Programming Guidelines

Prof. Dr. Dirk Riehle

Friedrich-Alexander University Erlangen-Nürnberg

ADAP B01

Programming Guidelines

- Programming guidelines …
  - are are a set of rules and conventions that determine
    - naming,
    - formating and
    - structuring
  - of source code and related artifacts
- Programming guidelines …
  - make developers more effective
  - ease reading source code
  - should be mandatory

First Rule of Programming Guidelines

Respect existing

rules and conventions

Java Programming Guidelines [S97]

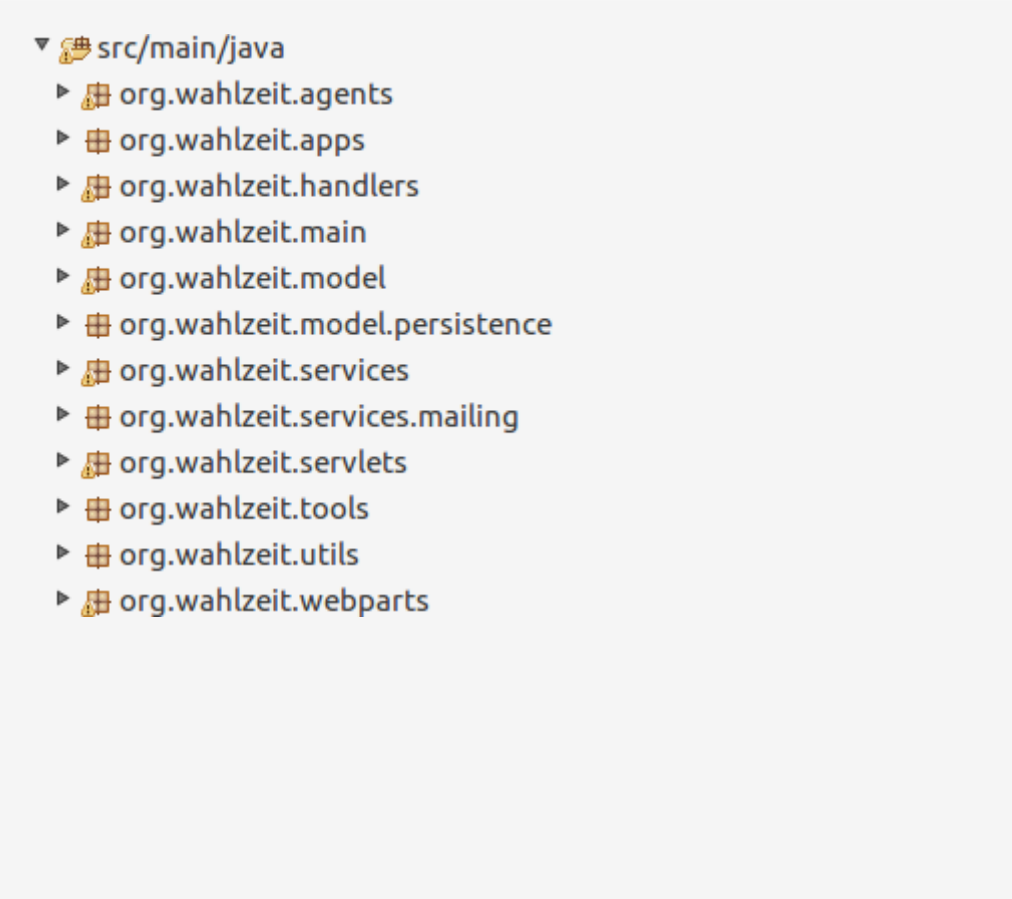
- We use the original Java guidelines: http://goo.gl/hNaJsG
  - While old, these are still the current guidelines
- Where those fail, we use Google's Java guidelines
  - See https://google.github.io/styleguide/javaguide.html

