Software Engineering Practice

# Scenario

Your team are part of a small software company that are working on an image manipulation program imaginatively called ‘fotoshop’. The company is hoping this is the first in a line of products including “pro” and “mini” versions, all of which will share the core, underlying structure. Therefore, it is critical that the code base is easy to maintain and extend. It is also intended this product will be sold to non-English speaking countries, too.

Initially, the company requested a simple prototype that used the command line to manipulate images. These commands are:

|  |  |
| --- | --- |
| open <file> | Loads an image in <file> as the current workable image |
| save <file> | Saved the current working image to <file> |
| help | Offers a helpful list of instructions |
| quit | Quits the workbench |
| look | Report the status of the workbench: for each image loaded, it provides the name of the image, the input file, a list of operations that have been applied to it. |
| mono | Converts the current workable image to monochrome. |
| rot90 | Rotates the image 90 degrees. |
| script <file> | Runs a script of commands from <file> (this is a text file with each command on a new line). |

Future plans include:

* An image cache of images being worked on. Each image in the cache should include the list of filters applied to it so they can be undone. The interface to the cache is:

|  |  |
| --- | --- |
| put <name> | Add a copy of the current image to the cache as <name>. |
| get <name> | Replaces the current working image with a copy of the image <name> from the cache. |

* An undo operation that removes the last filter from the image. Note: some operations cannot be undone as the image.
* Support for internationalisation.
* Further filters.
* A graphical user interface.

Your team looks over the prototype generated by an intern from the University of Sarre. You find this under fotoshop-bad.zip on StudyNet. You save a copy of this file, unzip it, inspect it and despair at the code: it’s awful. In its current state it simply cannot be extended, let alone meet any of the company’s ambitions. Your team has been given the task to refactor this code in order to meet the company’s goals.

# Your team

Groups must have a **minimum of three and a maximum of five** members. Groups larger or smaller than this will be split and/or merged with other groups.

When you have formed your group, **one** of you please e-mail [j.williams30@herts.ac.uk](mailto:j.williams30@herts.ac.uk) with the subject[[1]](#footnote-1):

SEP GROUP FORMATION

Include in the e-mail body: the full names, IDs and university e-mail address of your group members.

# Your tasks

There are three parts to this assignment. First, write a critique of the prototype. Second, refactor the code to remedy the shortcomings while using good software engineering practices. Finally, write a report explaining your improvements.

Read these instructions very carefully. Particularly pay attention to the requirements and future plans of the company, as your solution must support these.

**NB Use Netbeans for any coding, please do submit any BlueJ projects.**

## Critique the prototype (15%)

Read the existing code to understand what it is doing, and figure out where and why it is bad. You may find consulting your notes from Object Oriented Development last semester on cohesion and coupling as a start for your critique. Bear in mind the goals of the company as well as good software engineering practices.

Bullet point the critiques and ***briefly*** describe why they are a problem. Put these in a file called critiques.pdf

## Refactor (75% - split into two parts)

Refactor the bad ‘fotoshop’ prototype and fix the fundamental issues within. Your team’s implementation must show good design throughout and, critically, it must support the company’s plans for the future. Your code must be professionally written and will be assessed for good software engineering practices, which include:

### 2. a) Coding (45%)

* Correctness
* Design (think: cohesion, coupling, maintainability, extensibility)
* Supports the company’s future ambitions
* Appropriate use of language constructs
* Style (comments, indentation, etc.)

Your team’s solution must also integrate the following **new features** from the company’s wish list:

* Internationalisation support (see: <https://docs.oracle.com/javase/tutorial/i18n/index.html>)
* A cache for images
* An undo command

### 2. b) Software Engineering Practices (30%)

Your team must also provide:

* Appropriate unit tests…
  + …and evidence of good unit test coverage. Place screenshots of your coverage results within the ‘improvements’ report as an appendix.
* Static analysis report
* Full, complete commit logs in your chosen version control system that show every member of the team contributing to the project (it is very important one or two people aren’t just doing all work)
  + Please place the commit log in the ‘improvements’ report as either screenshots or a copy/paste dump.
* Good documentation (via JavaDocs)

## Report (10%)

Write brief notes on each of your improvements. E.g. how do they reduce coupling and increase cohesion? How do they increase extensibility? How do they support the plans of your company? Writing quality commit messages and keeping a logbook will certainly make writing this report a lot easier. Put these in a file called improvements.pdf

Use this report to also list bugs and/or limitations within your solution.

# What you should submit

You must submit the project by 23:59, March 22rd 2019. You must include in **ONE** zip file uploaded to StudyNet which includes:

1. Your PDF critique of the prototype, critique.pdf
2. The complete source code and JavaDoc documentation for your code. Please place the JavaDocs in a folder within the root called javadocs
3. Your PDF report, improvements.pdf.
4. A file called team.pdf that simply lists your team name, the members of your team (full names) and their student ID.

**Please submit one zip file PER GROUP. Name your zip file <group\_number>\_sep\_1819.zip replacing <group\_number> with your allocated group number. E.g. group1\_sep\_1819.zip**

# Unsure?

If you are unsure about any aspect of this assessment or what is expected of you, please speak to your lab tutor or contact [j.williams30@herts.ac.uk](mailto:j.williams30@herts.ac.uk) in good time. Please do not leave essential queries to the last minute, as it is unlikely you will receive the help you need in time. Please also check you have necessary access to submit the assessment.

1. It must follow this wording exactly, as it will automatically get placed into a folder that may otherwise get missed. [↑](#footnote-ref-1)