*) : *call(int Foo.m(int))* { ... }
runs after calls to *m* that exit abruptly by throwing a *NotFoundException*. The exception is named *e* in the body
after () : *call(int Foo.m(int))* { ... }
runs after calls to *m* regardless of how they exit
before(*int i*) : *set(int Foo.x) && args(i)* { ... }
runs before field assignment to *int Foo.x*. The value to be assigned is named *i* in the body
before(*Object o*) : *set(* Foo.*) && args(o)* { ... }
runs before field assignment to any field of *Foo*. The value to be assigned is converted to an object type (*int* to *Integer,* for example) and named *o* in the body
int **around** () : *call(int Foo.m(int))* { ... }
runs instead of calls to *int Foo.m(int)*, and returns an *int*. In the body, continue the call by using **proceed**(), which has the same signature as the around advice.
int **around** () **throws** *IOException* : *call(int Foo.m(int))* { ... }
same, but the body is allowed to throw *IOException*
Object **around** () : *call(int Foo.m(int))* { ... }
same, but the value of **proceed**() is converted to an *Integer*, and the body should also return an *Integer* which will be converted into an *int*

general form:
[**strictfp**] *AdviceSpec* [**throws** *TypeList*] : *Pointcut* { *Body* }
where *AdviceSpec* is one of
before (*Formals*)
after (*Formals*)
after (*Formals*) **returning** [(*Formal*)]
after (*Formals*) **throwing** [(*Formal*)]
Type **around** (*Formals*)

Special forms *in advice*

thisJoinPoint
reflective information about the join point.
thisJoinPointStaticPart
the equivalent of **thisJoinPoint.getStaticPart**(), but may use fewer resources.
thisEnclosingJoinPointStaticPart
the static part of the join point enclosing this one.

proceed (*Arguments*)
only available in **around** advice. The *Arguments* must be the same number and type as the parameters of the advice.

Inter-type Member Declarations *in aspects*

int Foo . m (*int i*) { ... }
a method *int m(int)* owned by *Foo*, visible anywhere in the defining package. In the body, **this** refers to the instance of *Foo*, not the aspect.
private *int Foo . m* (*int i*) **throws** *IOException* { ... }
a method *int m(int)* that is declared to throw *IOException,* only visible in the defining aspect. In the body, **this** refers to the instance of *Foo*, not the aspect.
abstract *int Foo . m* (*int i*) ;
an abstract method *int m(int)* owned by *Foo*
Point . **new** (*int x, int y*) { ... }
a constructor owned by *Point*. In the body, **this** refers to the new *Point*, not the aspect.
private static *int Point . x* ;
a static *int* field named *x* owned by *Point* and visible only in the declaring aspect
private *int Point . x = foo()* ;
a non-static field initialized to the result of calling *foo()*. In the initializer, **this** refers to the instance of *Foo*, not the aspect.

general form:
[*Modifiers*] *Type Type . Id* (*Formals*)
[**throws** *TypeList*] { *Body* }
abstract [*Modifiers*] *Type Type . Id* (*Formals*)
[**throws** *TypeList*] ;
[*Modifiers*] *Type* . new (*Formals*)
[**throws** *TypeList*] { *Body* }
[*Modifiers*] *Type Type . Id* [= *Expression*] ;

Other Inter-type Declarations *in aspects*

declare parents : *C* **extends** *D*;
declares that the superclass of *C* is *D*. This is only legal if *D* is declared to extend the original superclass of *C*.
declare parents : C **implements** *I, J* ;
C implements *I* and *J*
declare warning : *set(* Point.*) && !within(Point)* : *"bad set"* ;
the compiler warns *"bad set"* if it finds a set to any field of *Point* outside of the code for *Point*
declare error : *call(Singleton.new(..))* : *"bad construction"* ;
the compiler signals an error *"bad construction"* if it finds a call to any constructor of *Singleton*
declare soft : *IOException* : *execution(Foo.new(..))*;
any IOException thrown from executions of the constructors of *Foo* are wrapped in **org.aspectj.SoftException**
declare precedence : *Security, Logging, ** ;
at each join point, advice from *Security* has precedence over advice from *Logging*, which has precedence over other advice.

