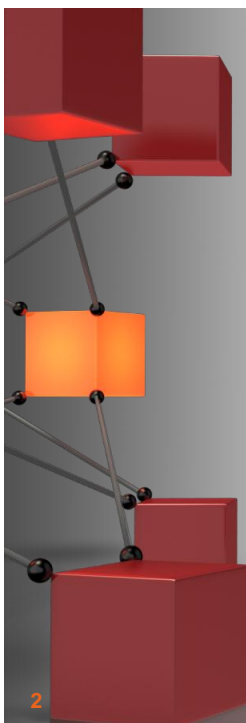



Code Documentation & Doxygen


COS 121 – Christoph Stallmann

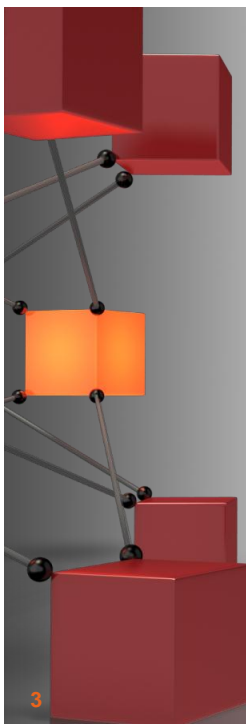


Introduction

- Written text and diagrams that accompanies your source code or software:
 - Explains how the code works
 - Explains how to use the code
 - Explains how to use the software

2

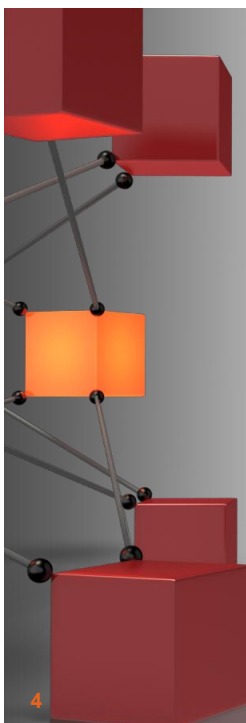





Introduction

- Means different things to different people:
- User manual for software users
- UML diagrams for software modellers
- API documentation for coders


3

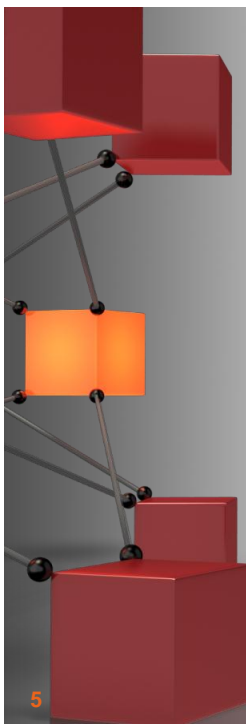


Reason

- Why bother?
- **Helps you** when you didn't work on a piece of code for a while.
- **Helps colleagues** and team members with your implementation.
- Future coders might need to **extend your code**.

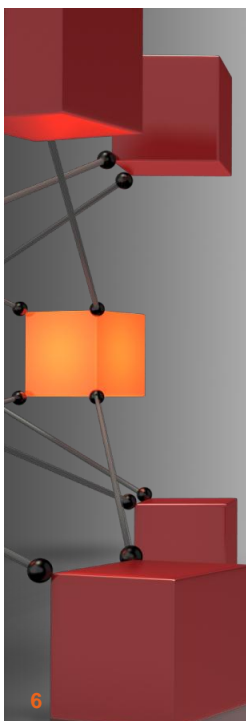

4






Reason

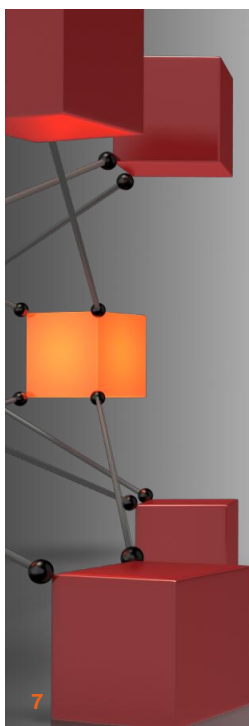
- Why bother?
- **Third parties** might use your code.
- Used for internal and external **quality checks**.
- **Proof of contract** that certain things were implemented.



