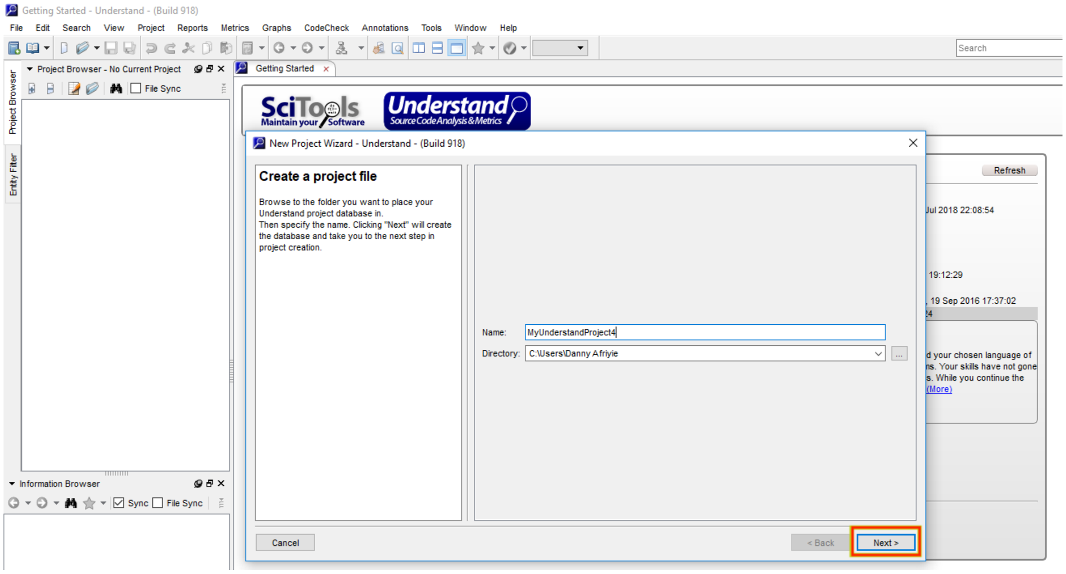
EXPORTING METRICS FROM SCITOOLS UNDERSTAND

Open *Understand*

Go to *File -> New -> Project*.


Getting Started - Understand - (Build 918)
File Edit Search View Project Reports Metrics Graphs CodeCheck Annotations Tools Window Help
Project Browser - No Current Project
File Sync
Getting Started
Information Browser
Sync File Sync
Refresh
Cancel
< Back
Next >

New Project Wizard - Understand - (Build 918)

Create a project file

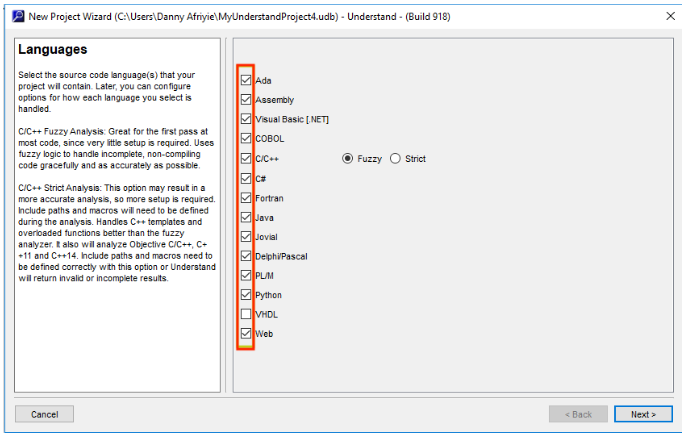
Browse to the folder you want to place your Understand project database in.
Then specify the name. Clicking "Next" will create the database and take you to the next step in project creation.

Name: MyUnderstandProject4

Directory: C:\Users\Danny Afriyie

Name the Project. Click on Next.

Select all Languages to ensure adequate coverage. VHDL will mostly not be selected. Ignore it. Tick *Fuzzy* instead of Strict. Click Next.



New Project Wizard (C:\Users\Danny Afriyie\MyUnderstandProject4.udb) - Understand - (Build 918)

Languages

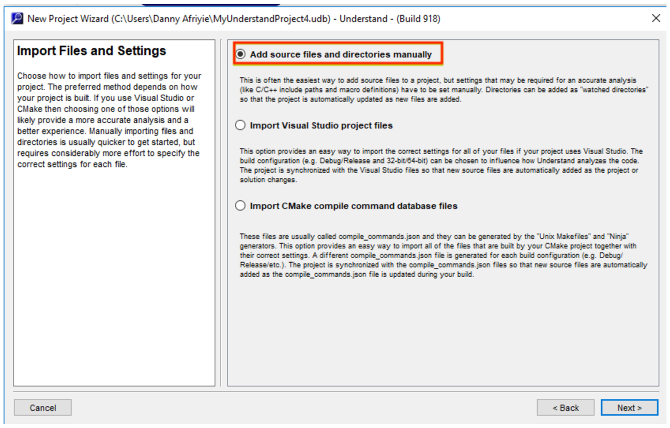
Select the source code language(s) that your project will contain. Later, you can configure options for how each language you select is handled.

C/C++ Fuzzy Analysis: Great for the first pass at most code, since very little setup is required. Uses fuzzy logic to handle incomplete, non-compiling code gracefully and as accurately as possible.

C/C++ Strict Analysis: This option may result in a more accurate analysis, so more setup is required. Include paths and macros will need to be defined during the analysis. Handles C++ templates and overloaded functions better than the fuzzy analyzer. It also will analyze Objective C/C++, C++11 and C++14. Include paths and macros need to be defined correctly with this option or Understand will return invalid or incomplete results.

- ☑ Ada
- ☑ Assembly
- ☑ Visual Basic [.NET]
- ☑ COBOL
- ☑ C/C++ ● Fuzzy ○ Strict
- ☑ C#
- ☑ Fortran
- ☑ Java
- ☑ Jovial
- ☑ Delphi/Pascal
- ☑ PL/M
- ☑ Python
- ☐ VHDL
- ☑ Web

Tick *add source files manually*. Click Next.



New Project Wizard (C:\Users\Danny Afriyie\MyUnderstandProject4.udb) - Understand - (Build 918)

Import Files and Settings

Choose how to import files and settings for your project. The preferred method depends on how your project is built. If you use Visual Studio or CMake then choosing one of those options will likely provide a more accurate analysis and a better experience. Manually importing files and directories is usually quicker to get started, but requires considerably more effort to specify the correct settings for each file.

● **Add source files and directories manually**

This is often the easiest way to add source files to a project, but settings that may be required for an accurate analysis (like C/C++ include paths and macro definitions) have to be set manually. Directories can be added as "watched directories" so that the project is automatically updated as new files are added.