general form
declare parents : *TypePat* **extends** *Type* ;
declare parents : *TypePat* **implements** *TypeList* ;
declare warning : *Pointcut* : *String* ;
declare error : *Pointcut* : *String* ;
declare soft : *Type* : *Pointcut* ;
declare precedence : *TypePatList* ;

Primitive Pointcuts

call (*void Foo.m(int)*)
a call to the method *void Foo.m(int)*
call (*Foo.new(..)*)
a call to any constructor of *Foo*
execution (* *Foo.*(..) throws IOException*)
the execution of any method of *Foo* that is declared to throw *IOException*
execution (*!public Foo .new(..)*)
the execution of any non-public constructor of *Foo*
initialization (*Foo.new(int)*)
the initialization of any *Foo* object that is started with the constructor *Foo(int)*
preinitialization (*Foo.new(int)*)
the pre-initialization (before the **super** constructor is called) that is started with the constructor *Foo(int)*
staticinitialization(*Foo*)
when the type *Foo* is initialized, after loading
get (*int Point.x*)
when *int Point.x* is read
set (*!private * Point.**)
when any non-private field of *Point* is assigned
handler (*IOException+*)
when an *IOException* or its subtype is handled with a catch block
adviceexecution()
the execution of all advice bodies
within (*com.bigboxco.**)
any join point where the associated code is defined in the package *com.bigboxco*
withincode (*void Figure.move()*)
any join point where the associated code is defined in the method *void Figure.move()*
withincode (*com.bigboxco.*.new(..)*)
any join point where the associated code is defined in any constructor in the package *com.bigoxco.*
cflow (*call(void Figure.move())*)
any join point in the control flow of each call to *void Figure.move()*. This includes the call itself.
cflowbelow (*call(void Figure.move())*)
any join point below the control flow of each call to *void Figure.move()*. This does not include the call.
if (*Tracing.isEnabled()*)
any join point where *Tracing.isEnabled()* is **true**. The boolean expression used can only access static members, variables bound in the same pointcut, and **thisJoinPoint** forms.

this (*Point*)
any join point where the currently executing object is an instance of *Point*
target (*java.io.InputPort*)
any join point where the target object is an instance of *java.io.InputPort*
args (*java.io.InputPort, int*)
any join point where there are two arguments, the first an instance of *java.io.InputPort,* and the second an *int*
args (**, int*)
any join point where there are two arguments, the second of which is an *int.*
args (*short, .., short)*
any join point with at least two arguments, the first and last of which are *short*s
Note: any position in **this**, **target**, and **args** can be replaced with a variable bound in the advice or pointcut.

general form:
call(*MethodPat*)
call(*ConstructorPat*)
execution(*MethodPat*)
execution(*ConstructorPat*)
initialization(*ConstructorPat*)
preinitialization(*ConstructorPat*)
staticinitialization(*TypePat*)
get(*FieldPat*)
set(*FieldPat*)
handler(*TypePat*)
adviceexecution()
within(*TypePat*)
withincode(*MethodPat*)
withincode(*ConstructorPat*)
cflow(*Pointcut*)
cflowbelow(*Pointcut*)
if(*Expression*)
this(*Type* | *Var*)
target(*Type* | *Var*)
args(*Type* | *Var* , …)
where *MethodPat* is:
[*ModifiersPat*] *TypePat* [*TypePat* .] *IdPat* (*TypePat* | .., …)
[**throws** *ThrowsPat*]
ConstructorPat is:
[*ModifiersPat*] [*TypePat* .] **new** (*TypePat* | .. , …)
[**throws** *ThrowsPat*]
FieldPat is:
[*ModifiersPat*] *TypePat* [*TypePat* .] *IdPat*
TypePat is one of:
IdPat [**+**] [**[]** …]
! *TypePat*
TypePat **&&** *TypePat*
TypePat **||** *TypePat*
(*TypePat*)