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| **PROJECT PROPOSAL** |
| **Title :** Documentation Generator for ECL Code  **Deliverables :**   1. Ecldoc utility developed in Java and packages as executable JAR file. 2. A plugin to run ecldoc utility from ECL-IDE 3. Ecldoc utility will contain 3 major parts:    1. File Parser – It parses individual .ecl files into a relevant intermediate format like XML.    2. Linker – If ecldoc is run on complete project, it generates link information (IMPORT, Inheritance in Modules, etc) between multiple ecl files.    3. Output Generator – It convert XML format into output format (Text/HTML/reST/others) with appropriate directory structure. Link information is encoded (for example using hyperlinks in HTML format) using the output of Documentation Linker.   **Wishlist :**   1. ECLDoclet API similar to Doclet API in Javadoc for custom output format. 2. ECLTaglet API similar to Taglet API in Javadoc for custom tags. 3. Links to version control systems so that ecldoc utility only processes files that are changed. |
| **DETAILS OF ECLDOC UTILITY:**  (In addition to those in specifications README.rst file provide with project description)  Example: Consider following project structures.  A E  |--- B |--- F.ecl  | ---- B1.ecl |--- G  | ---- B2.ecl |--- G1.ecl  |--- C.ecl  Where A and E are 2 different projects located in 2 different locations (eg - /home/usr/eclp/A & /mnt/eclp2/E).  To run ecldoc on A,   1. We specify docs output folder (eg - /home/usr/ecldocs) 2. Run : ecldoc [-o /home/usr/ecldocs] [-f html] ***<A>***   This generates a directory /home/usr/ecldocs/A-Doc with structure.  A-Doc  |-------- pkg.xml – contains information about the directory structure of this project.  |-------- link.xml – contains information about external links used by files in this project.  |-------- A  |--- B  | ---- B1.xml  | ---- B2.xml  |--- C.xml  |-------- index.html – point of entry for Docs of project A.  |-------- PKG-A – contains all general files for A project.  |--- pkgtree.html (Table of Contents)  |--- Bundle.html (If bundle file present in original)  |-------- HTML-A  |--- HTML-B  |---- B1.html  |---- B2.html  |--- C.html  **pkg.xml** :  <DIR name=”A”>  <DIR name=”B”>  <FILE name=”B1.xml”> A.B.B1 </FILE>  <FILE name=”B2.xml”> A.B.B2 </FILE>  </DIR>  <FILE name=”C.xml”> A.C </FILE>  </DIR>  A similar structure can be generated for E in, for example, /mnt/ecl2docs/E-Doc.  Note : pkg.xml contains similar info as pkgTree.html i.e. Table of Contents.  Format : ecldoc [options] ***<Source-Path>***  [Options]:   1. –f : output format. Potential values: HTML, txt, rest 2. –lp : link-paths. Provides paths to external docs directory (assuming it exists). See Example below. Use pkg.xml file in link-paths to make appropriate links. 3. –o : Output Folder where Docs directory (named ***<Source-Path>***-Doc) is created 4. –a : Provide all the above options as an argument file (See argfiles in Javadoc). 5. Other options as required.   ***<Source-Path>***: Specifies paths to all the files/directory whose documentation is needed. Any regex can be present in source path using <regex> format.  Eg - ***</home/usr/ecl/A/<\*>>***  Note : We do not have a –r option for recursion.  