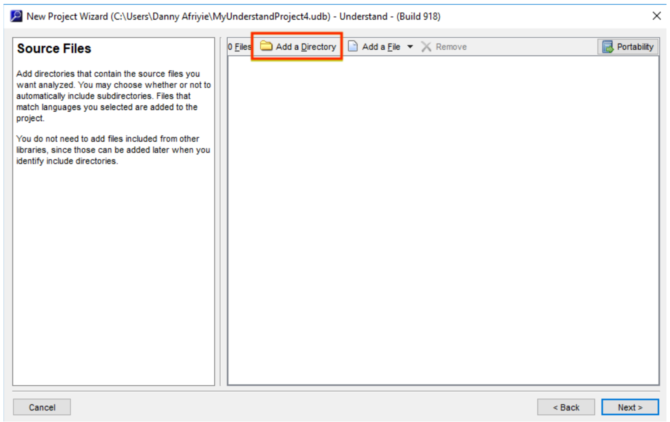
○ **Import Visual Studio project files**

This option provides an easy way to import the correct settings for all of your files if your project uses Visual Studio. The build configuration (e.g. Debug/Release and 32-bit/64-bit) can be chosen to influence how Understand analyzes the code. The project is synchronized with the Visual Studio files so that new source files are automatically added as the project or solution changes.

○ **Import CMake compile command database files**

These files are usually called compile_commands.json and they can be generated by the "Unix Makefiles" and "Ninja" generators. This option provides an easy way to import all of the files that are built by your CMake project together with their correct settings. A different compile_commands.json file is generated for each build configuration (e.g. Debug/Release/etc.). The project is synchronized with the compile_commands.json files so that new source files are automatically added as the compile_commands.json file is updated during your build.

Click on *Add a Directory.*



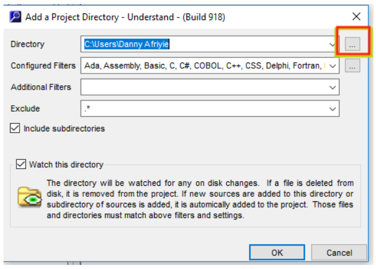
New Project Wizard (C:\Users\Danny Afriyie\MyUnderstandProject4.udb) - Understand - (Build 918)

Source Files

Add directories that contain the source files you want analyzed. You may choose whether or not to automatically include subdirectories. Files that match languages you selected are added to the project.

You do not need to add files included from other libraries, since those can be added later when you identify include directories.

For the Directory option, use the Browse icon to select the folder containing the project. For our analysis, we assume you have already separated the application code from the test code and the folder you are selecting contains either or the other (but not both). After selection, click ok.



Add a Project Directory - Understand - (Build 918)

Directory: C:\Users\Danny Afriyie

Configured Filters: Ada, Assembly, Basic, C, C#, COBOL, C++, CSS, Delphi, Fortran,

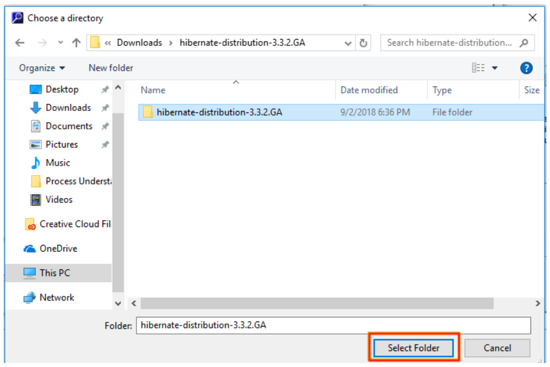
Additional Filters:

Exclude: .*

☑ Include subdirectories

☑ Watch this directory

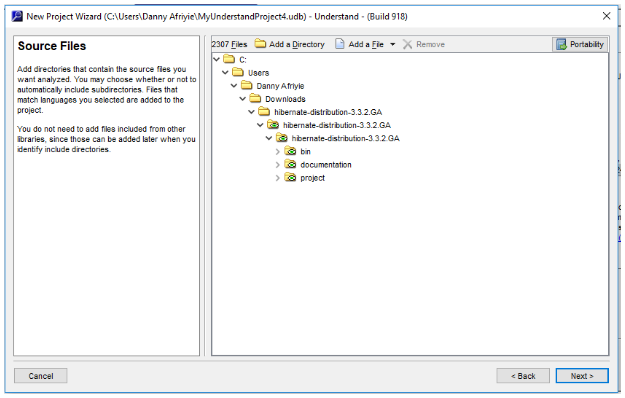
The directory will be watched for any on disk changes. If a file is deleted from disk, it is removed from the project. If new sources are added to this directory or subdirectory of sources is added, it is automically added to the project. Those files and directories must match above filters and settings.



hibernate-distribution-3.3.2.GA 9/2/2018 6:36 PM File folder

Folder: hibernate-distribution-3.3.2.GA

Understand will display the file path. Click next


New Project Wizard (C:\Users\Danny Afriyie\MyUnderstandProject4.udb) - Understand - (Build 918)
2307 Files
Add a Directory
Add a File
Remove
Portability
Cancel
< Back
Next >

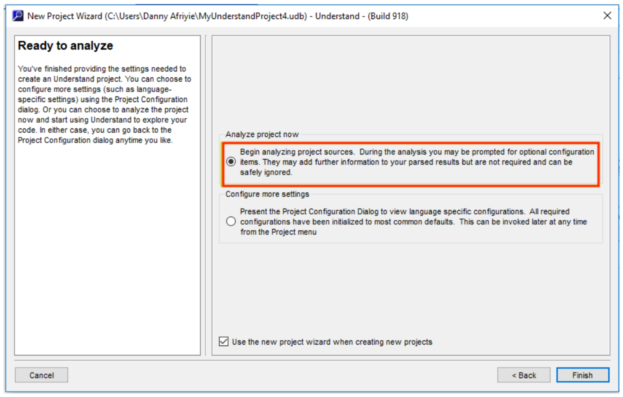
Source Files

Add directories that contain the source files you want analyzed. You may choose whether or not to automatically include subdirectories. Files that match languages you selected are added to the project.

You do not need to add files included from other libraries, since those can be added later when you identify include directories.

```
C:
  Users
    Danny Afriyie
      Downloads
        hibernate-distribution-3.3.2.GA
          hibernate-distribution-3.3.2.GA
            hibernate-distribution-3.3.2.GA
              bin
              documentation
              project
```

Understand will automatically select *begin analyzing project sources.* Click Finish.