Types

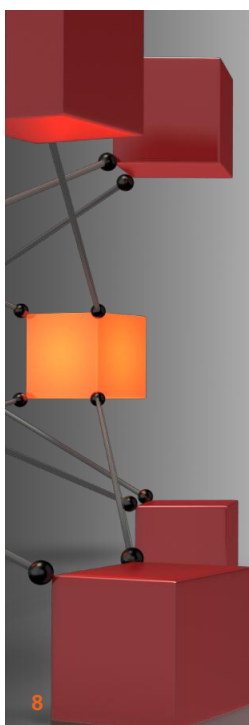
- **Requirements documentation:**
 - States what the system should do.
 - States what the client wants.
- **Architecture and Design documentation:**
 - States how the system should be implemented.
- **Technical documentation:**
 - Description of code, algorithms, libraries and APIs.
- **End-user documentation:**
 - Manuals and tutorials on how to use the system.



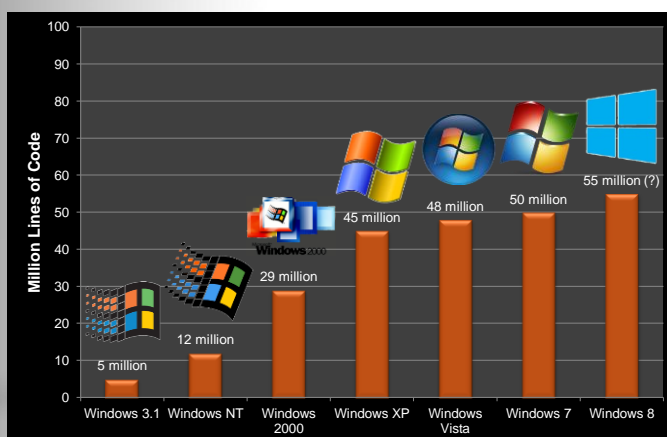


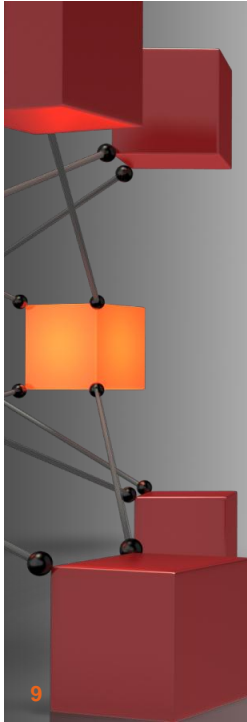
Types

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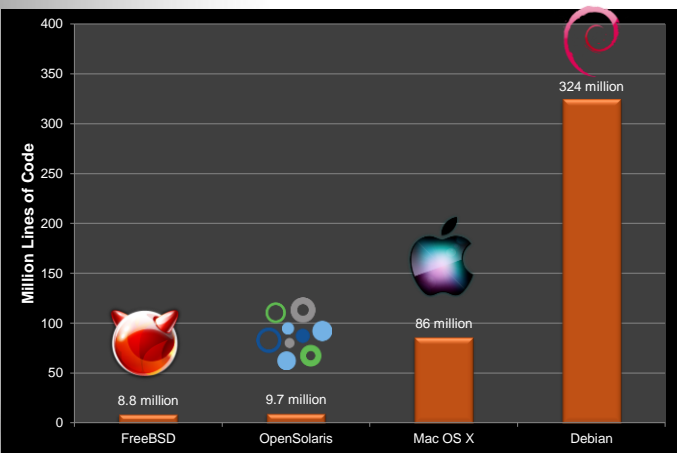


