Logger in Java – Java Logging Example

Java Logging API was introduced in 1.4 and you can use java logging API to log application messages. In this java logging document, we will learn basic features of Java Logger. We will also look into Java Logger example of different logging levels, Logging Handlers, Formatters, Filters, Log Manager and logging configurations.

Java Logger

`java.util.logging.Logger` is the class used to log application messages in java logging API.

We can create java Logger with very simple one line code as;

```
Logger logger = Logger.getLogger(MyClass.class.getName());
```

Java Logging Levels

`java.util.logging.Level` defines the different levels of java logging. There are seven levels of logging in java.

1. SEVERE (highest)
2. WARNING
3. INFO

4. CONFIG
5. FINE
6. FINER
7. FINEST

There are two other logging levels, **OFF** that will turn off all logging and **ALL** that will log all the messages.

We can set the logger level using following code:

```
logger.setLevel(Level.FINE);
```

The logs will be generated for all the levels equal to or greater than the logger level. For example if logger level is set to INFO, logs will be generated for INFO, WARNING and SEVERE logging messages.

Java Logging Handlers

We can add multiple handlers to a java logger and whenever we log any message, every handler will process it accordingly. There are two default handlers provided by Java Logging API.

1. **ConsoleHandler**: This handler writes all the logging messages to console
2. **FileHandler**: This handler writes all the logging messages to file in the XML format.

We can create our own custom handlers also to perform specific tasks. To create our own Handler class, we need to extend `java.util.logging.Handler` class or any of it's subclasses like StreamHandler, SocketHandler etc.

Here is an example of a custom java logging handler:

```
package com.journaldev.log;

import java.util.logging.LogRecord;

import java.util.logging.StreamHandler;

public class MyHandler extends StreamHandler {

  @Override

  public void publish(LogRecord record) {

    //add own logic to publish

    super.publish(record);

  }
```

```
    @Override
    public void flush() {
        super.flush();
    }
    @Override
    public void close() throws SecurityException {
        super.close();
    }
}
```

Java Logging Formatters

Formatters are used to format the log messages. There are two available formatters in java logging API.

1. **SimpleFormatter**: This formatter generates text messages with basic information. ConsoleHandler uses this formatter class to print log messages to console.
2. **XMLFormatter**: This formatter generates XML message for the log, FileHandler uses XMLFormatter as a default formatter.

We can create our own custom Formatter class by extending `java.util.logging.Formatter` class and attach it to any of the handlers. Here is an example of a simple custom formatter class.

```
package com.journaldev.log;
import java.util.Date;
import java.util.logging.Formatter;
import java.util.logging.LogRecord;
public class MyFormatter extends Formatter {
    @Override
    public String format(LogRecord record) {
        return record.getThreadID()+"::"+record.getSourceClassName()+"::"
                +record.getSourceMethodName()+"::"
```

```
            +new Date(record.getMillis())+"::"
            +record.getMessage()+"\n";
    }
}
```

Logger in Java – Java Log Manager

`java.util.logging.LogManager` is the class that reads the logging configuration, create and maintains the logger instances. We can use this class to set our own application specific configuration.

```
LogManager.getLogManager().readConfiguration(new FileInputStream("mylogging.properties"));
```

Here is an example of Java Logging API Configuration file. If we don't specify any configuration, it's read from JRE Home `lib/logging.properties` file.

`mylogging.properties`

```
handlers= java.util.logging.ConsoleHandler
.level= FINE
# default file output is in user's home directory.
java.util.logging.FileHandler.pattern = %h/java%u.log
java.util.logging.FileHandler.limit = 50000
java.util.logging.FileHandler.count = 1
java.util.logging.FileHandler.formatter = java.util.logging.XMLFormatter
# Limit the message that are printed on the console to INFO and above.
java.util.logging.ConsoleHandler.level = INFO
java.util.logging.ConsoleHandler.formatter = java.util.logging.SimpleFormatter
com.journaldev.files = SEVERE
```

