Code Smells

First *code smell*: Long Parameter List

```
private void writeMetadatatoPdf(List<ParserResult> loaded, String
filesAndCitekeys, Charset encoding, XmpPreferences xmpPreferences,
FilePreferences filePreferences, BibDatabaseMode databaseMode,
BibEntryTypesManager entryTypesManager, FieldWriterPreferences
fieldWriterPreferences, boolean writeXMP, boolean embeddBibfile) {
    if (loaded.isEmpty()) {
        LOGGER.error("The write xmp option depends on a valid import
option.");
        return;
    }
    ParserResult pr = loaded.get(loaded.size() - 1);
    BibDatabaseContext databaseContext = pr.getDatabaseContext();
    BibDatabase dataBase = pr.getDatabase();

    XmpPdfExporter xmpPdfExporter = new
XmpPdfExporter(xmpPreferences);
    EmbeddedBibFilePdfExporter embeddedBibFilePdfExporter = new
EmbeddedBibFilePdfExporter(databaseMode, entryTypesManager,
fieldWriterPreferences);

    if ("all".equals(filesAndCitekeys)) {
        for (BibEntry entry : dataBase.getEntries()) {
            writeMetadatatoPDFsOfEntry(databaseContext,
entry.getCitationKey().orElse("<no cite key defined>"), entry,
encoding, filePreferences, xmpPdfExporter, embeddedBibFilePdfExporter,
writeXMP, embeddBibfile);
        }
        return;
    }

    Vector<String> citeKeys = new Vector<>();
    Vector<String> pdfs = new Vector<>();
    for (String fileOrCiteKey : filesAndCitekeys.split(",")) {
        if (fileOrCiteKey.toLowerCase(Locale.ROOT).endsWith(".pdf")) {
            pdfs.add(fileOrCiteKey);
        } else {
            citeKeys.add(fileOrCiteKey);
        }
    }

    writeMetadatatoPdfByCitekey(databaseContext, dataBase, citeKeys,
encoding, filePreferences, xmpPdfExporter, embeddedBibFilePdfExporter,
writeXMP, embeddBibfile);
    writeMetadatatoPdfByFileNames(databaseContext, dataBase, pdfs,
encoding, filePreferences, xmpPdfExporter, embeddedBibFilePdfExporter,
writeXMP, embeddBibfile);

}
```

This long parameter list code smell can be found in **jabref > cli > ArgumentProcessor.**

This method has ten parameters, which is too much. Some of them could be transformed into parameter objects (for example, the various preferences parameters) in order to reduce the parameter count.

Second *code smell*: Reminder Comments

```
// TODO: Move to OS.java
public static NativeDesktop getNativeDesktop() {
    if (OS.WINDOWS) {
        return new Windows();
    } else if (OS.OS_X) {
        return new OSX();
    } else if (OS.LINUX) {
        return new Linux();
    }
    return new DefaultDesktop();
}
```

This reminder comment code smell can be found in **jabref > gui > desktop > JabRefDesktop.**

These comments take on a reminder nature, indicating something that needs to be done, which designates bad code.

Third *code smell*: Long Method

```
private Node createToolbar() {
    final ActionFactory factory = new
ActionFactory(Globals.getKeyPrefs());

    final Region leftSpacer = new Region();
    final Region rightSpacer = new Region();

    final PushToApplicationAction pushToApplicationAction =
getPushToApplicationsManager().getPushToApplicationAction();
    final Button pushToApplicationButton =
factory.createIconButton(pushToApplicationAction.getActionInformation(
), pushToApplicationAction);

pushToApplicationsManager.registerReconfigurable(pushToApplicationButt
on);

    // Setup Toolbar

    ToolBar toolBar = new ToolBar(
```

```
            new HBox(

factory.createIconButton(StandardActions.NEW_LIBRARY, new
NewDatabaseAction(this, prefs)),

factory.createIconButton(StandardActions.OPEN_LIBRARY, new
OpenDatabaseAction(this, prefs, dialogService, stateManager)),

factory.createIconButton(StandardActions.SAVE_LIBRARY, new
SaveAction(SaveAction.SaveMethod.SAVE, this, prefs, stateManager))),

            leftSpacer,

            globalSearchBar,

            rightSpacer,

            new HBox(

factory.createIconButton(StandardActions.NEW_ARTICLE, new
NewEntryAction(this, StandardEntryType.Article, dialogService, prefs,
stateManager)),

factory.createIconButton(StandardActions.NEW_ENTRY, new
NewEntryAction(this, dialogService, prefs, stateManager)),
                    createNewEntryFromIdButton(),

factory.createIconButton(StandardActions.NEW_ENTRY_FROM_PLAIN_TEXT,
new ExtractBibtexAction(dialogService, prefs, stateManager)),

factory.createIconButton(StandardActions.DELETE_ENTRY, new
EditAction(StandardActions.DELETE_ENTRY, this, stateManager))
            ),

            new Separator(Orientation.VERTICAL),

            new HBox(
                    factory.createIconButton(StandardActions.UNDO, new
UndoRedoAction(StandardActions.UNDO, this, dialogService,
stateManager)),
                    factory.createIconButton(StandardActions.REDO, new
UndoRedoAction(StandardActions.REDO, this, dialogService,
stateManager)),
                    factory.createIconButton(StandardActions.CUT, new
EditAction(StandardActions.CUT, this, stateManager)),
                    factory.createIconButton(StandardActions.COPY, new
EditAction(StandardActions.COPY, this, stateManager)),
                    factory.createIconButton(StandardActions.PASTE,
new EditAction(StandardActions.PASTE, this, stateManager))
            ),

            new Separator(Orientation.VERTICAL),

            new HBox(
                    pushToApplicationButton,

factory.createIconButton(StandardActions.GENERATE_CITE_KEYS, new
GenerateCitationKeyAction(this, dialogService, stateManager,
taskExecutor, prefs)),
```

```
factory.createIconButton(StandardActions.CLEANUP_ENTRIES, new
CleanupAction(this, prefs, dialogService, stateManager))
            ),

            new Separator(Orientation.VERTICAL),

            new HBox(

factory.createIconButton(StandardActions.OPEN_GITHUB, new
OpenBrowserAction("https://github.com/JabRef/jabref")),

factory.createIconButton(StandardActions.OPEN_FACEBOOK, new
OpenBrowserAction("https://www.facebook.com/JabRef/")),

factory.createIconButton(StandardActions.OPEN_TWITTER, new
OpenBrowserAction("https://twitter.com/jabref_org"))
            ),

            new Separator(Orientation.VERTICAL),

            new HBox(
                    createTaskIndicator()
            )
    );

    leftSpacer.setPrefWidth(50);
    leftSpacer.setMinWidth(Region.USE_PREF_SIZE);
    leftSpacer.setMaxWidth(Region.USE_PREF_SIZE);
    HBox.setHgrow(globalSearchBar, Priority.ALWAYS);
    HBox.setHgrow(rightSpacer, Priority.SOMETIMES);

    toolBar.getStyleClass().add("mainToolbar");

    return toolBar;
}
```

This long method code smell can be found in **jabref > gui > JabRefFrame.**

Even though this method is setting up a user interface, it is still hard to read. A solution to make the method more readable and easier to understand would be to divide it into smaller methods.

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