Statistics - Windows

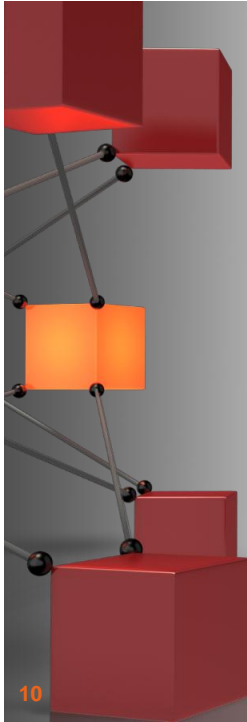




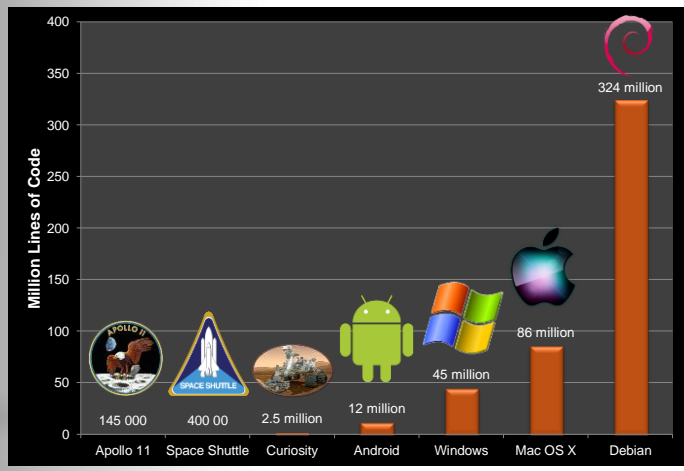
Statistics - Unix



9

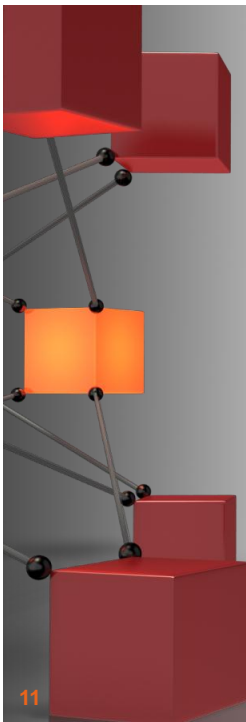


Statistics - Comparison




10



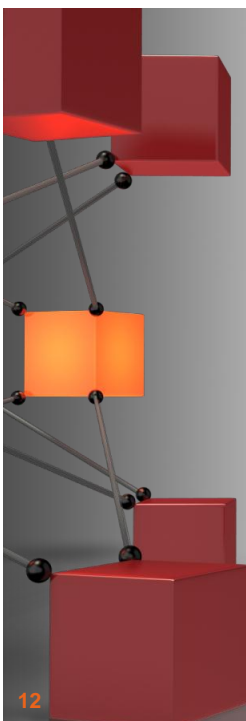


Statistics

- South Africa is the **83rd** (from **194**) richest (poorest) countries in the world.
 - That is in the middle.
- The president of SA is the **8th** highest paid politician in the world.
 - Before Russia, China, UK and Australia.
- Jacob Zuma earns about **R2.7 million** per annum.




11

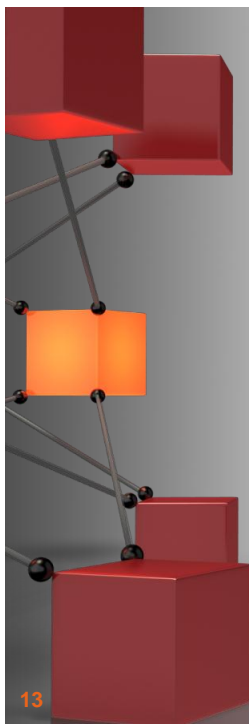


Statistics

- Ohloh estimates it will cost **\$8 billion** to develop 324 million lines of code.
- Therefore to develop Debian, it will take Zuma's entire salary for:
 - **27 000 000 000** years
 - **27 billion** years
 - **6 times longer** than the earth exists



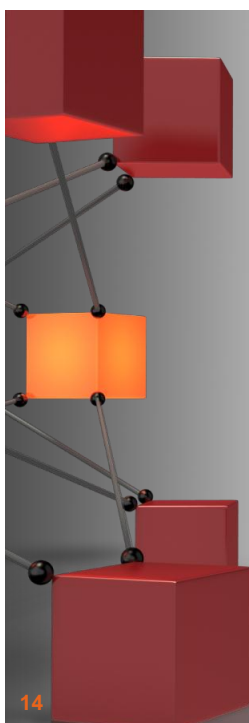
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Statistics

- A productive programmer writes about **1000** lines of code per day.
- Therefore to develop Debian it will take a single programmer:
 - **324 000** days.
 - **1350** years (on an average working-week).
 - This excludes documentation, planning, design and testing.

