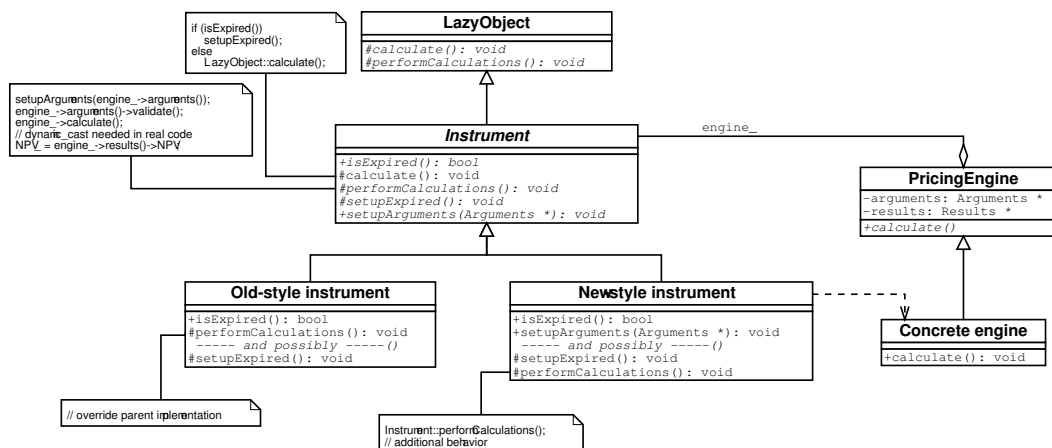


0.1 A developer's guide to the Instrument class

Since version 0.3.4, the Instrument class was reworked as shown in the following figure.



On the one hand, the checking of the expiration condition is now performed in a method `isExpired()` separated from the actual calculation, and a `setupExpired()` method is provided. The latter sets the NPV to 0.0 and can be extended in derived classes should any other results be returned.

On the other hand, the pricing-engine machinery previously contained in the Option class was moved upwards to the Instrument class. Also, the `setupEngine()` method was replaced by a `setupArguments(Arguments*)` method. This allows one to cleanly implement containment of instruments with code such as:

```

class FooArguments : public Arguments { ... };

class Foo : public Instrument {
public:
    void setupArguments(Arguments*);
    ...
};

class FooOptionArguments : public FooArguments { ... };

class FooOption : public Option {
private:
    Foo underlying_;
public:
    void setupArguments(Arguments* args) {
        underlying_.setupArguments(args);
        // set the option-specific part
    }
    ...
};
  
```

which was more difficult to write with `setupEngine()`.

Therefore, there are now two ways to inherit from Instrument, namely:

1. implement the `isExpired` method, and completely override the `performCalculations` method so that it bypasses the pricing-engine machinery. If the class declared any other results beside `NPV_` and `errorEstimate_`, the `setupExpired` method should also be extended

so that those results are set to a value suitable for an expired instrument. This was the migration path taken for all instruments not previously deriving from the `Option` class.

2. define suitable argument and result classes for the instrument and implement the `isExpired` and `setupArguments` methods, reusing the pricing-engine machinery provided by the default `performCalculations` method. The latter can be extended by first calling the default implementation and then performing any additional tasks required by the instrument—most often, copying additional results from the pricing engine results to the corresponding data members of the instrument. As in the previous case, the `setupExpired` method can be extended to account for such extra data members.