New Project Wizard (C:\Users\Danny Afriyie\MyUnderstandProject4.udb) - Understand - (Build 918)
Cancel
< Back
Finish

Ready to analyze

You've finished providing the settings needed to create an Understand project. You can choose to configure more settings (such as language-specific settings) using the Project Configuration dialog. Or you can choose to analyze the project now and start using Understand to explore your code. In either case, you can go back to the Project Configuration dialog anytime you like.

Analyze project now

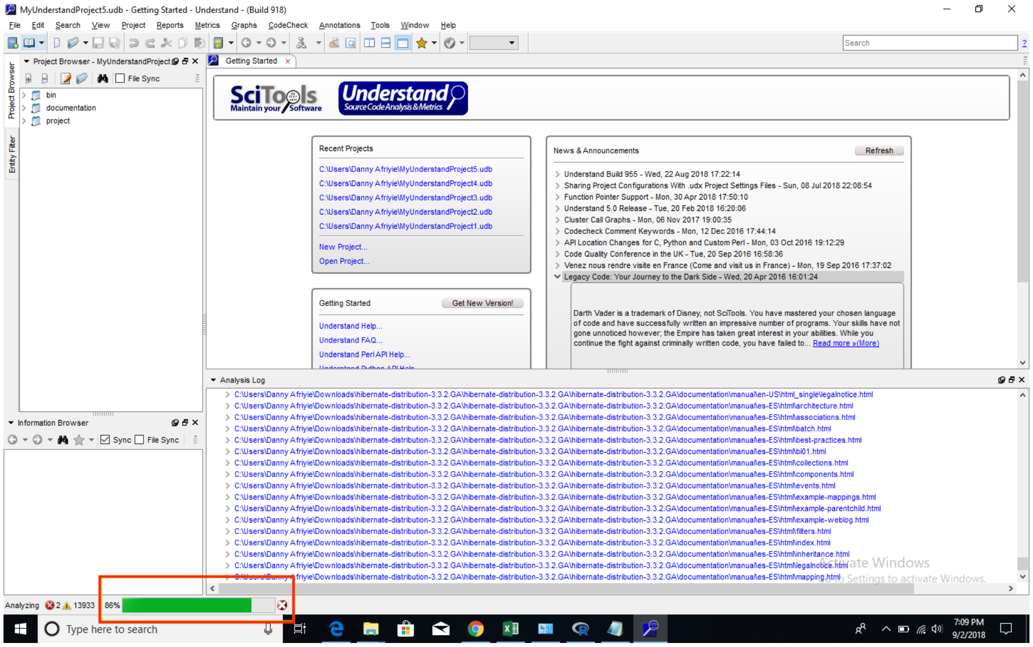
● Begin analyzing project sources. During the analysis you may be prompted for optional configuration items. They may add further information to your parsed results but are not required and can be safely ignored.

Configure more settings

○ Present the Project Configuration Dialog to view language specific configurations. All required configurations have been initialized to most common defaults. This can be invoked later at any time from the Project menu

☑ Use the new project wizard when creating new projects

Understand will start analyzing the code. A progress bar will be shown at the bottom left corner, displaying the percentage of code analyzed.


MyUnderstandProject5.udb - Getting Started - Understand - (Build 918)
File Edit Search View Project Reports Metrics Graphs CodeCheck Annotations Tools Window Help
Search
Project Browser - MyUnderstandProject5
File Sync
bin
documentation
project
Getting Started
SciTools Maintain your Software
Understand Source Code Analysis & Metrics
Information Browser
Sync
File Sync
Analyzing
2
13933
86%
Type here to search
7:09 PM
9/2/2018

Recent Projects

C:\Users\Danny Afriyie\MyUnderstandProject5.udb
C:\Users\Danny Afriyie\MyUnderstandProject4.udb
C:\Users\Danny Afriyie\MyUnderstandProject3.udb
C:\Users\Danny Afriyie\MyUnderstandProject2.udb
C:\Users\Danny Afriyie\MyUnderstandProject1.udb

New Project...
Open Project...

Getting Started — Get New Version!

Understand Help...
Understand FAQ...
Understand Perl API Help...

News & Announcements — Refresh

- Understand Build 955 - Wed, 22 Aug 2018 17:22:14
- Sharing Project Configurations With .udx Project Settings Files - Sun, 08 Jul 2018 22:08:54
- Function Pointer Support - Mon, 30 Apr 2018 17:50:10
- Understand 5.0 Release - Tue, 20 Feb 2018 16:20:06
- Cluster Call Graphs - Mon, 06 Nov 2017 19:00:35
- Codecheck Comment Keywords - Mon, 12 Dec 2016 17:44:14
- API Location Changes for C, Python and Custom Perl - Mon, 03 Oct 2016 19:12:29
- Code Quality Conference in the UK - Tue, 20 Sep 2016 16:58:36
- Venez nous rendre visite en France (Come and visit us in France) - Mon, 19 Sep 2016 17:37:02
- Legacy Code: Your Journey to the Dark Side - Wed, 20 Apr 2016 16:01:24

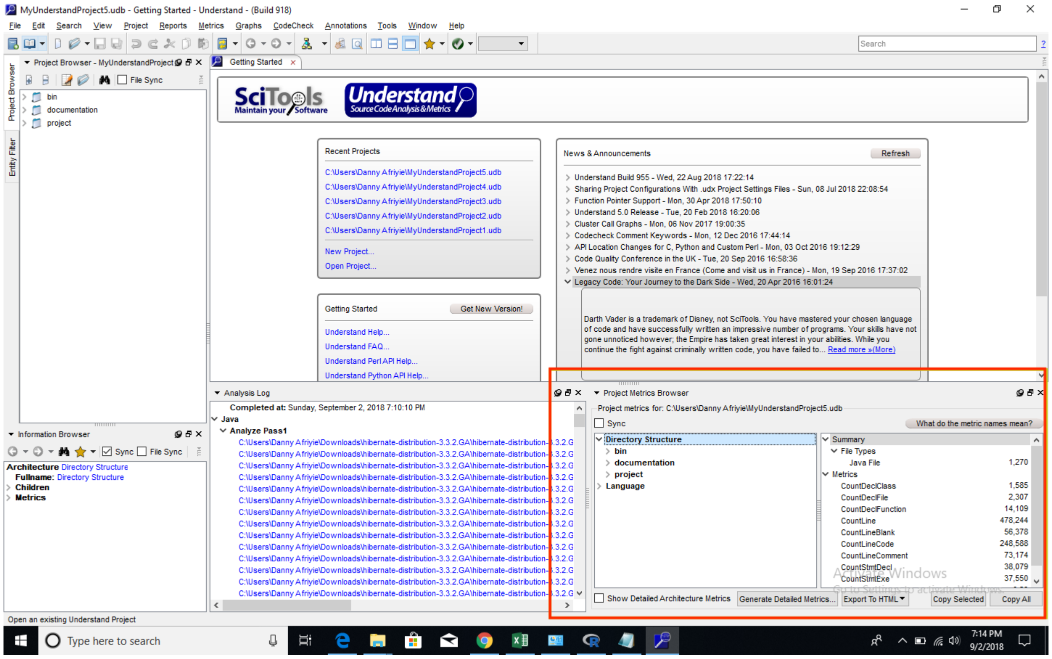
Darth Vader is a trademark of Disney, not SciTools. You have mastered your chosen language of code and have successfully written an impressive number of programs. Your skills have not gone unnoticed however; the Empire has taken great interest in your abilities. While you continue the fight against criminally written code, you have failed to... Read more »(More)