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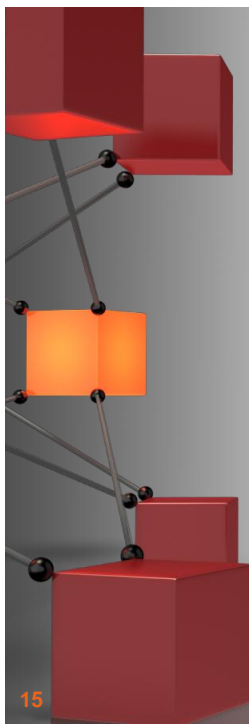


Statistics - Documentation

- Microsoft's MSDN Library (English) documentation has:
 - **3 154 289** topics
- With 3 pages per topic, 40 lines per page
 - **380 million** lines of documentation
 - **8 times more** documentation than code in Windows.

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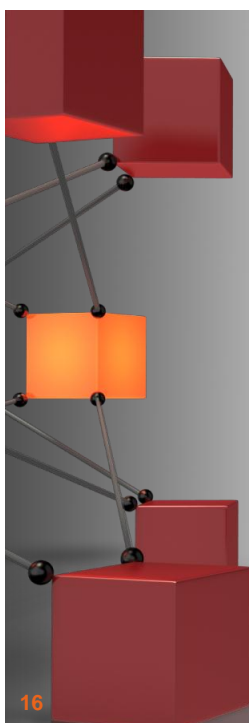
Doxygen

- Documentation generator
 - Standards for documenting code
 - Tools for converting code into different formats
- Supports many programming languages:
 - C++
 - C#
 - Java
 - PHP
 - Python
 - Many more ...

The logo for Doxygen, featuring the word "doxygen" in a stylized, blue, lowercase font with a white outline and a slight shadow effect.



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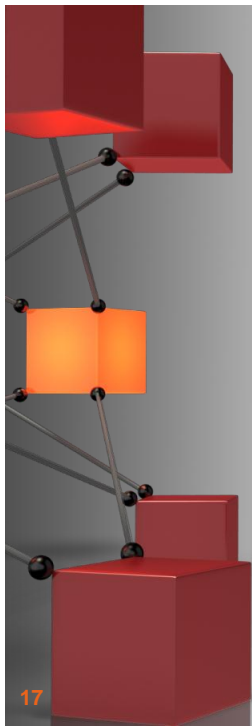


Doxygen

- <http://www.doxygen.org>
- Free of charge:
 - Open source
 - GNU General Public License (GPL)
- Written in C++
- Release:
 - Initial: October 1997
 - Latest: August 2012



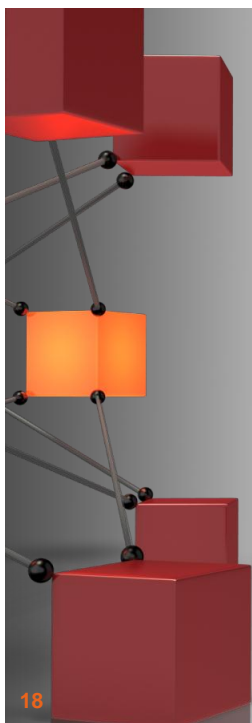
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Doxygen Installation

- Ubuntu:
 - 413 MB
 - `sudo apt-get install doxygen doxygen-gui`
 - Start GUI with terminal command: `doxywizard`
- Windows:
 - 15 MB
 - Download installer from their site
- Mac OS X:
 - 44 MB
 - Download installer from their site

