

# Part I: Coding Practices

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# Documentation

- Minimum Version of your Language
  - MATLAB, IDL, Fortran/C/C++ Compiler
- Additional Libraries or Toolboxes
  - Image Processing, Parallel, etc
- How to use the code/executables
- Add a sample data file if allowable.
  - BOTH input and output



# What Format?

- Any thing that works for you
- Plain Text
- HTML
- LaTeX
- Word
- RTF

# Doxygen

- <http://www.stack.nl/~dimitri/doxygen/>
- Doxygen automatically parses through codes (c/c++/fortran/java)
- Generates
  - Plain Text
  - HTML
  - LaTeX
- Uses special tags in C/C++ Comments



# Doxygen C/C++/Java

```
/**
```

```
* @Brief This function will ...
```

```
* @param a An input value
```

```
* @param b An input value
```

```
* @return This function returns ...
```

```
*/
```

```
int myFunction(double a, double b);
```

# Doxygen Markdown

```
Read H5Ebsd File {#readh5ebds}
```

```
=====
```

```
## Group (Subgroup) ##
```

```
I/O Filters (Input)
```

```
## Description ##
```

This Filter reads from the **h5ebds** file that was generated with the `[Import Orientation File(s) to H5Ebsd](ebstdtoh5ebds.html)` filter. The user can use the checkboxes under the **Voxel Data** tab to select which specific data arrays they are interested in processing. Different pipelines may require different arrays to be read and this advanced interface allows the user to be selective in the data that is read into memory for processing. The user can select a subset of the slices if they do not wish to process the entire volume of data. The type of transformations that are recommended based on the manufacturer of the data are also listed with a checkbox that the user can check to make sure the data is transformed into the proper `Euler` and `Spatial` reference frame.

If the processing pipeline is going to process phase based data for crystallographic information the user should enable the reading of the `CrystalStructure_Ensemble Data` array.

```
![[Read H5Ebsd File User Interface](ReadH5Ebsd_UI.png)
```

```
@image latex ReadH5Ebsd_UI.png "User Interface" width=6in
```

# Doxygen Output

## DREAM3D User Manual

Main Page

Related Pages

▼ DREAM3D User Manual

▼ Table of Contents

Brief History and Acknowledgements

DREAM.3D Data Structure

► Supported File Formats

Overview of the User Interface

Creating a Pipeline

Import, Export & Favorite Pipelines

▼ Filter Documentation

► GenericFilters

▼ IOFilters

Avizo Rectilinear Coordinates

Avizo Uniform Coordinate System

Read DREAM3D Data File

Write DREAM3D Data File

Read Dx File (Field Ids)

Write Dx File (Field Ids)

Import Orientation File(s) to

Read Ensemble Info File

Write Field Data as CSV File

Read Field Info File

Read Legacy DREAM.3D H5

Write INL File

Nodes & Triangles To Stl File

Nodes & Triangles To Vtk File

Read Ph File (Field Ids)

### Read H5Ebsd File

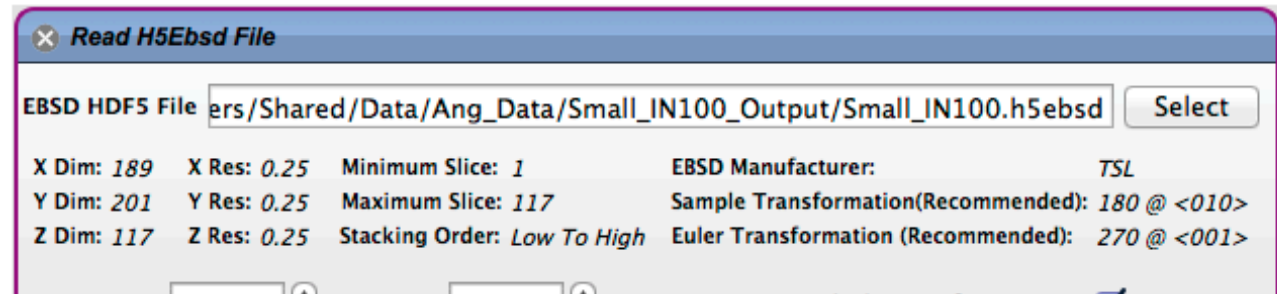
#### Group (Subgroup)

I/O Filters (Input)

#### Description

This Filter reads from the **\*\*.h5ebsd\*\*** file that was generated with the [Import Orientation File\(s\) to H5Ebsd filter](#). The user can use the checkboxes under the **\_\*\*Voxel Data\*\*\_** tab to select which specific data arrays they are interested in processing. Different pipelines may require different arrays to be read and this advanced interface allows the user to be selective in the data that is read into memory for processing. The user can select a subset of the slices if they do not wish to process the entire volume of data. The type of transformations that are recommended based on the manufacturer of the data are also listed with a checkbox that the user can check to make sure the data is transformed into the proper *Euler* and *Spatial* reference frame.

