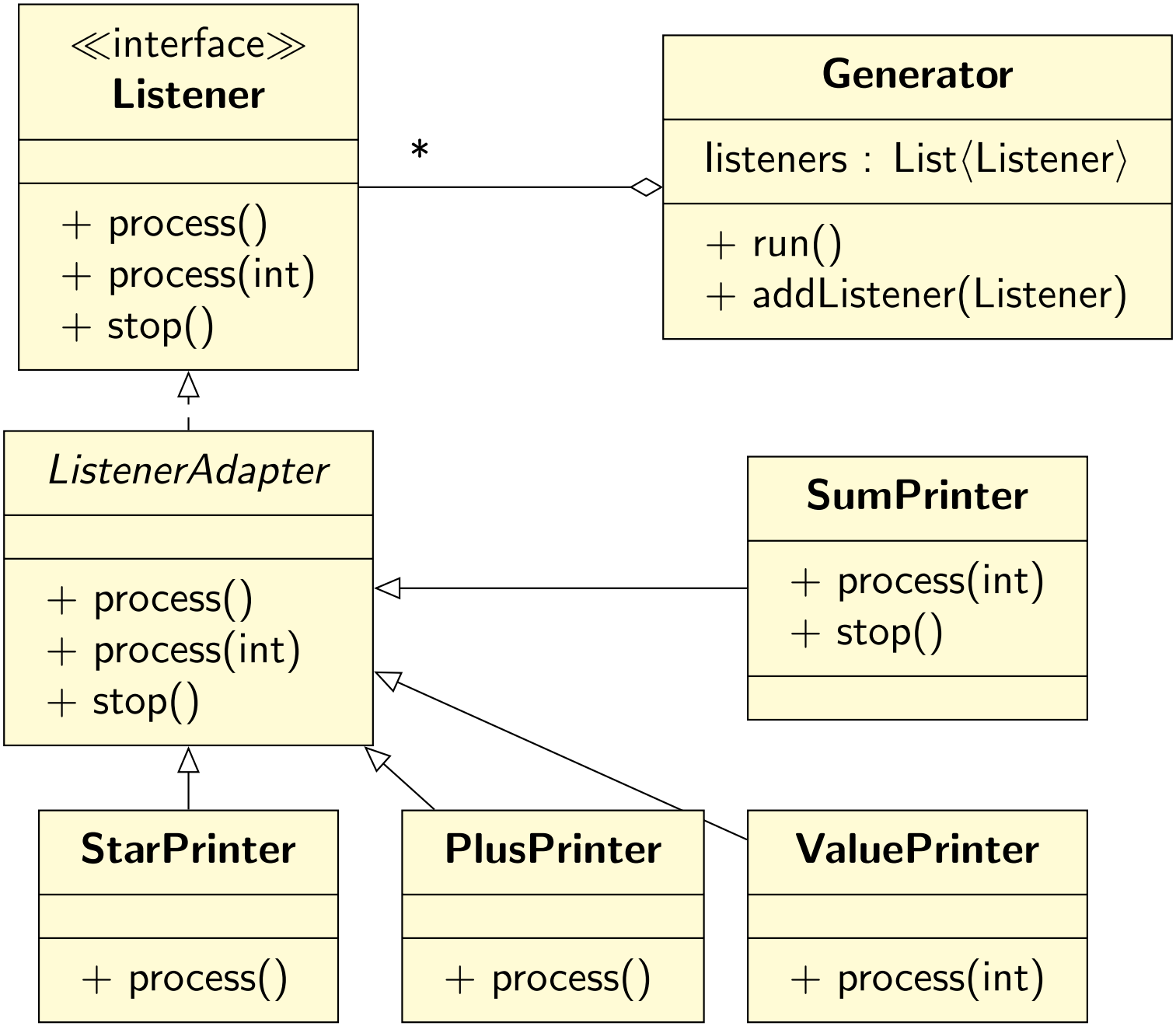
Listen

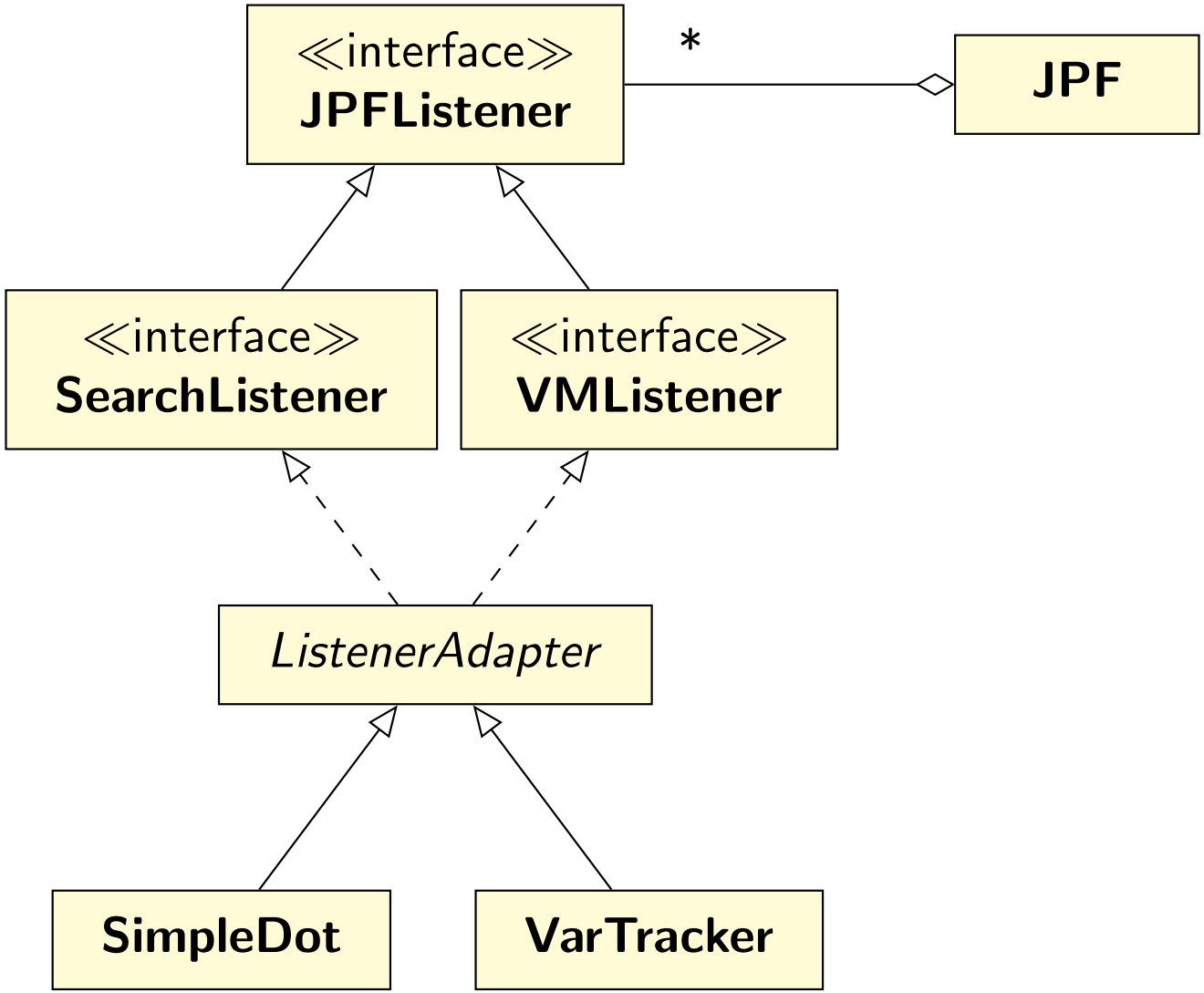
EECS 4315

www.eecs.yorku.ca/course/4315/

Generator and listeners



JPF and listeners



JPFListener

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Question

Why introduce an empty interface?