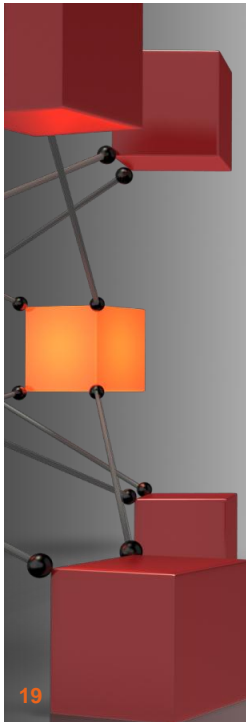
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Example Code

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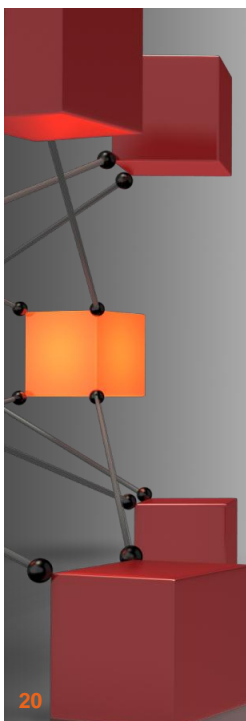



C++ Comments

```
// This is a single-line comment
```

```
/*  
  This  
  is  
  a  
  multi-line  
  comment  
*/
```

19




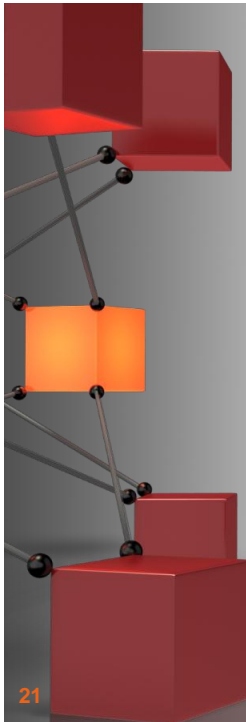
Doxygen Comments

```
/// This is a single-line Doxygen comment
```

```
/**  
  This  
  is  
  a  
  multi-line  
  Doxygen  
  comment  
*/
```

20

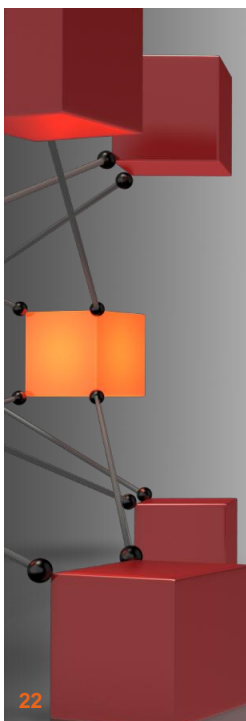





Qt Doxygen Comments

```
///  
  
/*!  
  This  
  is  
  a  
  multi-line  
  Qt Doxygen  
  comment  
*/
```


21

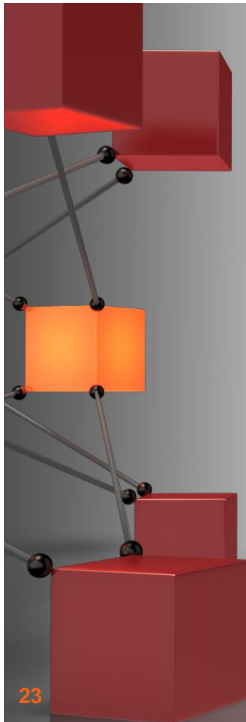


Doxygen Tags

- Tags start with @ or \
- Depends on which version you use
- Mostly both of them work
- Example:
 - @tag
 - \tag

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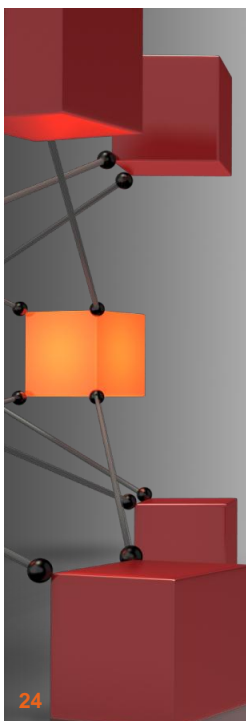