Analysis Log

```
> C:\Users\Danny Afriyie\Downloads\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\documentation\manual\en-US\html_single\legalnotice.html
> C:\Users\Danny Afriyie\Downloads\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\documentation\manual\es-ES\html\architecture.html
> C:\Users\Danny Afriyie\Downloads\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\documentation\manual\es-ES\html\associations.html
> C:\Users\Danny Afriyie\Downloads\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\documentation\manual\es-ES\html\batch.html
> C:\Users\Danny Afriyie\Downloads\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\documentation\manual\es-ES\html\best-practices.html
> C:\Users\Danny Afriyie\Downloads\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\documentation\manual\es-ES\html\bi01.html
> C:\Users\Danny Afriyie\Downloads\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\documentation\manual\es-ES\html\collections.html
> C:\Users\Danny Afriyie\Downloads\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\documentation\manual\es-ES\html\components.html
> C:\Users\Danny Afriyie\Downloads\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\documentation\manual\es-ES\html\events.html
> C:\Users\Danny Afriyie\Downloads\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\documentation\manual\es-ES\html\example-mappings.html
> C:\Users\Danny Afriyie\Downloads\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\documentation\manual\es-ES\html\example-parentchild.html
> C:\Users\Danny Afriyie\Downloads\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\documentation\manual\es-ES\html\example-weblog.html
> C:\Users\Danny Afriyie\Downloads\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\documentation\manual\es-ES\html\filters.html
> C:\Users\Danny Afriyie\Downloads\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\documentation\manual\es-ES\html\index.html
> C:\Users\Danny Afriyie\Downloads\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\documentation\manual\es-ES\html\inheritance.html
> C:\Users\Danny Afriyie\Downloads\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\documentation\manual\es-ES\html\legalnotice.html
> C:\Users\Danny Afriyie\Downloads\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.GA\documentation\manual\es-ES\html\mapping.html
```

To export metrics. There are three major things that need to be done:

1. Click on Metrics from the Menu Bar. Select Browse Metrics. A pane will show on the bottom right corner. Enlarge the pane for proper visibility. There are two panes. One contains the Directory Structure and the other contains metrics.


MyUnderstandProject5.udb - Getting Started - Understand - (Build 918)
File Edit Search View Project Reports Metrics Graphs CodeCheck Annotations Tools Window Help
Search
Project Browser - MyUnderstandProject5
File Sync
bin
documentation
project
Getting Started
SciTools Maintain your Software
Understand Source Code Analysis & Metrics
Recent Projects
New Project...
Open Project...
Getting Started
Get New Version!
Understand Help...
Understand FAQ...
Understand Perl API Help...
Understand Python API Help...
News & Announcements
Refresh
Information Browser
Sync
File Sync
Type here to search
7:14 PM
9/2/2018

Architecture Directory Structure
Fullname: Directory Structure
Children
Metrics

Analysis Log

```
Completed at: Sunday, September 2, 2018 7:10:10 PM
Java
  Analyze Pass1
    C:\Users\Danny Afriyie\Downloads\hibernate-distribution-3.3.2.GA\hibernate-distribution-3.3.2.G
```

Project Metrics Browser

Project metrics for: C:\Users\Danny Afriyie\MyUnderstandProject5.udb

☐ Sync — What do the metric names mean?

Directory Structure
- bin
- documentation
- project

Language

Summary
File Types

Java File	1,270

Metrics

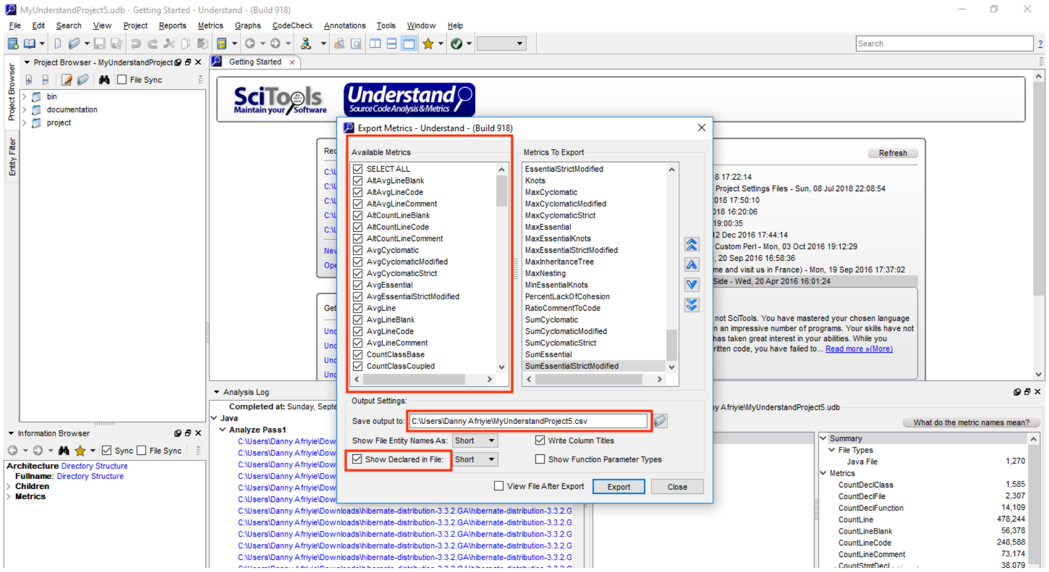
CountDeclClass	1,585
CountDeclFile	2,307
CountDeclFunction	14,109
CountLine	478,244
CountLineBlank	56,378
CountLineCode	248,588
CountLineComment	73,174
CountStmtDecl	38,079
CountStmtExe	37,550

☐ Show Detailed Architecture Metrics | Generate Detailed Metrics... | Export To HTML | Copy Selected | Copy All

Open an existing Understand Project

Click on the *Directory Structure*. Check *Detailed Metric Architecture* in the check box below this pane and click on *Generate detailed Metrics.*

Tick *SELECT ALL* in the check box displayed.
Tick *Show declared in File* displayed at the bottom.
Browse for destination folder Click *Export*


MyUnderstandProject5.udb - Getting Started - Understand - (Build 918)
File Edit Search View Project Reports Metrics Graphs CodeCheck Annotations Tools Window Help
Project Browser - MyUnderstandProject5
bin
documentation
project
Getting Started
SciTools Maintain your Software
Understand Source Code Analysis & Metrics
Information Browser
Analysis Log
Refresh
What do the metric names mean?

