Creating a Layered Text Editor

Hawk Weisman
hawk@hawkweisman.me
http://hawkweisman.me

Department of Computer Science
Allegheny College

March 27, 2015

Text Editors Today

1. Terminal-Based

Text Editors Today

1. Terminal-Based
   - `vim(1)`: released 1991, based on `vi(1)` from 1978

Text Editors Today

1. Terminal-Based
   - `vim(1)`: released 1991, based on `vi(1)` from 1978
   - `emacs(1)`: released 1976

Text Editors Today

1. Terminal-Based
   - `vim(1)`: released 1991, based on `vi(1)` from 1978
   - `emacs(1)`: released 1976
   - Minimal featureset

Text Editors Today

1. Terminal-Based
   - `vim(1)`: released 1991, based on `vi(1)` from 1978
   - `emacs(1)`: released 1976
   - Minimal featureset
   - Extensible and hackable

Text Editors Today

1. Terminal-Based
   - `vim(1)`: released 1991, based on `vi(1)` from 1978
   - `emacs(1)`: released 1976
   - Minimal featureset
   - Extensible and hackable
2. GUI-Based

Text Editors Today

1. Terminal-Based
   - `vim(1)`: released 1991, based on `vi(1)` from 1978
   - `emacs(1)`: released 1976
   - Minimal featureset
   - Extensible and hackable
2. GUI-Based
   - IDEs (Eclipse, Visual Studio, IntelliJ IDEA, XCode ...)

Text Editors Today

1. Terminal-Based
   - `vim(1)`: released 1991, based on `vi(1)` from 1978
   - `emacs(1)`: released 1976
   - Minimal featureset
   - Extensible and hackable
2. GUI-Based
   - IDEs (Eclipse, Visual Studio, IntelliJ IDEA, XCode ...)
     - Many features built in

Text Editors Today

1. Terminal-Based
   - `vim(1)`: released 1991, based on `vi(1)` from 1978
   - `emacs(1)`: released 1976
   - Minimal featureset
   - Extensible and hackable
2. GUI-Based
   - IDEs (Eclipse, Visual Studio, IntelliJ IDEA, XCode ...)
     - Many features built in
     - Often language-specific

Text Editors Today

1. Terminal-Based
   - `vim(1)`: released 1991, based on `vi(1)` from 1978
   - `emacs(1)`: released 1976
   - Minimal featureset
   - Extensible and hackable
2. GUI-Based
   - IDEs (Eclipse, Visual Studio, IntelliJ IDEA, XCode ...)
     - Many features built in
     - Often language-specific
     - Information overload?

Text Editors Today

1. Terminal-Based
   - `vim(1)`: released 1991, based on `vi(1)` from 1978
   - `emacs(1)`: released 1976
   - Minimal featureset
   - Extensible and hackable
2. GUI-Based
   - IDEs (Eclipse, Visual Studio, IntelliJ IDEA, XCode ...)
     - Many features built in
     - Often language-specific
     - Information overload?
   - Text Editors (SublimeText, notepad++, TextMate ...)

Text Editors Tomorrow

- Many programmers still prefer terminal-based editors

Text Editors Tomorrow

- Many programmers still prefer terminal-based editors
- But programming in 2015 is very different from programming in 1976

Text Editors Tomorrow

- Many programmers still prefer terminal-based editors
- But programming in 2015 is very different from programming in 1976
- **Idea**: display information in *layers*

Text Editors Tomorrow

- Many programmers still prefer terminal-based editors
- But programming in 2015 is very different from programming in 1976
- **Idea**: display information in *layers*
  - First proposed by Gary Bernhardt in *A Whole New World*

Text Editors Tomorrow

- Many programmers still prefer terminal-based editors
- But programming in 2015 is very different from programming in 1976
- **Idea**: display information in *layers*
  - First proposed by Gary Bernhardt in *A Whole New World*
  - **Modal editors:** multiplex keyboard commands

Text Editors Tomorrow

- Many programmers still prefer terminal-based editors
- But programming in 2015 is very different from programming in 1976
- **Idea**: display information in *layers*
  - First proposed by Gary Bernhardt in *A Whole New World*
  - **Modal editors:** multiplex keyboard commands
  - **Layered editors:** multiplex information display

```
     * @return The object result of the evaluation, or null if there was no
     *         result.
     * @throws ScriptException
     *             if an error takes place during script execution. The
     *             ScriptException wraps the native exceptions thrown by
     *             Beanshell.
     * @throws IOException
     *                 if an error takes place while accessing the FileHan
     * @see com.meteorcode.pathway.script.ScriptContainer#eval(FileHandle)
     */
    @Override
    public Object eval(FileHandle file) throws
            ScriptException, IOException {
        try {
            String script = file.readString();
            return i.eval(script);
        } catch (EvalError e) {
            throw new ScriptException(
                "Script evaluation from file caused EvalError", e);
        } catch (InterpreterError e) {
            throw new ScriptException(
                    "Script evaluation from file caused InterpreterError",
                    e);
        } /*catch (IOException e) {
            throw new ScriptException("Could not open script file", e);
        }*/
    }
```

