

DALHOUSIE UNIVERSITY

TOPICS IN PROGRAM COMPREHENSION

CSCI 6306

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# Architecture Extraction

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*Group : Something*

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Note: Our fourth group member, Anto Anthony Arulappan had an emergency in the family and had to leave to India for the same. He has dropped the course and hence will no longer be a part of our group.

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## Abstract

Your abstract.

# 1 Finding a Software System

We looked at the following software systems and games.

1. **Kodi**: Kodi is an open source software media player and entertainment hub. This is available on atleast seven platforms. This was one of the first softwares we looked at and kept it as a contender
2. **Quake III**: The source code for Quake is challenging and interesting. However, there is almost no documentation for the same and hence we decided not to go ahead with this for now.
3. **GIMP**: GIMP is a cross platform image editor with an excellent community backing it up. We decided to extract the architecture for GIMP. We talk more about GIMP in the further sections.

We also looked at Doom3, SuperTuxKart, Wordpress, TuxRunner and Linux but found GIMP to be the most interesting on to use for this assignment

# 2 About GIMP

Gimp was designed initially as a General image manipulation program. This was later changed to GNU Image Manipulation Program. It is free and openly available to retouch and edit images, convert image formats and more specialized tasks targeted towards image manipulation. GIMP provides an interface to handle simple graphics needs without learning advanced methods for image manipulation. GIMP is more user friendly as compared to other photoshop techniques and can be modified to fit your needs. And the best part about it is that it is free.

```

5102 unique files.
1859 files ignored.
[
github.com/AlDanial/cloc v 1.72 T=42.12 s (81.5 files/s, 87718.6 lines/s)

```

Language	files	blank	comment	code
P0 File	446	567383	750322	1378612
C	1409	142802	85749	608029
C/C++ Header	1229	17629	25137	61853
make	153	1698	512	12006
HTML	7	8	0	11229
Racket	55	1077	1443	5946
Python	27	974	832	3739
Perl	12	596	216	3680
m4	8	580	36	3108
Windows Module Definition	10	14	6	2970
Qt	5	0	13	1911
XML	37	75	15	1424
yacc	3	114	73	588
Bourne Shell	7	84	59	422
C++	1	70	25	387
JSON	1	0	0	317
XSLT	4	53	12	207
lex	3	91	63	188
Bourne Again Shell	4	37	1	115
Windows Resource File	1	33	45	111
DTD	4	14	4	57
Markdown	1	16	0	39
DOS Batch	1	4	0	32
INI	1	0	0	29
Lua	2	18	45	24
vim script	1	4	12	12
diff	2	3	11	11
CMake	1	1	0	4
SUM:	3435	733378	864631	2097050

Figure 1: CLOC output for GIMP

## 3 Counting the lines of code

### 3.1 Count Lines of Code

Count Lines of Code, abbreviated as CLOC is a software used to count comment lines, blank lines and physical lines of code[?]. We used this software initially when we looked at what software system we need to pick. We can look at figure 1 for the output for GIMP.

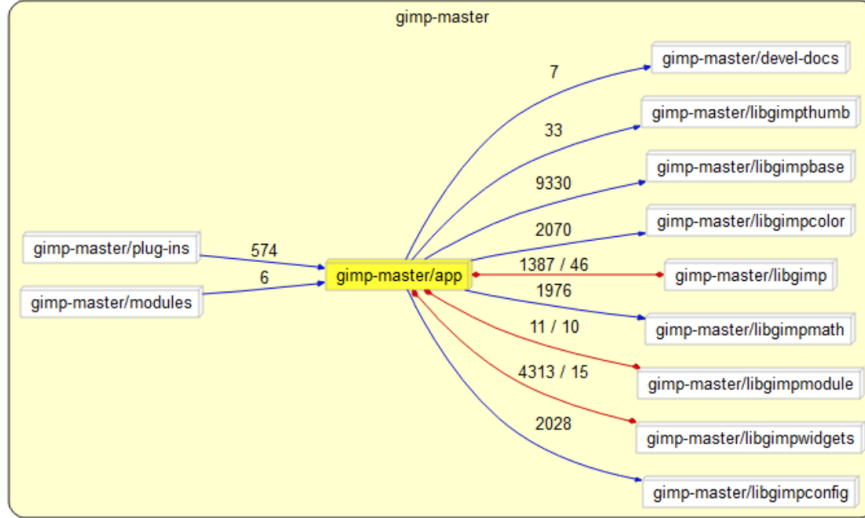


Figure 2: Directory Structure

### 3.2 LocMetrics

LocMetrics[?] is very similar to what CLOC does. We did find this software interesting because of how it visualized the output.

## 4 Architecture Extraction Tool

## 5 Directory Structure

We generated a butterfly diagram in figure 2 for the directory structure. Using this and the documentation we did want to identify the main folder we would want to have a look at. We concluded that the app directory is the main directory that we are concerned about. It contains the source code for GIMP without any external tools or plugins. We would ideally ignore the modules, plugins and libraries for now and focus on the app directory. So we did the same for the app folder in figure 3. It was easy to comprehend since GIMP is very well organized with a good community support and documentation. The app/core directory is the guts of the GIMP software. Looking at the

documentation provided for GIMP, major changes that need to be made start here. With the goal of refactoring in mind, this is where we would start, keeping in mind that changing files here will have an avalanche effect, so we need to be prepared for big changes in other files depending on these.