Here is a simple java program showing usage of Logger in Java.

```
package com.journaldev.log;
import java.io.FileInputStream;
import java.io.IOException;
import java.util.logging.ConsoleHandler;
import java.util.logging.FileHandler;
import java.util.logging.Handler;
import java.util.logging.Level;
import java.util.logging.LogManager;
import java.util.logging.Logger;
public class LoggingExample {
  static Logger logger = Logger.getLogger(LoggingExample.class.getName());
  public static void main(String[] args) {
    try {
      LogManager.getLogManager().readConfiguration(new
FileInputStream("mylogging.properties"));
    } catch (SecurityException | IOException e1) {
      e1.printStackTrace();
    }
    logger.setLevel(Level.FINE);
    logger.addHandler(new ConsoleHandler());
    //adding custom handler
    logger.addHandler(new MyHandler());
    try {
      //FileHandler file name with max size and number of log files limit
      Handler fileHandler = new FileHandler("/Users/pankaj/tmp/logger.log", 2000, 5);
      fileHandler.setFormatter(new MyFormatter());
      //setting custom filter for FileHandler
```

```
            fileHandler.setFilter(new MyFilter());
            logger.addHandler(fileHandler);

            for(int i=0; i<1000; i++){
                //logging messages
                logger.log(Level.INFO, "Msg"+i);
            }
            logger.log(Level.CONFIG, "Config data");
        } catch (SecurityException | IOException e) {
            e.printStackTrace();
        }
    }
}
```

When you will run above java logger example program, you will notice that CONFIG log is not getting printed in file, that is because of MyFilter class.

```
package com.journaldev.log;
import java.util.logging.Filter;
import java.util.logging.Level;
import java.util.logging.LogRecord;
public class MyFilter implements Filter {
	@Override
	public boolean isLoggable(LogRecord log) {
		//don't log CONFIG logs in file
		if(log.getLevel() == Level.CONFIG) return false;
		return true;
	}
}
```

Also the output format will be same as defined by MyFormatter class.

1::com.journaldev.log.LoggingExample::main::Sat Dec 15 01:42:43 PST 2012::Msg977

1::com.journaldev.log.LoggingExample::main::Sat Dec 15 01:42:43 PST 2012::Msg978

1::com.journaldev.log.LoggingExample::main::Sat Dec 15 01:42:43 PST 2012::Msg979

1::com.journaldev.log.LoggingExample::main::Sat Dec 15 01:42:43 PST 2012::Msg980

If we don't add our own Formatter class to FileHandler, the log message will be printed like this.

<record>

<date>2012-12-14T17:03:13</date>

<millis>1355533393319</millis>

<sequence>996</sequence>

<logger>com.journaldev.log.LoggingExample</logger>

<level>INFO</level>

<class>com.journaldev.log.LoggingExample</class>

<method>main</method>

<thread>1</thread>

<message>Msg996</message>

</record>

Console log messages will be of following format:

Dec 15, 2012 1:42:43 AM com.journaldev.log.LoggingExample main

INFO: Msg997

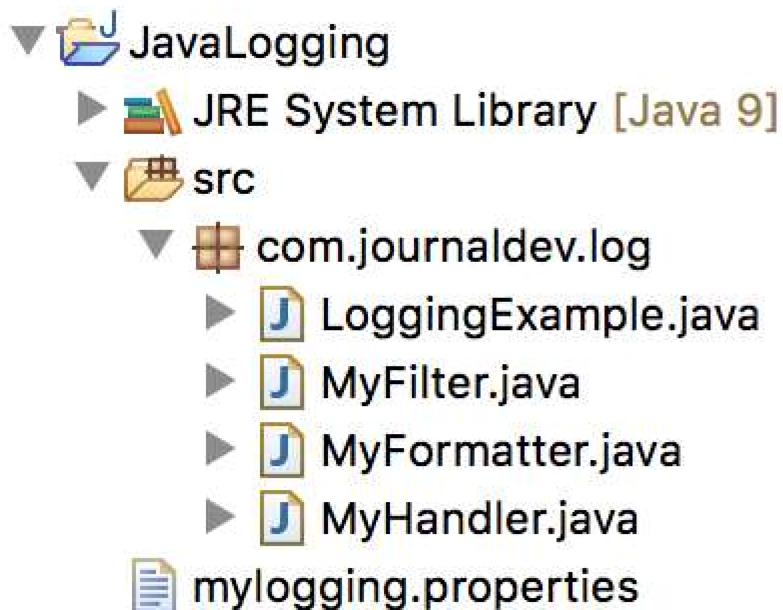
Dec 15, 2012 1:42:43 AM com.journaldev.log.LoggingExample main

INFO: Msg998

Dec 15, 2012 1:42:43 AM com.journaldev.log.LoggingExample main

INFO: Msg998

Below image shows the final Java Logger example project.



That's all for Logger in Java and Java Logger Example. You can download the project from [HERE]

Reference:

https://docs.oracle.com/javase/6/docs/api/java/util/logging/package-summary.html