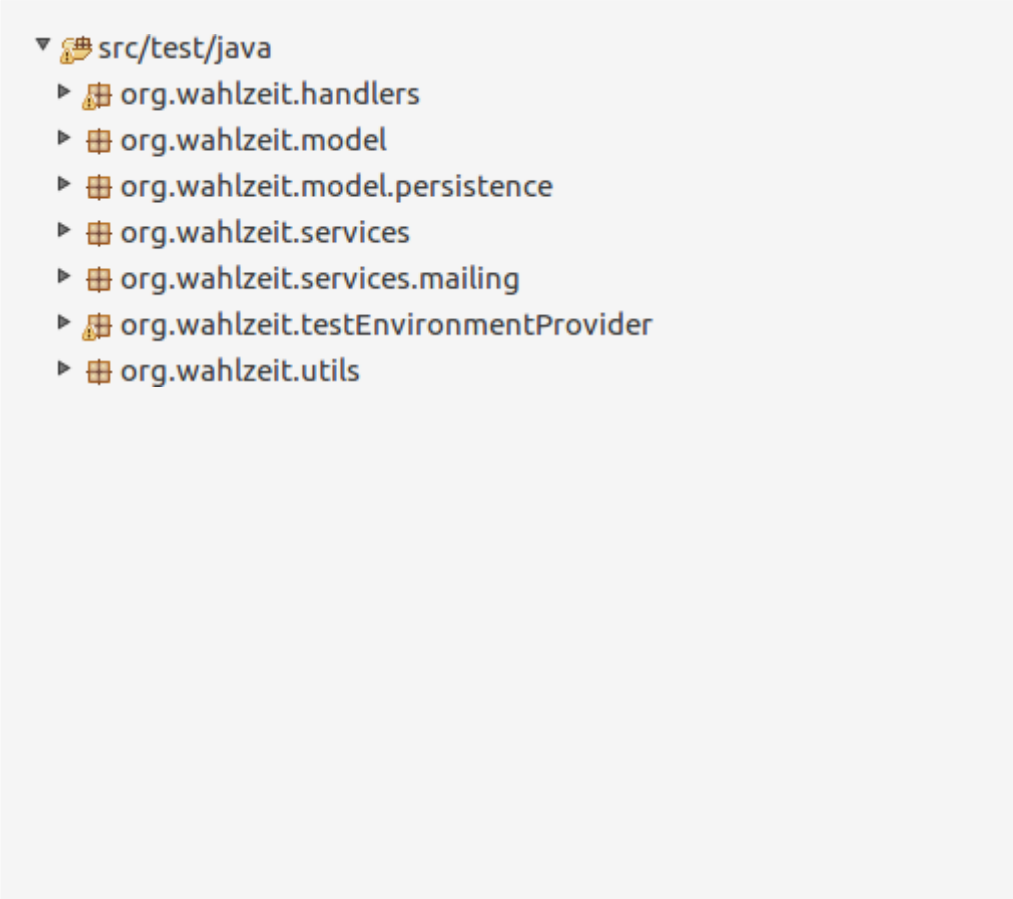
File Names

- Stick to established file naming conventions
  - For example, file names should match main class name
- Stick to established suffixes (.java, .gradle, .war)
- Stick with established file names (README, LICENSE)

File Organization

- Stick with folder structure provided as default (web apps)
- Separate source from test folder hierarchy





File Content

- Beginning comments
  - Without the programmer name
- Package declaration
- Import statements
- Program code with comments
  - Class declaration
  - Field declarations
  - Method definition
  - ...

File Content Example

3.1.1 Beginning Comments

All source files should begin with a c-style comment that lists the class name, version information, date, and copyright notice:

```
/*
 * Classname
 *
 * Version information
 *
 * Date
 *
 * Copyright notice
 */

...
```

Naming Elements

- Nouns
  - Classes
  - Interfaces
  - Packages
  - Fields
- Verbs
  - Methods

Order of Adjectives in the English Language

adjectives in English absolutely have to be in this order: opinion-size-age-shape-colour-origin-material-purpose Noun. So you can have a lovely little old rectangular green French silver whittling knife. But if you mess with that word order in the slightest you'll sound like a maniac. It's an odd thing that every English speaker uses that list, but almost none of us could write it out. And as size comes before colour, green great dragons can't exist.