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Why introduce an empty interface?

Answer

JPF has a collection of `JPFListener`s, some can be `SearchListener`s and others can be `VMListener`s.

VMListener

```
public interface VMListener extends JPFListener {
  // VM has been initialized and, hence, classes
  // have been loaded
  void vmInitialized(VM vm);

  // A number of methods related to the execution
  // of instructions
  void executeInstruction(VM vm,
    ThreadInfo currentThread,
    Instruction instructionToExecute);

  void instructionExecuted (VM vm,
    ThreadInfo currentThread,
    Instruction nextInstruction,
    Instruction executedInstruction);
  ...
```

VMListener

```
// A number of methods related to threads
void threadStarted(VM vm,
  ThreadInfo startedThread);
...

// Class has been loaded
void loadClass(VM vm,
  ClassFile classFile);

// A number of methods related to objects
void objectCreated(VM vm,
  ThreadInfo currentThread,
  ElementInfo newObject);
...
```

VMListener

```
// A number of methods related to garbage
// collection
void gcBegin(VM vm);
...

// A number of methods related to exceptions
void exceptionThrown(VM vm,
  ThreadInfo currentThread,
  ElementInfo thrownException);
...
```

VMListener

```
// A number of methods related to choice
// generators
void choiceGeneratorRegistered(VM vm,
  ChoiceGenerator<?> nextCG,
  ThreadInfo currentThread,
  Instruction executedInstruction);
...

// A number of methods about methods
void methodEntered(VM vm,
  ThreadInfo currentThread,
  MethodInfo enteredMethod);
...
}
```

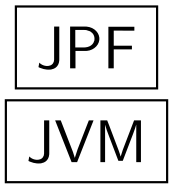
Garbage collector

Write a listener that prints a $*$ whenever the garbage collector is invoked by JPF.

Garbage collector

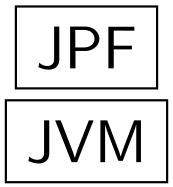
To compile the listener, make sure that `jpf.jar` is part of the classpath.

JPF as a JVM



- JPF is a JVM.
- Since JPF is written in Java, it runs on a JVM.

JPF as a JVM

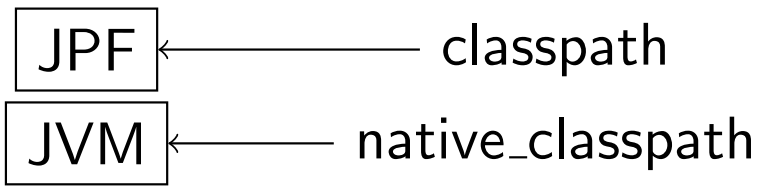


- JPF is a JVM.
- Since JPF is written in Java, it runs on a JVM.

- JPF model checks Java bytecode.
- JVM executes Java bytecode.

JPF as a JVM

Each JVM has a classpath which tells the JVM where to look for classes.



JPF as a JVM

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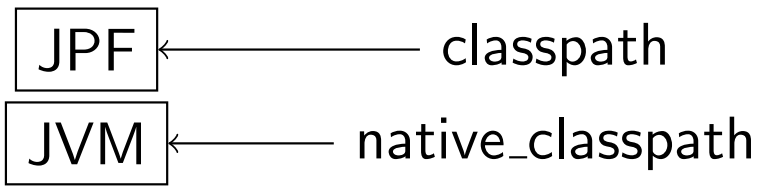

classpath of JPF: where JPF looks for classes to model check

native_classpath of JPF: where the JVM looks for classes to execute (as part of JPF)

Garbage collector

Write a listener that measures the amount of time (in milliseconds) JPFs garbage collector takes whenever it is invoked by JPF.