Export Metrics - Understand - (Build 918)

Available Metrics

- ☑ SELECT ALL
- ☑ AltAvgLineBlank
- ☑ AltAvgLineCode
- ☑ AltAvgLineComment
- ☑ AltCountLineBlank
- ☑ AltCountLineCode
- ☑ AltCountLineComment
- ☑ AvgCyclomatic
- ☑ AvgCyclomaticModified
- ☑ AvgCyclomaticStrict
- ☑ AvgEssential
- ☑ AvgEssentialStrictModified
- ☑ AvgLine
- ☑ AvgLineBlank
- ☑ AvgLineCode
- ☑ AvgLineComment
- ☑ CountClassBase
- ☑ CountClassCoupled

Metrics To Export

EssentialStrictModified
Knots
MaxCyclomatic
MaxCyclomaticModified
MaxCyclomaticStrict
MaxEssential
MaxEssentialKnots
MaxEssentialStrictModified
MaxInheritanceTree
MaxNesting
MinEssentialKnots
PercentLackOfCohesion
RatioCommentToCode
SumCyclomatic
SumCyclomaticModified
SumCyclomaticStrict
SumEssential
SumEssentialStrictModified

Output Settings:

Save output to: C:\Users\Danny Afriyie\MyUnderstandProject5.csv

Show File Entity Names As: Short ☑ Write Column Titles

☑ Show Declared in File: Short ☐ Show Function Parameter Types

☐ View File After Export [Export] [Close]

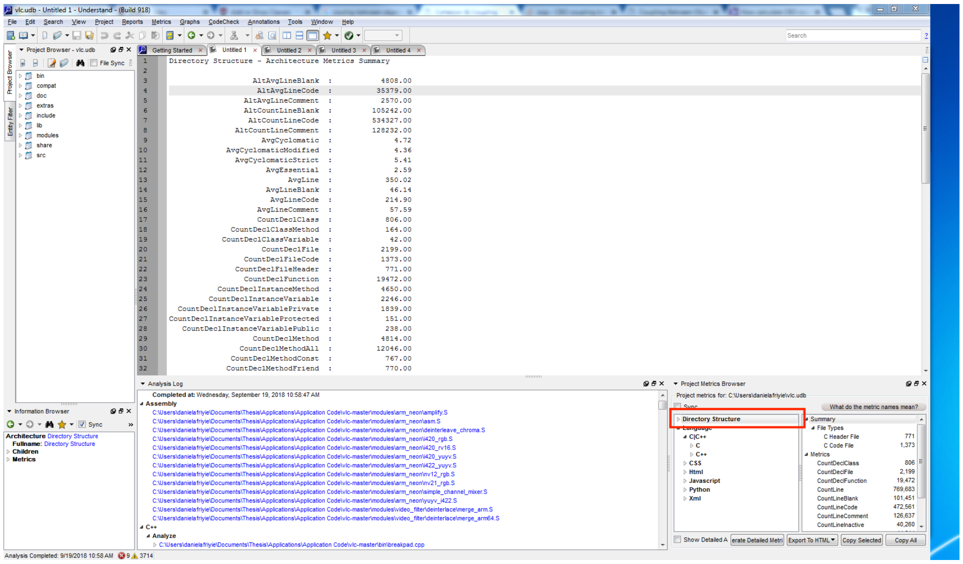
Summary	
File Types	
Java File	1,270
Metrics	
CountDeclClass	1,585
CountDeclFile	2,307
CountDeclFunction	14,109
CountLine	478,244
CountLineBlank	56,378
CountLineCode	248,588
CountLineComment	73,174
CountStmtDecl	38,079

A progress bar will show the percentage of completion. After it has completed exporting, close the Export Metric Window.

I. Exporting Results for Different Programming Languages

Go to the same pane at the bottom right corner. The tool displays the directory structure and a list of the programming languages used.

Right click on the *Directory Structure and select Metric Summary. Once it has completed generating the values for the metrics, select all, copy and paste in a text editor (notepad, word, pages tec) and name as "detailed metric results". The metric values for all the various software will be saved here to save time and effort. It is ideal paste all application code and test code data on separate sheets.*



```
Directory Structure - Architecture Metrics Summary

                 AltAvgLineBlank  :       4808.00
                   AltAvgLineCode  :      35379.00
                AltAvgLineComment  :       2570.00
                AltCountLineBlank  :     105242.00
                 AltCountLineCode  :     534327.00
              AltCountLineComment  :     128232.00
                     AvgCyclomatic  :          4.72
            AvgCyclomaticModified  :          4.36
              AvgCyclomaticStrict  :          5.41
                     AvgEssential  :          2.59
                          AvgLine  :        350.02
                     AvgLineBlank  :         46.14
                      AvgLineCode  :        214.90
                   AvgLineComment  :         57.59
                   CountDeclClass  :        806.00
             CountDeclClassMethod  :        164.00
           CountDeclClassVariable  :         42.00
                    CountDeclFile  :       2199.00
                CountDeclFileCode  :       1373.00
              CountDeclFileHeader  :        771.00
                CountDeclFunction  :      19472.00
          CountDeclInstanceMethod  :       4650.00
        CountDeclInstanceVariable  :       2246.00
 CountDeclInstanceVariablePrivate  :       1839.00
CountDeclInstanceVariableProtected  :        151.00
  CountDeclInstanceVariablePublic  :        238.00
                  CountDeclMethod  :       4814.00
               CountDeclMethodAll  :      12046.00
             CountDeclMethodConst  :        767.00
            CountDeclMethodFriend  :        770.00
```

Analysis Log

```
Completed at: Wednesday, September 19, 2018 10:58:47 AM
Assembly
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\amplify.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\asm.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\deinterleave_chroma.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\i420_rgb.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\i420_rv16.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\i420_yuyv.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\i422_yuyv.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\nv12_rgb.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\nv21_rgb.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\simple_channel_mixer.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\yuyv_i422.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\video_filter\deinterlace\merge_arm.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\video_filter\deinterlace\merge_arm64.S
C++
  Analyze
    C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\bin\breakpad.cpp
```