Naming Objects and Classes 1 / 2

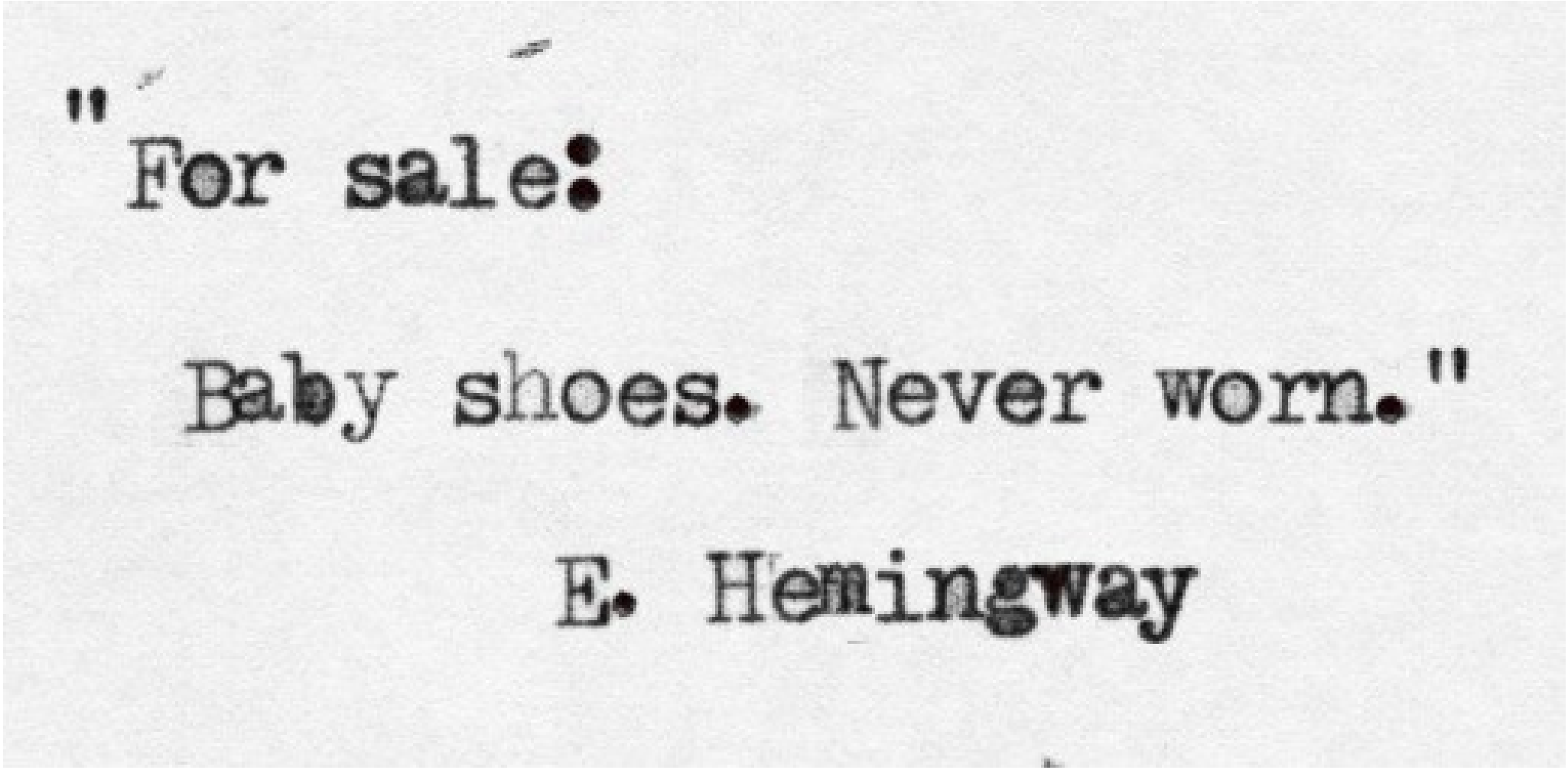
quantity - opinion - size - age - shape - color - origin - material - purpose

- Class and interface names
  - File // no adjective
  - TempFile // adding age
  - BigTempFile // adding size
  - BigTempHotRedFile // adding “color”
  - BigTempHotRedBinaryFile // adding “material”
  - BigTempSequentialHotRedBinaryFile // adding shape
- Object names (variable/field names)
  - invalidBigTempSequentialHotRedBinaryFile // adding opinion
  - doublyInvalidBigTempSequentialHotRedBinaryFile // adding quantity

Naming Objects and Classes 2 / 2

- An adjective can take the genitive form (but should rarely)
  - Usually only happens if the genitive form is an established domain term
    - Examples: FileOfBits vs BinaryFile, QuoteBook vs. BookOfQuotes
- Use of reserved adjectives (abstract, default, etc)
  - By default lead the noun (no other explanation but convention)
    - Examples: AbstractSequentialFile, DefaultHashMap
- Fields have an implied specifier (a, one, many, the, all)
  - It is often omitted for reasons of brevity
- More conventions in lectures on class and interface design

For Sale: Baby shoes. Never worn.