If the processing pipeline is going to process phase based data for crystallographic information the user should enable the reading of the *CrystalStructure* **\_\*\*Ensemble Data\*\*\_** array.





# Project Transition



# Cross Platform Concerns

- We live in a multi-platform world
- Many diverse development environments
  - IDEs (Visual Studio, Xcode, QtCreator)
  - Terminal (Emacs, Vi, Make)
- Need an automated way to generate platform specific project files

# CMake

- Single file configuration
  - CMakeLists.txt
- Generate many different types of projects
  - Xcode, VS, Creator, Makefile, Eclipse
- Allows single user to support multiple Operating Systems
- CPack for packaging your software
- [www.cmake.org](http://www.cmake.org)



# Toolkits

- GUI
  - Qt ([www.qt-project.org](http://www.qt-project.org))
- Low Level
  - Boost ([www.boost.org](http://www.boost.org))

# Source Code Control



# Can You...

- Show me the incremental changes to a specific source file?
- Show me the exact version of your code that your latest executables came from?
- Show me an annotated history of the source code?
- Show me the changes YOU made versus the changes your collaborator made?

# Terminology

- Different names but same concept
- Revision Control System (RCS)
- Version Control System (VCS)
- Source Code Control System (SCCS)



# Implementations - Old

- Single Central Repository
- CVS - Concurrent Version System
  - Do NOT use!
- SVN - Subversion
  - Replacement for CVS
  - Considered “out of date” but quite usable

# Distributed Version Control System

- No single “central” server
- Faster & more flexible
- Git
  - <http://www.git-scm.com>
- Mercurial (Hg)
  - <http://mercurial.selenic.com>



# Benefits of SCM

- Simultaneous development of codes
- Manage differences in Code
- Merge different versions into a single version
- Keep a history of the source code
- Allow EASY collaboration