If we need to recur, we can specify the wildcard path like ***<A/<\*>>***  If we do not need recursion, we can specify wildcard path like ***<A/<\*.ecl>>***  Examples :   1. Consider we want to generate documentation for all files in A recursively. No external dependencies. (ie no stmts like IMPORT E; or IMPORT E.G; etc)   **Run :** ecldoc [–r] [-f html] [-o /home/usr/ecldocs] ***</home/usr/eclp/A/<\*>>***  **Output :** Generate /home/usr/ecldocs/A-Doc   1. Consider we want to generate documentation for all files in E recursively. No external dependencies. (ie no stmts like IMPORT A; or IMPORT A.B; etc)   **Run :** ecldoc [-f html] [–r] [-o /mnt/ecl2docs/] ***</mnt/eclp2/E/<\*>>***  **Output :** Generate /mnt/ecl2docs/E-Doc   1. Consider we want to generate documentation for all files in A recursively. External dependencies. (e.g. stmts like IMPORT E; or IMPORT E.G; in B.B1.ecl etc)   **Run :** ecldoc [-f html] [–r] [–lp /mnt/ecl2docs/E-Doc] [-o /home/usr/ecldocs] ***</home/usr/eclp/A/<\*>>***  **Output :**   * 1. Generate /home/usr/ecldocs/A-Doc   2. A-Doc/link.xml contain appropriate external links to /mnt/eclp2docs/E-Doc   3. HTML files in A-Doc/A are appropriately linked to files in /mnt/ecl2docs/E-Doc/E  1. Consider we want to generate documentation for all files in B only. No external dependencies. (ie no stmts like IMPORT E; or IMPORT E.G; etc)   **Run :** ecldoc [–f html] [-o /home/usr/ecldocs] ***</home/usr/eclp/A/B>***  **Output :** Generate /home/usr/ecldocs/B-Docs . Note in this case, it is not /home/usr/ecldocs/A/B-docs |
| Real Example:  Consider ecl-ml library which contains ML and PBblas.  Many files in ML refer to PBblas as IMPORT PBlas;  So if we run ecldoc [–r] ***</ecl-ml>*** – All links between ML and PBblas are done automatically.  However if we want Docs for ML and PBblas separately, we **run :**   1. ecldoc [–r] [-o /ecldocs] ***</ecl-ml/Pbblas>*** 2. ecldoc [–r] [–lp /ecldocs/PBblas-Doc] ***</ML>*** |

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| Timeline Details | Week No |
| **Processing of Single File:**   1. Generation of an appropriate combination of Lexer and Parser rules for ECL file processing. 2. Generation of Lexer and Parser rules for Docstring processing. 3. Generation of XML Output for Intermediate Representation. | 1-2 |
| **Generation of Linkage Information:**   1. Placeholders to provide appropriate linkage info for IMPORTs in XML files or @see tags.   E.g.  **ECL :** IMPORT E.G.G1;  **XML :**  <IMPORT>  <A href=”@PATH/E/G/G1.xml”> E.G.G1 </A>  </IMPORT> | 2 |
| **Directory Processing:**  Until now, we have only dealt with single file processing. Now we move onto complete project processing to generate XML representation.   1. Java Code – parse [options] given in command line. 2. Check to see if all –lp paths are valid and contain pkg.xml file. 3. Process any wildcards in ***<source-path>*** - filename portion.   To process wildcard path, get the largest prefix with no regex. That will form the \*-Doc portion of output directory.  E.g. – for **/home/usr/ecl/D**/D***<\d+>***/DD***<\d+>***.ecl, the output directory will be , assuming [–o /home/usr/docs],  OUTPUT : /home/usr/docs/D-Doc   1. Generate backbone of output directory structure i.e.   --- pkg.xml  --- link.xml,  --- overview.xml,  --- XML ***Directory***,  --- PKG ***Directory***, etc. | 3 |
| **Walking the Code Directory (1): Generate pkg.xml**   1. Walk the Directory, starting from largest prefix w/o regex. 2. Match the regex in source path with file/directory names. 3. If file name match, append <FILE name> </FILE> to pkg.xml. 4. If directory name match, create corresponding subdirectory using <DIR name> … </DIR> and recur within … . | 3 |
| **Walking the Code Directory (1): Generate actual doc files**   1. Walk the Directory, starting from largest prefix w/o regex. 2. Match the regex in source path with file/directory names. 3. If file name match, generate a corresponding .xml file in output directory 4. If directory name match, create the corresponding subdirectory within output directory and recur within the subdirectory. | 4 |