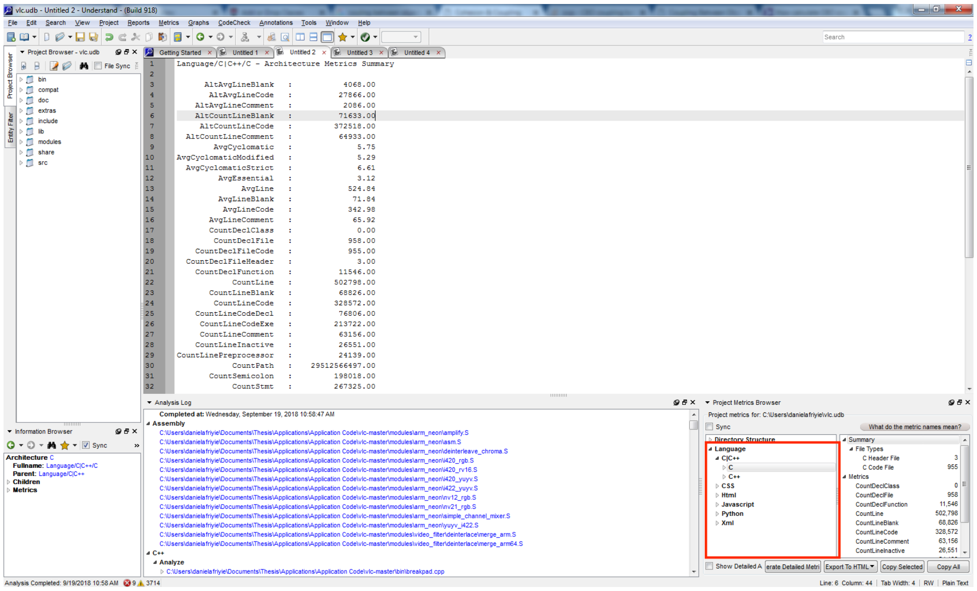
Project Metrics Browser

Project metrics for: C:\Users\danielafriyie\vlc.udb

Summary	
File Types	
C Header File	771
C Code File	1,373
Metrics	
CountDeclClass	806
CountDeclFile	2,199
CountDeclFunction	19,472
CountLine	769,683
CountLineBlank	101,451
CountLineCode	472,561
CountLineComment	126,637
CountLineInactive	40,260

vlc.udb - Untitled 1 - Understand - (Build 918)
File Edit Search View Project Reports Metrics Graphs CodeCheck Annotations Tools Window Help
Getting Started
Untitled 1
Untitled 2
Untitled 3
Untitled 4
Project Browser - vlc.udb
File Sync
bin
compat
doc
extras
include
lib
modules
share
src
Information Browser
Sync
Architecture Directory Structure
Fullname: Directory Structure
Children
Metrics
Directory Structure
Language
C|C++
C
C++
CSS
Html
Javascript
Python
Xml
What do the metric names mean?
Show Detailed A
erate Detailed Metri
Export To HTML
Copy Selected
Copy All
Analysis Completed: 9/19/2018 10:58 AM
9
3714

Repeat the same procedure for all the programming languages (i.e. Right click the programming language, select metric summary, copy the data and paste on a text editor). Ignore scripting languages like HTML, CSS, JavaScript and the likes.



```
Language/C|C++/C - Architecture Metrics Summary

     AltAvgLineBlank  :        4068.00
      AltAvgLineCode  :       27866.00
   AltAvgLineComment  :        2086.00
   AltCountLineBlank  :       71633.00
    AltCountLineCode  :      372518.00
 AltCountLineComment  :       64933.00
       AvgCyclomatic  :           5.75
AvgCyclomaticModified  :           5.29
 AvgCyclomaticStrict  :           6.61
        AvgEssential  :           3.12
             AvgLine  :         524.84
        AvgLineBlank  :          71.84
         AvgLineCode  :         342.98
      AvgLineComment  :          65.92
      CountDeclClass  :           0.00
       CountDeclFile  :         958.00
   CountDeclFileCode  :         955.00
 CountDeclFileHeader  :           3.00
   CountDeclFunction  :       11546.00
           CountLine  :      502798.00
      CountLineBlank  :       68826.00
       CountLineCode  :      328572.00
   CountLineCodeDecl  :       76806.00
    CountLineCodeExe  :      213722.00
    CountLineComment  :       63156.00
   CountLineInactive  :       26551.00
CountLinePreprocessor  :       24139.00
           CountPath  :   29512566497.00
      CountSemicolon  :      198018.00
           CountStmt  :      267325.00
```

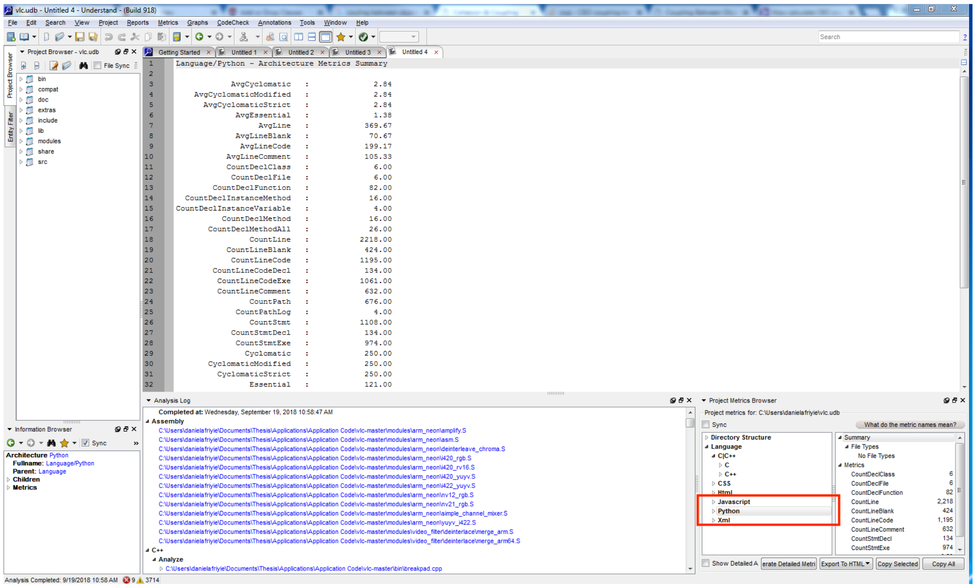
Analysis Log

```
Completed at: Wednesday, September 19, 2018 10:58:47 AM
Assembly
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\amplify.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\asm.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\deinterleave_chroma.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\i420_rgb.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\i420_rv16.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\i420_yuyv.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\i422_yuyv.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\nv12_rgb.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\nv21_rgb.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\simple_channel_mixer.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\arm_neon\yuyv_i422.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\video_filter\deinterlace\merge_arm.S
  C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\modules\video_filter\deinterlace\merge_arm64.S
C++
  Analyze
    C:\Users\danielafriyie\Documents\Thesis\Applications\Application Code\vlc-master\bin\breakpad.cpp
```