Doxygen – Class Tags

- @file
- @class
- @author
- @version
- @brief
- @section

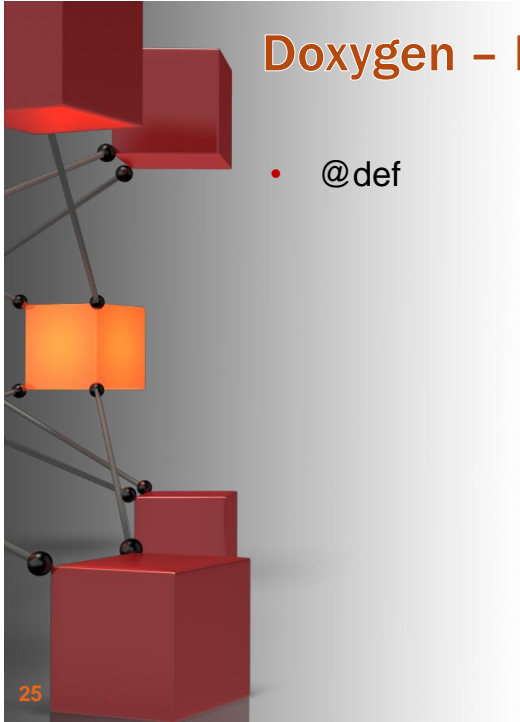
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Class Tags Example

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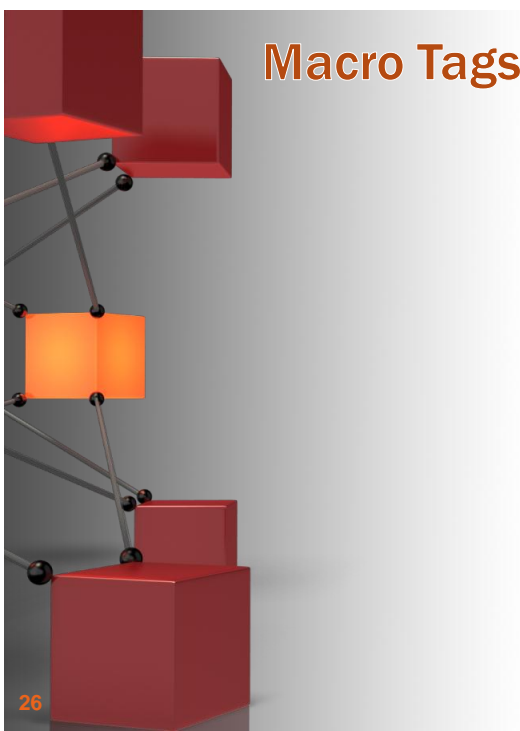




Doxygen - Macro Tags

- @def

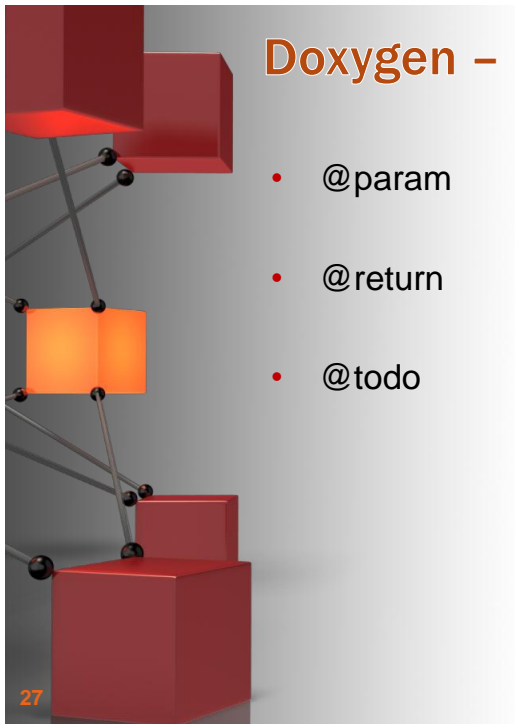
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Macro Tags Example