ErnestHemingwaysForSaleNeverWornBabyShoesUltraShortStory

Naming Methods

- Methods are commands
  - Simplify, use active voice (e.g. prepare rather than bePreparedFor)
- Follow established patterns
  - Specifically, container(-like) classes have a fair number of conventions
    - Add and remove
    - Insert, prepend, append, remove
    - What is the difference between remove and delete?
- More conventions in lectures on method types and properties

Code Formatting

- One statement per line
- Semantic line wrapping after defined length
- Use of consistent bracketing
  - Sun’s guidelines don’t tell you how
  - How to decide what to use?
- Indentation for readability
  - Use tabs not spaces

Techniques for Avoiding Bugs

- Initialize fields where declared
- Declare variables only at beginning of blocks
- Bracket even single-statement blocks
- …

- Consider using FindBugs or similar tools

Techniques that Depend on Context

```
if (arg == null) {
  return -1;
}

if (someCondition) {
  return 1;
}

if (anotherCondition) {
  return 2;
}

return 0;
```

```
int result = 0;

if (arg == null) {
  result = -1;
} else if (someCondition) {
    result = 1;
  } else if (anotherCondition) {
      result = 2;
    } else {
      result = 0;
    }
  }
}

return result;
```

Techniques Too Smart for the Rest of Us

```
if (null == arg) {
  doSomething();
}
```

Clear Commit Messages

Google Git Sign in

android / platform / packages / apps / GlobalSearch / 592150ac00086400415afe936d96f04d3be3ba0c^! / .

```
    commit 592150ac00086400415afe936d96f04d3be3ba0c        [log] [tgz]
    author Anonymous Coward <nobody@android.com>          Wed Aug 19 15:44:42 2009 -0700
 committer Anonymous Coward <nobody@android.com>          Wed Aug 19 15:56:16 2009 -0700
      tree 33a5517dcfba62a2652a5b809b71a6c9ff4514cd
    parent 500413e48c7b96743ea13357aa2fba856edd1c8c [diff]
```

```
Remove the search engine setting. Hard-code the search engine to Google,
using EnhancedGoogleSearchProvider if available, otherwise GoogleSearch if
available, otherwise throwing a RuntimeException requiring one of these
packages.
```

```
diff --git a/res/xml/preferences.xml b/res/xml/preferences.xml
index 25cd7f5..eae8034 100644
--- a/res/xml/preferences.xml
+++ b/res/xml/preferences.xml
```

```
@@ -20,16 +20,8 @@
     <PreferenceCategory
             android:title="@string/web_search_category_title">
```

Review / Summary of Session

- General programming guidelines
  - What are programming guidelines?
  - Why do we have them? What is their importance?
- Java programming guidelines
  - What are example guidelines?
  - How and where to read up for a complete set?
- Things not covered by guidelines
  - What naming conventions beyond guidelines are there?
  - What techniques? How and when to learn?

Thanks! Questions?

dirk.riehle@fau.de – http://osr.cs.fau.de

dirk@riehle.org – http://dirkriehle.com – @dirkriehle

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- Contributions
  - ...

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It is Friedrich-Alexander University Erlangen-Nürnberg – FAU, in short.

Corporate identity wants us to say “Friedrich-Alexander University”.