# Manually Mange Merge

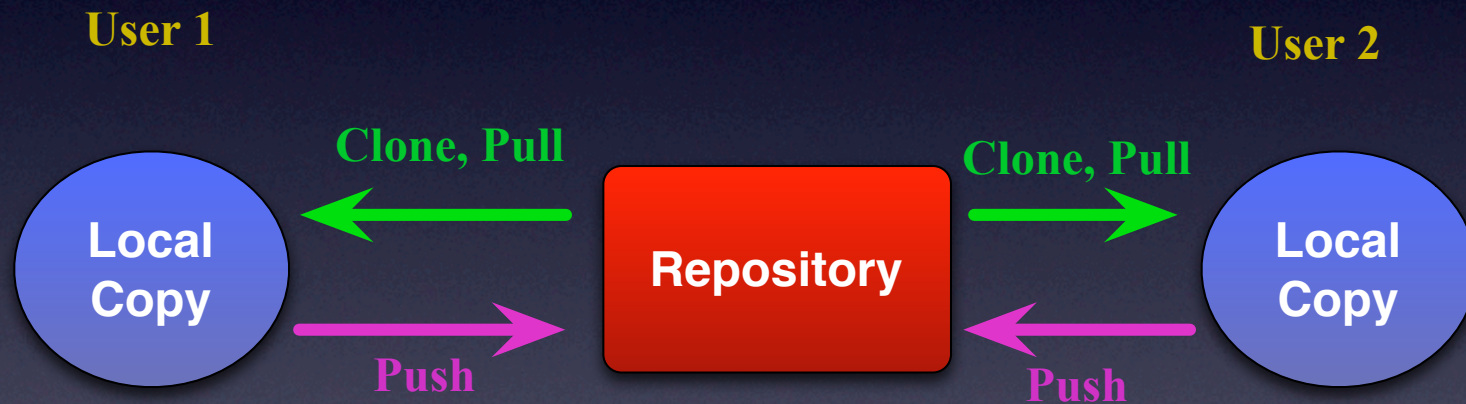
```
// -----  
//~  
BadDataNeighborOrientationCheck::~BadDataNeighborOrientationCheck()  
AbstractFilter(),~  
m_QuatsArrayName(DREAM3D::CellData::Quats),~  
m_GoodVoxelsArrayName(DREAM3D::CellData::GoodVoxels),~  
m_CellPhasesArrayName(DREAM3D::CellData::Phases),~  
m_CrystalStructuresArrayName(DREAM3D::EnsembleData::CrystalStructures),~  
m_MisorientationTolerance(5.0f),~  
m_NumberOfNeighbors(6),~  
m_Quats(NULL),~  
m_GoodVoxels(NULL),~  
m_CellPhases(NULL),~  
m_CrystalStructures(NULL)~  
{  
  m_OrientationOps = OrientationMath::getOrientationOpsVector();  
  setupFilterParameters();  
}
```

```
Hunk 1 : Lines 54-69 (previously 54-68)  
54 54 // -----  
55 55 BadDataNeighborOrientationCheck::~BadDataNeighborOrientationCheck() :  
56 56 AbstractFilter(),  
57 + m_QuatsArrayName(DREAM3D::CellData::Quats),  
57 58 m_GoodVoxelsArrayName(DREAM3D::CellData::GoodVoxels),  
58 59 m_CellPhasesArrayName(DREAM3D::CellData::Phases),  
59 60 m_CrystalStructuresArrayName(DREAM3D::EnsembleData::CrystalStructures),  
60 - m_QuatsArrayName(DREAM3D::CellData::Quats),  
61 + m_MisorientationTolerance(5.0f),  
61 62 m_NumberOfNeighbors(6),  
62 - m_MisorientationTolerance(5),  
63 + m_Quats(NULL),  
63 64 m_GoodVoxels(NULL),  
64 65 m_CellPhases(NULL),  
65 - m_Quats(NULL)  
66 + m_CrystalStructures(NULL)  
66 67 {  
67 68   m_OrientationOps = OrientationMath::getOrientationOpsVector();  
68 69   setupFilterParameters();  
Reverse Hunk Reverse Selected Lines
```

```
BadDataNeighborOrientationCheck() :~  
: GoodVoxels),~  
: Phases),~  
EnsembleData::CrystalStructures),~  
ts),~  
getOrientationOpsVector();~
```



# SCM Visually



# Basic Commands

- Clone
- Commit
- Push
- Pull
- Merge
- Branch



# Cloning Repository

- Makes a copy of the repository to local device
- *git clone ssh://code@muri.materials.cmu.edu/  
MyProject.git*

# Committing Changes

- Saves current state of code to the Local repository
- Always available on your system
- No one else has access to these commits
- Always write a commit message or description of what was changed.
- `git commit -a -m "Blah Blah Blah"`



# “Push”ing to Repository

- Copies all the commits to the Remote repository
- Commits available to all developers on the project
- *git push origin master*

# “Pull”ing Changes

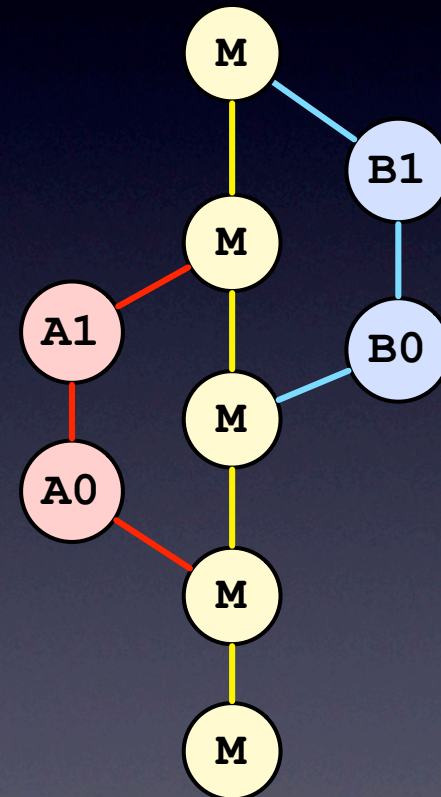
- Copies all the latest commits from Repository to local machine
- Performs a Merge if files were edited by both you and your collaborator
- *git pull origin master*





# Branching

- Manage multiple versions
- Easy to create
- “Try out” implementations
- SCM Handles the Merge





# Tools To Help

- GUI App for SCM
- SourceTree - <http://sourcetreeapp.com>
- Rudimentary GUIs built into Git
- Terminal/Command Prompt if all else fails