| **Integrating External Link Information:**  **External Links are 2 types:**  **Run : ecldoc [options] </A/\*>**   1. **External to file but internal to current run**   **E.g. In A/B/B1.ecl**  **IMPORT A.C;**   1. **External to file and external to current run**   **E.g. In A/B/B1.ecl**  **IMPORT E.F;**   1. Process pkg.xml files from link-paths to get info about Type (b). 2. Process pkg.xml from current run to get info about Type(a) 3. While generating XML files from ECL, check if corresponding link placeholder matches some link in pkg.xml files (See Example below.) 4. If yes, create logical link URL to the linked file. 5. If no, keep the placeholder for future link additions.   E.g. Consider ECL Code for A.B.B1.ecl file in A project as before.  **ECL Code:**  IMPORT E.G.G1;  RUN: ecldoc [-f][-o /home/usr/docs][-lp /mnt/ecl2docs/E-Doc] ***</home/usr/ecl/A/\*>***  **pkg.xml file in /mnt/ecl2docs/E-Doc/pkg.xml :**  <DIR name=”E”>  <DIR name=”G”>  <FILE name=”G1.xml”> E.G.G1 </FILE>  </DIR>  <FILE name=”F.xml”> E.F </FILE>  </DIR>  **XML Code in /home/usr/docs/A-Doc/XML-A/XML-B/B1.xml :**  <IMPORT>  <A href=”/mnt/ecl2docs/E-Doc/E/G/G1.xml”>  E.G.G1  </A>  </IMPORT> | 4-5 |
| **HTML Output Generator :**  HTML Document will be generated according to following rules :   1. Imports in the file 2. Export Tree – A TOC for the file with nested structure (using nested lists, etc) with <docstring-type> : <Attribute-signature> format. 3. Exports Information – Here we do not use nesting but linear format.   Each Export will be of format :  -----------------------------------------------------------  <docstring-type> : <Attribute-Signature>  <Content>  -----------------------------------------------------------  This type of formatting will allow nesting structure to be represented independent of the content of the comment (which may be large), yielding a cleaner interface.  **See Attached file (example.html) to this proposal for a sample.**  Generator :   1. We use XSLT to convert XML to HTML Directly. 2. Link Information is automatically converted to use corresponding HTML files rather than XML files.   **Text Output Generator:**  Convert XML to Text directly with appropriate indentation.  This will be a trivial conversion since XML is already in a nested format.  **RestructuredText Output Generator :**  Convert XML to RestructuredText Format with appropriate link information using :ref tags in reST. | 6, 7 |
| **ECL-IDE plugin:**   1. Generate ECL-IDE plugin to run ecldoc directly. | 8 |

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| **Testing Information:** |
| During all tasks in above timeline, unit tests will be generated for each new Bold heading.  Test cases will of 3 types:   1. Tests are written specifically for the current task. 2. Running the ecldoc on ECL-Samples Folder. 3. Running the ecldoc on ECL-ML folder.   2 Types of tests evaluation will be done:   1. Tests on the correctness of single file output. 2. Tests on the correctness of directory output. |

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| **Knowledge and Skills:** |
| Languages: C++, C, Java, Python, ECL, SQL, R |
| Libraries : Regex (in C++, Java, Python), ANTLR, lex/flex/Jflex, yacc/bison/cup |
| Web Dev : HTML/CSS, Javascript, XML, XSL , XQuery, AJAX, JSON, DJango, Ruby-on-Rails, MySQL |
| Relevant Projects Done (On Github):   1. Implementation of 3 working compilers:    1. Slang: a procedural language with C-like syntax    2. COOL: an OOP Language with inheritance    3. YScript: a scripting language like Lua with concurrency, garbage collection, and VM Interpreter 2. Implementation of working CLI-OS 3. Implementation of complete website using HTML/CSS, Javascript, Django, AJAX with XML and JSON for data exchange 4. Implementation of website in Ruby-on-Rails |