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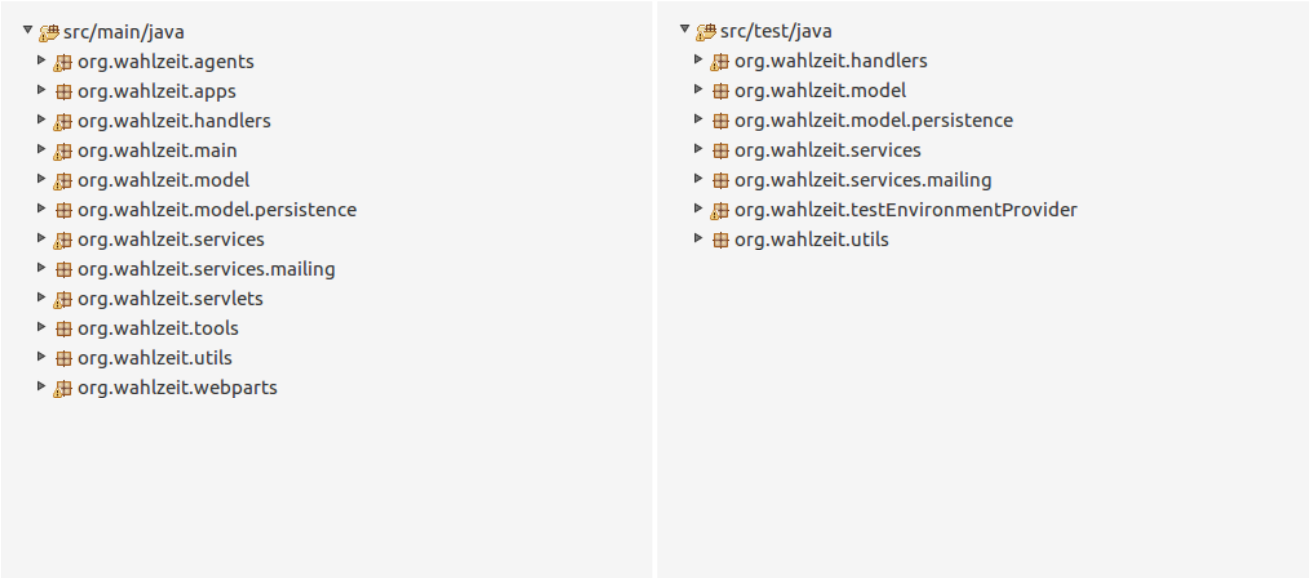

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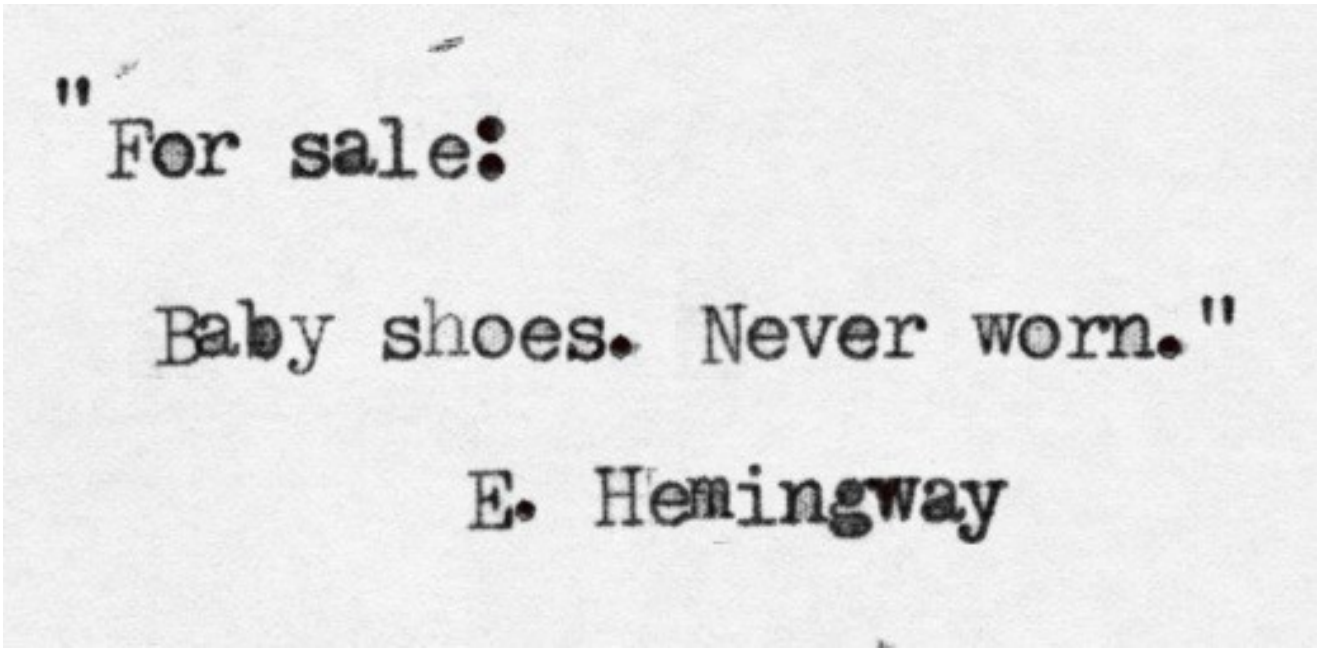