DREAM3D (Git)

View   Commit   Checkout   Reset   Stash   Add   Remove   Add/Remove   Fetch   Pull   Push   Branch   Merge   Tag   Git Flow   Terminal   Settings

FILE STATUS: Working Copy

BRANCHES: develop, linux-fixes, master, Megna\_test, feature (ArrayNameList, BrukerToH5Ebsd, CurvatureCodes, hyperslab, ImageImport, proxyfilter, QFilterWidget, QHDFViewer, multicontainer)

TAGS

REMOTES: origin (develop, HEAD, linux-fixes, master, Megna\_test, multicontainer, Version-1, feature (ArrayNameL..., BrukerToH5..., CurvatureC..., doxygen\_d..., hyperslab))

All Branches   Show Remote Branches   Date Order   Jump to:

Graph	Description	Commit	Author	Date
	Fixing Compile errors on Linux due to not ...	b0da3b0	Mike Jackson <mike.jackson@bluequart...	Jun 20, 2013 10:02 AM
	Merge branch 'develop' of ssh://scm.blueq...	7aea51	Mike Jackson <mike.jackson@bluequart...	Jun 20, 2013 9:54 AM
	Fixing runtime and configuration errors on...	6825199	Mike Jackson <mike.jackson@bluequart...	Jun 20, 2013 9:54 AM
	Fixing compile error on GCC (OS X 10.6.8)	3b7e04e	Michael Jackson <mike.jackson@bluequ...	Jun 20, 2013 9:52 AM
	Merge branch 'develop' into feature/Versio...	888eca8	Michael Jackson <mike.jackson@bluequ...	Jun 20, 2013 9:48 AM
	Merge branch 'feature/VersionCheck' of ss...	ee244dc	Joey Kleingers <joe.kleingers@gmail.com>	Jun 19, 2013 4:40 PM
	fixing doc errors	3cbbc02	Michael Jackson <mike.jackson@bluequ...	Jun 19, 2013 4:39 PM
	Code clean-up for the Check Update featur...	514453a	Joey Kleingers <joe.kleingers@gmail.com>	Jun 19, 2013 4:13 PM
	Added a Version class that makes it easier ...	72c1c49	Joey Kleingers <joe.kleingers@gmail.com>	Jun 19, 2013 1:41 PM
	Updating ToDo.md	29e496b	Joey Kleingers <joe.kleingers@gmail.com>	Jun 19, 2013 9:54 AM
	Removed old code that is no longer neede...	5d6de83	Joey Kleingers <joe.kleingers@gmail.com>	Jun 19, 2013 9:37 AM
	Restructured the UpdateCheck API so that ...	88b31a4	Joey Kleingers <joe.kleingers@gmail.com>	Jun 18, 2013 3:58 PM
	Added functionality for automatic update c...	7c72ac4	Joey Kleingers <joe.kleingers@gmail.com>	Jun 18, 2013 1:00 PM

**Commit:** 514453a08af211841dee32b602704287446ae4d6 [514453a]  
**Parents:** [72c1c493f1](#)  
**Author:** Joey Kleingers <joe.kleingers@gmail.com>  
**Date:** June 19, 2013 4:13:38 PM EDT

Code clean-up for the Check Update feature. Set default update check frequency to Monthly. Changed

Filename	Path
DREAM3D_UI.cpp	Sou...3D
DREAM3D_UI.h	Sou...3D
DREAM3DUpdateCheckDialog.cpp	Sou...port
DREAM3DUpdateCheckDialog.h	Sou...port
DREAM3DUpdateCheckDialog.ui	Sou...iles
UpdateCheck.cpp	Sou...port

Context: 3 Li...   Diff P...   Show Whites...   External Diff

```

57 59 }
58 60
59 61 // -----
Reverse Hunk   Reverse Selected Lines
Hunk 2 : Lines 65-100 (previously 63-90)
63 65 QDialog(parent),
64 66 m_UpdateCheckThread(NULL),
65 67 m_DialogState(DefaultDialog),
66 - m_UpdateCheck(NULL)
68 + m_UpdateCheck(NULL),
69 + m_WhenToCheck(UpdateType::UpdateCheckMonthly)
67 70 {
68 71
69 72 setupUi(this);
70 73
71 74 setupGui();
72 75
73 - // If the UpdatePreferences.ini file exists, read

```

develop   1 Modified   153 Not Tracked

Atlassian