Project Metrics Browser

Project metrics for: C:\Users\danielafriyie\vlc.udb

Summary	
File Types	
C Header File	3
C Code File	955
Metrics	
CountDeclClass	0
CountDeclFile	958
CountDeclFunction	11,546
CountLine	502,798
CountLineBlank	68,826
CountLineCode	328,572
CountLineComment	63,156
CountLineInactive	26,551

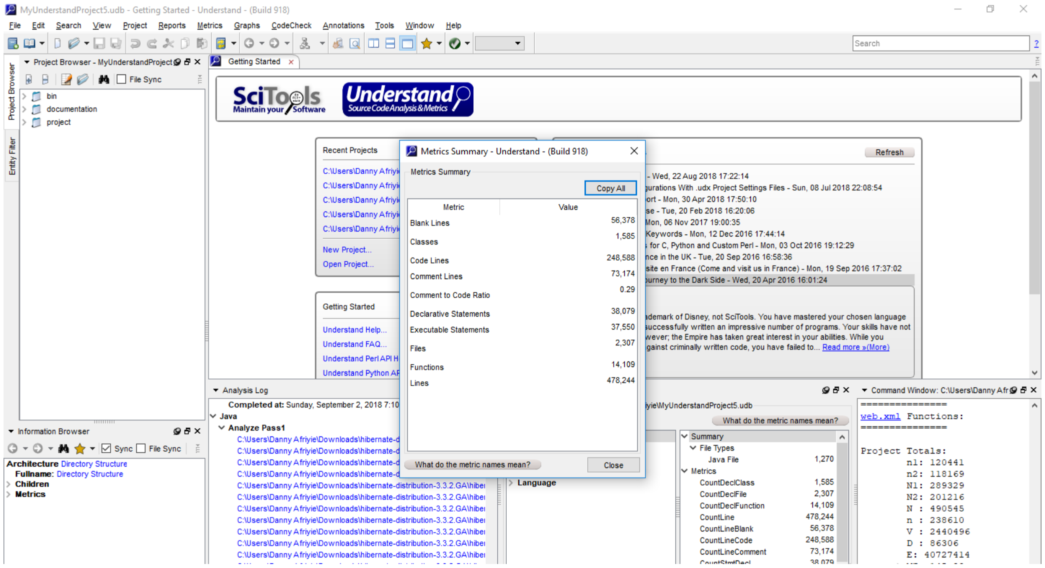


```
Language/Python - Architecture Metrics Summary

             AvgCyclomatic   :          2.84
     AvgCyclomaticModified   :          2.84
       AvgCyclomaticStrict   :          2.84
              AvgEssential   :          1.38
                   AvgLine   :        369.67
              AvgLineBlank   :         70.67
               AvgLineCode   :        199.17
            AvgLineComment   :        105.33
            CountDeclClass   :          6.00
             CountDeclFile   :          6.00
         CountDeclFunction   :         82.00
   CountDeclInstanceMethod   :         16.00
 CountDeclInstanceVariable   :          4.00
           CountDeclMethod   :         16.00
        CountDeclMethodAll   :         26.00
                 CountLine   :       2218.00
            CountLineBlank   :        424.00
             CountLineCode   :       1195.00
         CountLineCodeDecl   :        134.00
          CountLineCodeExe   :       1061.00
          CountLineComment   :        632.00
                 CountPath   :        676.00
              CountPathLog   :          4.00
                 CountStmt   :       1108.00
             CountStmtDecl   :        134.00
              CountStmtExe   :        974.00
                Cyclomatic   :        250.00
        CyclomaticModified   :        250.00
          CyclomaticStrict   :        250.00
                 Essential   :        121.00
```

Completed at: Wednesday, September 19, 2018 10:58:47 AM

2. Click on Metrics from the Menu Bar. Select Metrics Summary. Copy All and paste this data into any text editor (Notepad, Word, Pages, etc.) and give the file a name. On this document, we are interested in putting the summary of the code metrics for all the different projects that will be analyzed. Enter all the data on one document to save time and effort. Example:



Metrics Summary - Understand - (Build 918)

Metric	Value
Blank Lines	56,378
Classes	1,585
Code Lines	248,588
Comment Lines	73,174
Comment to Code Ratio	0.29
Declarative Statements	38,079
Executable Statements	37,550
Files	2,307
Functions	14,109
Lines	478,244

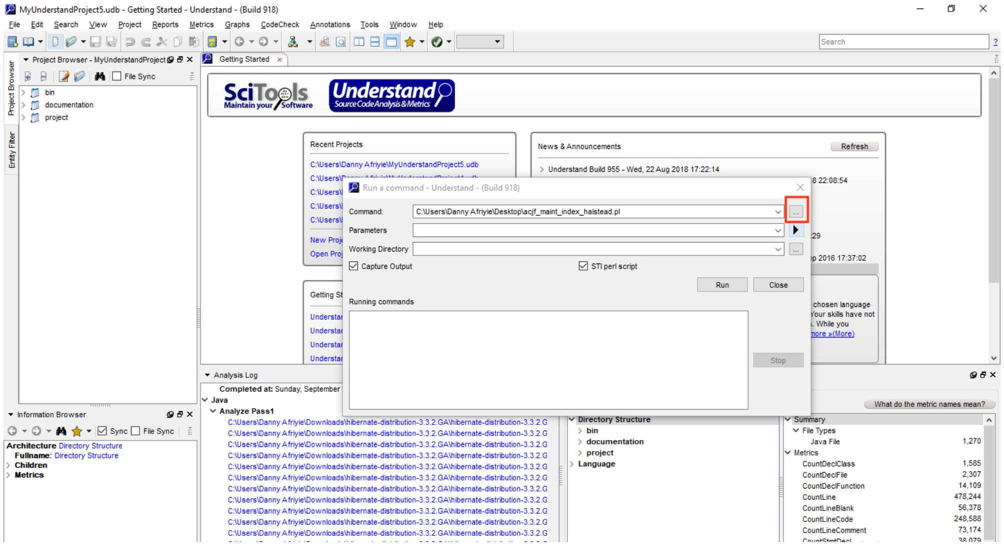
3. Halstead Complexity

A file called *acjf_maint_index_halstead.pl* has been attached (Save the original into a safe place and copy the file). This is a plugin. Go to the project files, and Search for Metrics following this directory path.