GameObject.java

```
     * @return The object result of the evaluation, or null if there was no
     *         result.
     * @throws ScriptException
     *             if an error takes place during script execution. The
     *             ScriptException wraps the native exceptions thrown by
     *             Beanshell.
     * @throws IOException
     *                 if an error takes place while accessing the FileHan
     * @see com.meteorcode.pathway.script.ScriptContainer#eval(FileHandle)
     */
    @Override
    public Object eval(FileHandle file) throws
            ScriptException, IOException {
        try {
            String script = file.readString();
            return i.eval(script);
        } catch (EvalError e) {
            throw new ScriptException(
                "Script evaluation from file caused EvalError", e);
        } catch (InterpreterError e) {
            throw new ScriptException(
                "Script evaluation from file caused InterpreterError",
                e);
++      } /*catch (IOException e) {
++          throw new ScriptException("Could not open script file", e);
++      }*/
    }
```

GameObject.java -- (diff)

```
     * @return The object result of the evaluation, or null if there was no
     *         result.
     * @throws ScriptException
     *             if an error takes place during script execution. The
     *             ScriptException wraps the native exceptions thrown by
     *             Beanshell.
     * @throws IOException
     *                 if an error takes place while accessing the FileHan
     * @see com.meteorcode.pathway.script.ScriptContainer#eval(FileHandle)
     */
    @Override
    public Object eval(FileHandle file) throws
            ScriptException, IOException {
2           try {
2               String script = file.readString();
1           return i.eval(script);
1           } catch (EvalError e) {
1               throw new ScriptException(
1                   "Script evaluation from file caused EvalError", e);
0           } catch (InterpreterError e) {
0               throw new ScriptException(
0                   "Script evaluation from file caused InterpreterError",
0                   e);
            } /*catch (IOException e) {
                throw new ScriptException("Could not open script file", e);
            }*/
    }
```

GameObject.java -- (coverage)

```
     * @return The object result of the evaluation, or null if there was no
     *         result.
     * @throws ScriptException
     *             if an error takes place during script execution. The
     *             ScriptException wraps the native exceptions thrown by
     *             Beanshell.
     * @throws IOException
     *                 if an error takes place while accessing the FileHan
     * @see com.meteorcode.pathway.script.ScriptContainer#eval(FileHandle)
     */
    @Override
    public Object eval(FileHandle file) throws
            ScriptException, IOException {
            try {
    file: FileHandle, fileHandle.readString() -> String
                String script = file.readString();
    script: String, ScriptContainer.eval(String) -> Object
                return i.eval(script);
            } catch (EvalError e) {
                throw new ScriptException(
    e: EvalError
                        "Script evaluation from file caused EvalError", e);
            } catch (InterpreterError e) {
                throw new ScriptException(
                        "Script evaluation from file caused InterpreterError",
    e: InterpreterError
                        e);
GameObject.java -- (types)
```

Evaluation

1. User Studies

Evaluation

1. User Studies
    - Students in introductory programming courses (112, 210)

Evaluation

1. User Studies
   - Students in introductory programming courses (112, 210)
   - **Performance:** time to complete assignments

Evaluation

1. User Studies
   - Students in introductory programming courses (112, 210)
   - **Performance:** time to complete assignments
   - **Opinions:** satisfaction, ease of use, ease to learn

Evaluation

1. User Studies
   - Students in introductory programming courses (112, 210)
   - **Performance:** time to complete assignments
   - **Opinions:** satisfaction, ease of use, ease to learn
2. Plugin Developers

Evaluation

1. User Studies
   - Students in introductory programming courses (112, 210)
   - **Performance:** time to complete assignments
   - **Opinions:** satisfaction, ease of use, ease to learn
2. Plugin Developers
   - Open-source release

Evaluation

1. User Studies
   - Students in introductory programming courses (112, 210)
   - **Performance:** time to complete assignments
   - **Opinions:** satisfaction, ease of use, ease to learn
2. Plugin Developers
   - Open-source release
   - Collect feedback

Evaluation

1. User Studies
   - Students in introductory programming courses (112, 210)
   - **Performance:** time to complete assignments
   - **Opinions:** satisfaction, ease of use, ease to learn
2. Plugin Developers
   - Open-source release
   - Collect feedback
   - Compare lines of code with plugins for other editors

Questions?

Contact me: hi@hawkweisman.me

More information: `http://hawkweisman.me/notebook/ideas/2015/03/04/a-layer-based-text-editor/`