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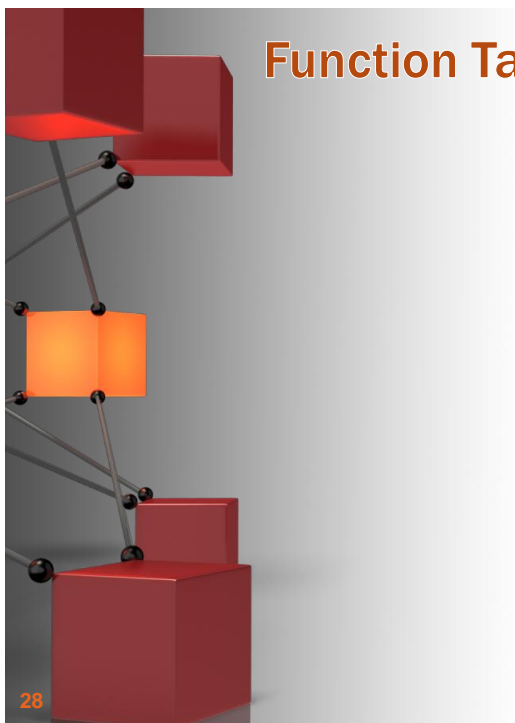




Doxygen - Function Tags

- @param
- @return
- @todo

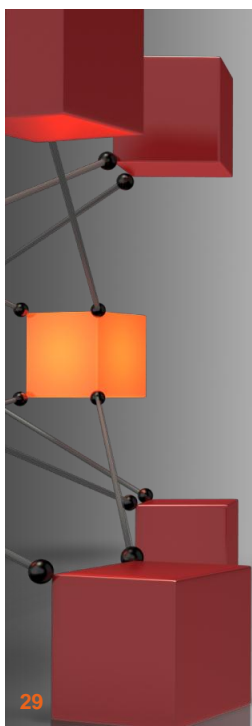
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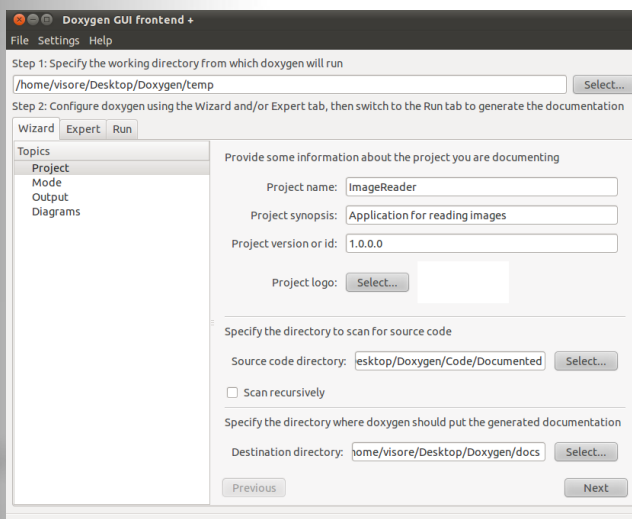
Function Tags Example

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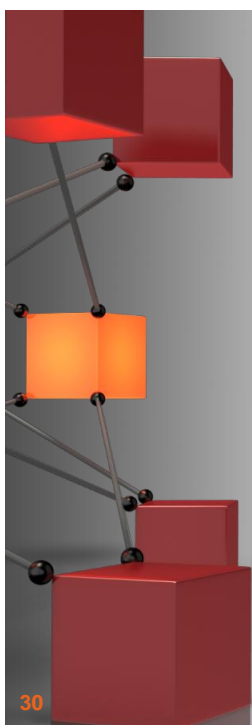




Doxygen - Compilation



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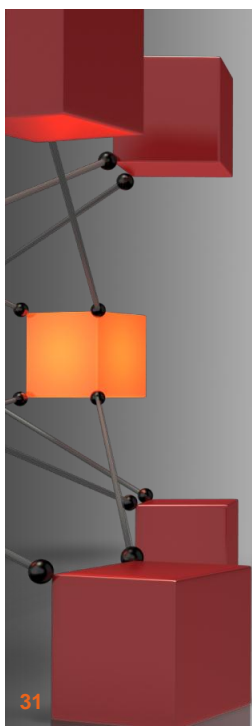
Latex

- Document markup language.
 - Intermediate format, mostly used in academia.
 - Similar to Microsoft Word.
 - Can be used to convert Doxygen output.
 - <http://www.latex-project.org>
- Document are compiled into:
 - PDF
 - DVI
 - PS
 - Many more ...