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commit	592150ac00086400415afe936d96f04d3be3ba0c	[log] [tgz]
author	Anonymous Coward <nobody@android.com>	Wed Aug 19 15:44:42 2009 -0700
committer	Anonymous Coward <nobody@android.com>	Wed Aug 19 15:56:16 2009 -0700
tree	33a5517dcfba62a2652a5b809b71a6c9ff4514cd	
parent	500413e48c7b96743ea13357aa2fba856edd1c8c [diff]	

```
Remove the search engine setting. Hard-code the search engine to Google,
using EnhancedGoogleSearchProvider if available, otherwise GoogleSearch if
available, otherwise throwing a RuntimeException requiring one of these
packages.
```

```
diff --git a/res/xml/preferences.xml b/res/xml/preferences.xml
index 25cd7f5..eae8034 100644
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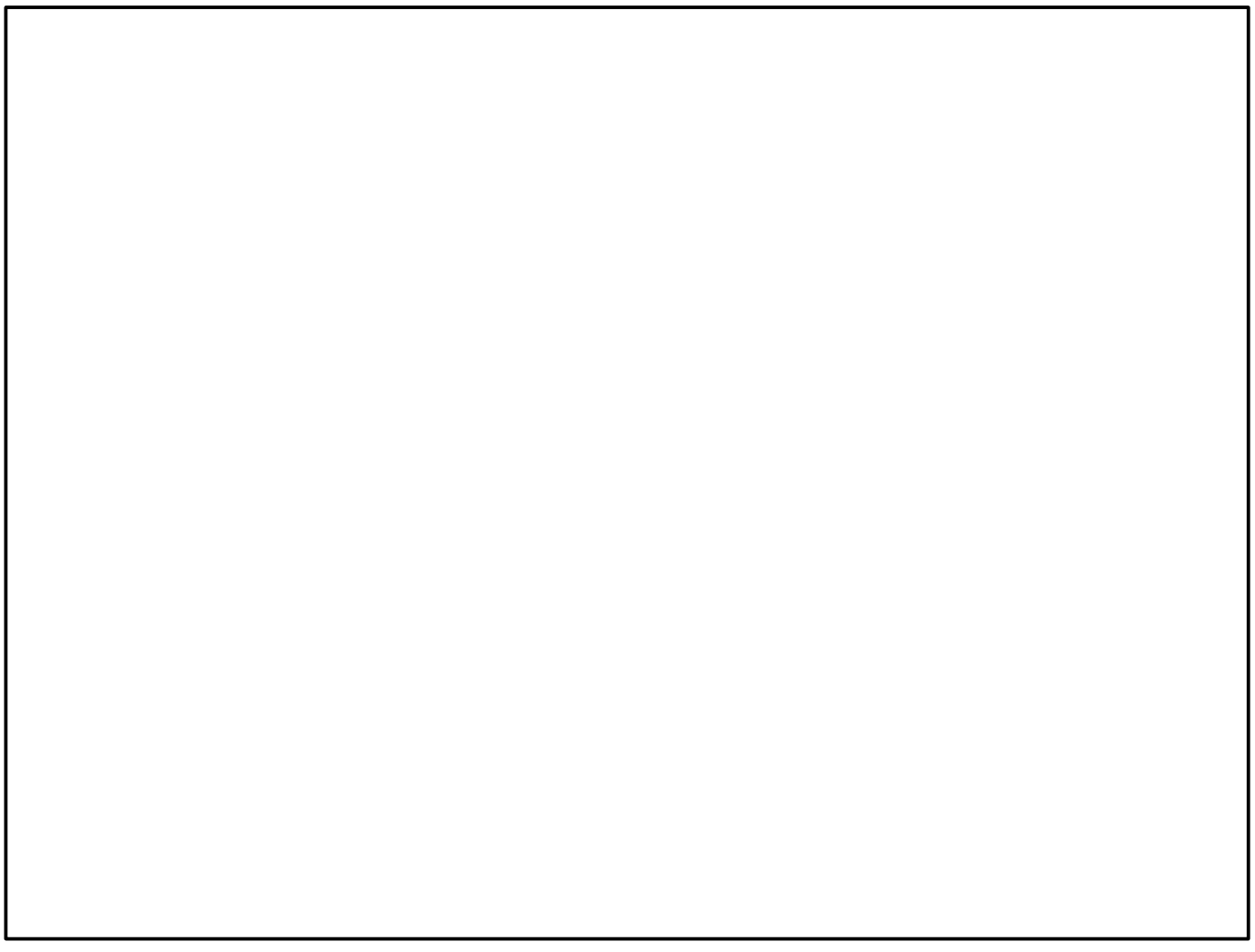

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