## **6 Entry Point**

## **7 Build Process**

## **8 Control Flow**

## **9 Dependencies**

## **10 Algorithms**

To find the underlying algorithms behind the operations performed on GIMP, the wiki for the same had a link to the algorithms used. We expected to find all the underlying algorithms here but encountered a problem. There was only one operation described here shown in figure 4.

Since this is implemented in the `gimpoperationflood.c`, the best way to find the algorithms for the other operations performed would be to have a look at where this file is located.

The `app/operations` folder is where this file located. Looking at the other files in the folder, we got an idea of where to look incase we had to change or add any further operations. Since these operations are triggered using the GUI, changing something here would cause us to look at the UI elements to be updated as well.

## **11 Conclusion**

### **11.1 Tables and Figures**

Use the `table` and `tabular` commands for basic tables — see Table ??, for example. You can upload a figure (JPEG, PNG or PDF) using the files

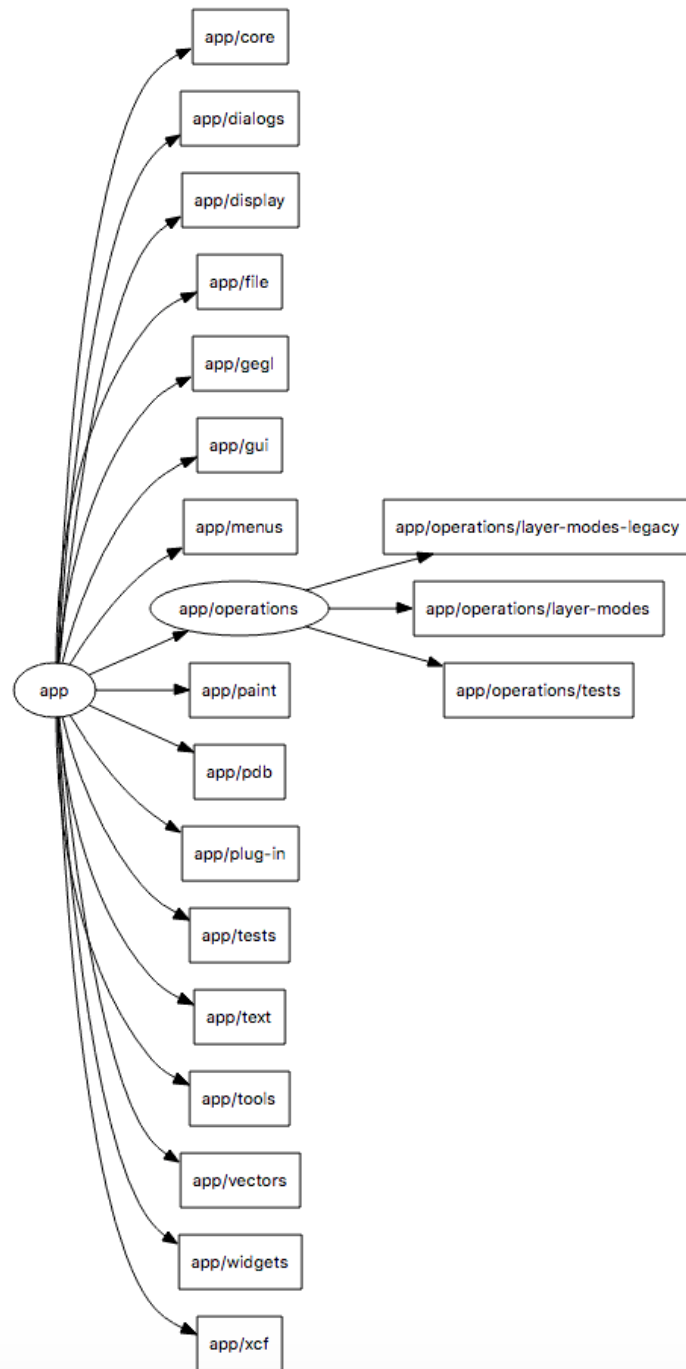


Figure 3: Directory Structure for app folder



Operation name	PDB operation name	GUI menu item	Implementation file	Description
<code>gimp:flood</code>	<code>gimp-selection-flood</code>	Select -> Remove holes	<a href="#">gimpoperationflood.c</a>	<a href="#">Flood algorithm</a>

Figure 4: Documentation on operation algorithms

menu. To include it in your document, use the `includegraphics` command as in the code for Figure ?? below.

1. Like this,
2. and like this.

...or bullet points ...

- Like this,
- and like this.

We hope you find `writeLATEX` useful, and please let us know if you have any feedback using the help menu above.

## References

- [1] <http://www.locmetrics.com/>
- [2] <https://github.com/AlDanial/cloc>