L^AT_EX



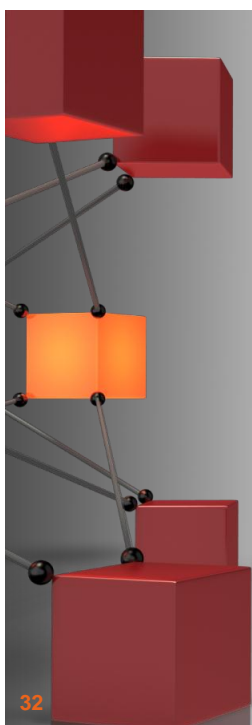
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Latex - Installation

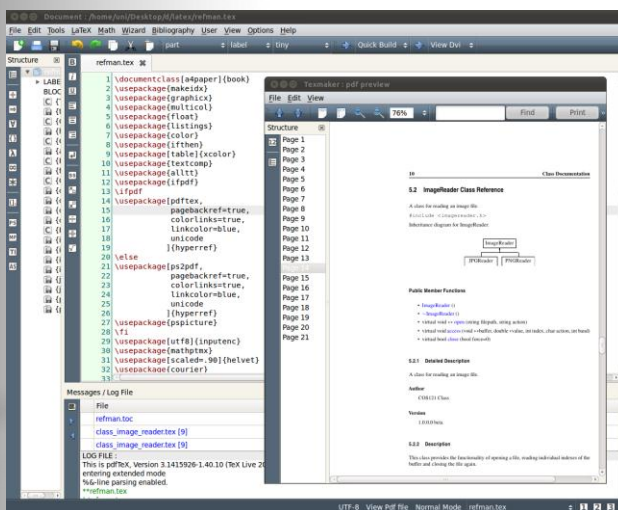
- In Ubuntu:
 - Basic Latex:
 - `sudo apt-get install texlive`
 - All packages:
 - `sudo apt-get install texlive-full`
 - Fonts needed by Doxygen:
 - `sudo apt-get install texlive-fonts-recommended`
 - Texmaker (GUI Latex Editor):
 - `sudo apt-get install texmaker`

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Latex - Texmaker

- Open **refman.tex**



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Doxygen - As HTML

Image Reader 1.0.0.0

Main Page | Related Pages | **Classes** | Files

Class List | Class Index | Class Hierarchy | Class Members

ImageReader Class Reference

A class for reading an image file. [More...](#)

```
#include <ImageReader.h>
```

Inheritance diagram for ImageReader:

```

    graph TD
      ImageReader[ImageReader]
      JPGReader[JPGReader]
      PNGReader[PNGReader]
      ImageReader --> JPGReader
      ImageReader --> PNGReader
  
```

List of all members.

Public Member Functions

ImageReader ()
~ImageReader ()
virtual void ** open (string filepath, string action)
virtual void access (void **buffer, double *value, int index, char action, int band)
virtual bool close (bool force=0)

Detailed Description

A class for reading an image file.

Author: COS121 Class

Version: 1.0.0.0 beta

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Doxygen - As PDF

refman.pdf

File Edit View Go Help

Previous Next 10 (14 of 21) Fit Page Width

Thumbnails

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10

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Class Documentation

5.2 ImageReader Class Reference

A class for reading an image file.

```
#include <ImageReader.h>
```

Inheritance diagram for ImageReader:

```

    graph TD
      ImageReader[ImageReader]
      JPGReader[JPGReader]
      PNGReader[PNGReader]
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      ImageReader --> PNGReader
  
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Public Member Functions

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5.2.1 Detailed Description

A class for reading an image file.

Author: COS121 Class

Version: 1.0.0.0 beta

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