University of Toronto
Department of Computer Science

CSC302S – Engineering Large Software Systems

Instructor: Matt Medland
March 1, 2014

Assignment 3: Requirements Analysis

Due Date: Sunday, March 16, 2014 – 11:59 p.m.

This assignment counts for 10% of the final grade.

Analyze the requirements for a new feature request for *matplotlib*. You will need to select a new feature request from the list of requests in the *matplotlib* github project issue list. Your analysis will include the user's requirements, a domain model to map out the domain entities (if applicable), a set of use cases describing how the users will use the requested feature, and (optionally) UML sequence diagrams derived from the use cases. You are also required to break the feature down into smaller, implementable sub-features, and apply a sizing to them. You are not required to implement the new feature for this assignment (but will be doing so for the next assignment). This assignment is to be carried out in your assigned teams. Each team will submit one report.

Doing the Assignment:

This assignment has 7 steps. They are:

1. Read the list of new feature requests in the project's github issue list. Check that you understand what each feature is. Ask your TA or the instructor if you need any clarification.

2. Select one of the feature requests for the assignment. Use the techniques you have learned in the course for estimating effort, assessing risk, and understanding customer priority to help you make the selection. You will be expected to defend your decision in the project write up. You are encouraged to investigate whether existing libraries and/or (open-source) implementations of any of the requested functionality can be re-used for your implementation – if you can make good use of existing code from elsewhere, that will help demonstrate you're using good engineering judgment. If the chosen library is ill-suited for the task or used incorrectly, it may accomplish the opposite...proceed with caution!

3. Complete a requirements analysis for the selected feature. Your requirements analysis will identify why the users want the requested feature, and will identify relevant assumptions about the problem domain. At the end of the analysis, you should have a detailed list of specific functions and quality

requirements, along with a rationale for how the functions will allow the users to meet their goals.

4. Generate a detailed set of use cases for the selected feature. Create a use case diagram to give an overview of the set of use cases, and create individual descriptions for each use case, including pre and post-conditions, exceptional behavior, and alternative paths for each use case. Your use case descriptions should be written in a style that the users would understand, so that, for example, they could form the basis for a user manual.

5. [Optional] Generate sequence diagrams, as necessary, to clarify and provide more detail to the use cases.

6. Write a report that describes the steps you went through in your requirements analysis. Include your risk assessment, feature breakdown and sizing, all use case and any sequence diagrams.

7. Document your teamwork by completing the group evaluation form, which is linked on the course webpage. Submit your printed review form in person to your TA in the interview portion of the assignment.

What to Submit:

Submit your report electronically on CDF, or by email to the instructor only if there is a problem submitting on CDF. The report should not exceed twenty (20) pages (not counting cover pages, appendices, and group evaluation forms). It should include the following items:

1. A brief description of the rationale for your choice of feature to implement.

2. A requirements analysis for the selected feature. Your analysis should clearly distinguish between user requirements (e.g. goals) and the specific functions to be implemented, and indicate any assumptions needed to ensure that these functions will indeed satisfy the requirements. Include any models (e.g. domain models, goal models) that you created to help you in the analysis.

3. A complete set of use cases for the selected feature. Your use cases should show alternative paths and exceptional behaviors, and document pre and post-conditions for each use case. Draw a high-level use case diagram for the feature. Write detailed descriptions for each use case, use further diagrams only to add clarity.

4. [Optional] Other diagrams or notes you generated while doing your requirements analysis. For example, if you generated sequence diagrams or did a robustness analysis, include it only if it adds clarity.

Be sure to include a cover page indicating the name of your team, the names and student numbers of all team members, title of work, course, and date. Assignments will be judged on the basis of visual appearance, the grammatical correctness and quality of writing, and the visual appearance and readability of the models, as well as their contents. Please make sure that the text of your report is well-structured, using paragraphs, full sentences, and other features of a well-written presentation. Use

itemized lists of points where appropriate. Text font size should be either 10 or 12 point.

Marking Scheme:

Your TA will grade your assignment. If you have questions about a marked assignment, you should first ask your TA before/after a tutorial or by email. If you don't get satisfactory answers, you should talk to your instructor.

Marks for this assignment will depend on the following factors:

- **Description of your choice of feature to implement (25%):** Did you clearly describe the criteria you used for your decision? Are the criteria appropriate? Is the choice sensible, given the criteria? Did you investigate existing resources (e.g. libraries, open source code, etc.) that you could use to implement the features? Did you use appropriate tools such as estimation and risk analysis to help make the decision?

- **Description of your requirements analysis (25%):** Did you analyze the requested feature from the user's perspective? Did you clearly distinguish between the user's goals and the functions that the software will provide? Is your list of required functions complete and appropriate? Did you set out a clear argument for why the specified functions will meet the user's goals? Did you make appropriate use of goal models and domain models to support this argument? Did you identify any domain assumptions used in these analyses?

- **Description of your use cases (25%):** Did you identify an appropriate set of use cases for the requested feature? Did you draw a Use Case diagram? Are your use cases written from the users' perspective? Would the use cases be suitable as the basis for a user manual? Did you clearly document the normal and alternative paths for each use case? Did you identify exceptions? Did you identify pre and post-conditions for each use case? Did you identify relationships between use cases (e.g. "uses", "extends") where appropriate?

- **Presentation (10%):** The style of your presentation, including language, grammar, clarity of the presentation, layout and legibility of the diagrams, etc.

- **Interview (15%):** Did you present your work well during the interview? Did you work effectively as a team? Did you demonstrate active involvement of all team members in the project? If your teams had problems, did you address them effectively and in a timely manner?