C:\Program Files\SciTools\conf\plugin\SciTools\Codecheck\All Checks\Metrics

Paste the file into this Metrics folder. Don't repeat this process for subsequent analyses once this is complete and the first Run works (explained below).

Go to the Understand software again. On the Menu bar Click on Tools. Select Run. A pop-up Window will appear. In the command field, browse into your folders to select the file *acjf_maint_index_halstead.pl.* Use the original download or the one in the program files. Click Run. You could leave the Working Directory field empty since it automatically recognizes it by inference.



MyUnderstandProject5.udb - Getting Started - Understand - (Build 918)

Run a command - Understand - (Build 918)

Command: C:\Users\Danny Afriyie\Desktop\acjf_maint_index_halstead.pl

Parameters

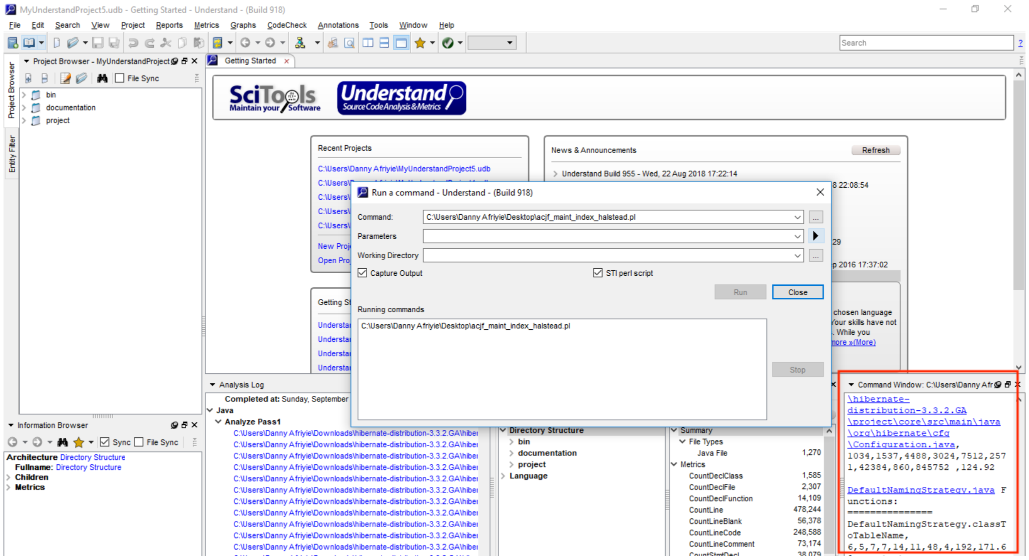
Working Directory

☑ Capture Output

☑ STI perl script

Summary
File Types
Java File 1,270
Metrics
CountDeclClass 1,585
CountDeclFile 2,307
CountDeclFunction 14,109
CountLine 478,244
CountLineBlank 56,378
CountLineCode 248,588
CountLineComment 73,174

The results are displayed in a pane on the bottom right corner. Right click in the pane and select Save and give the project name *(example: Project 1_ Application Code_ Halstead).* Name the file as *.csv file.*



MyUnderstandProject5.udb - Getting Started - Understand - (Build 918)

Run a command - Understand - (Build 918)

Command: C:\Users\Danny Afriyie\Desktop\acjf_maint_index_halstead.pl

Parameters

Working Directory

☑ Capture Output ☑ STI perl script

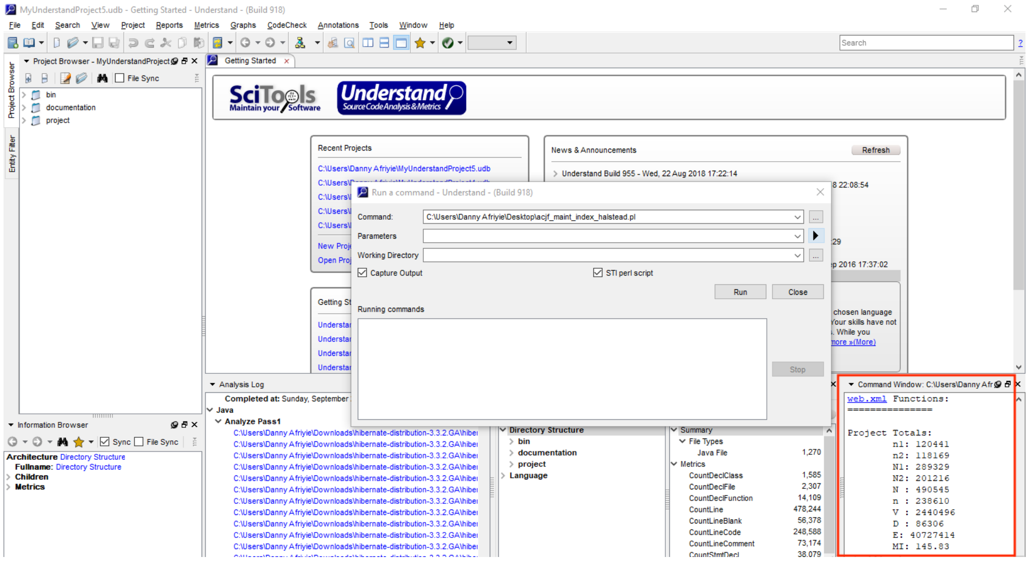
Running commands

C:\Users\Danny Afriyie\Desktop\acjf_maint_index_halstead.pl

Command Window: C:\Users\Danny Afr

```
\hibernate-
distribution-3.3.2.GA
\project\core\src\main\java
\org\hibernate\cfg
\Configuration.java,
1034,1537,4488,3024,7512,257
1,42384,860,845752 ,124.92

DefaultNamingStrategy.java F
unctions:
=================
DefaultNamingStrategy.classT
oTableName,
6,5,7,7,14,11,48,4,192,171.6
```



MyUnderstandProject5.udb - Getting Started - Understand - (Build 918)

Run a command - Understand - (Build 918)

Command: C:\Users\Danny Afriyie\Desktop\acjf_maint_index_halstead.pl

Parameters

Working Directory

☑ Capture Output ☑ STI perl script

Running commands

Command Window: C:\Users\Danny Afr

```
web.xml Functions:
=================

Project Totals:
        n1: 120441
        n2: 118169
        N1: 289329
        N2: 201216
        N : 490545
        n : 238610
        V : 2440496
        D : 86306
        E: 40727414
        MI: 145.83
```

Open the csv file with Microsoft Excel and select the names of the functions or methods in Column A and delete them.