1. OVERVIEW

The purpose of this assignment is to help you grasp the task of devising tests for a system. These tests are at the level of “system testing” or “acceptance testing”: assess a delivered system on the sole basis of its initial requirements specification.

For this assignment, project groups have been randomly swapped; you are asked to develop the tests from the requirements specification produced by another group for Assignment 1. You do not know who the other group is, and should not try to find out; this is a formal rule (see under “RULES” below), but it also makes the task more interesting as you grapple with the challenge of writing a truly objective Test Suite from the requirements, without any “implementer bias” or any other prejudice resulting from insider knowledge about the application.

The concrete results that you have to turn in are, at a minimum, a Test Plan and a Test Specification as described below. You may include other documents (such as a Test Report Specification) if you find them necessary.

Please read carefully the next five sections, which give information about:

- Terminology and reference documents
- The Test Plan
- The Test Specification
- The rules for this assignment
- The grading scheme
2. TERMINOLOGY AND REFERENCE DOCUMENTS

In the rest of this document:

- “The Test Assignment”, or “Your Test Assignment”, denotes what you have to do as part of the present assignment (prepare the test step).
- “Target Project” denotes the project for which you are preparing Your Test Assignment.
- “SRS” (Software Requirements Specification) denotes the entire set of documents produced by the other project group as part of their Assignment 1. This includes any English text they may have produced as well as any complementary document such as an Object-Oriented Analysis diagram. For Your Test Assignment you may rely on all of these documents. (And, as noted under “Rules” below you may only use these documents.)

The reference for the terms used in this assignment, and the guide for the documents you have to turn in, is the IEEE Standard for Software Test Documentation, IEEE Std 829-1998, also referred to below as just “The Standard”. You can find it at http://ieeexplore.ieee.org/iel4/5976/16010/00741968.pdf?arnumber=741968 or http://tinyurl.com/35pep6

The Standard defines in detail what is expected of a Test Plan and Test Specification. The next two sections summarize the essential aspects with some complementary details and explanations as they pertain to Your Assignment.

3. TEST PLAN

A Test Plan “prescribes the scope, approach, resources, and schedule of the testing activities. It identifies the items to be tested, the features to be tested, the testing tasks to be performed, the personnel responsible for each task, and the risks associated with the plan” (IEEE 829-1998). This is the general specification from the standard and you may use your judgment to ignore aspects not relevant in a course project, e.g. responsible personnel.

Here are some typical elements that one may find in a Test Plan:

<table>
<thead>
<tr>
<th>Purpose</th>
<th>A description of the purpose of the application under test.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Features to test</td>
<td>A list of the features in the software that will be tested. It is a catalog of all of the test cases (including a test case number and title) that will be conducted, as well as all of the base states. Since you are asked to produce a Test Specification as well this can be just a reference to the Test Specification, which provides the details.</td>
</tr>
<tr>
<td>Features not to test</td>
<td>A list of any areas of the software that will be excluded from the test, as well as any test cases that were written but will not be run.</td>
</tr>
<tr>
<td>Environmental needs</td>
<td>A complete description of the environment or environments necessary to perform the tests. This should include a description of hardware, networking, databases, software, operating systems, and any other attribute of the environment that could affect the test.</td>
</tr>
<tr>
<td>Acceptance criteria</td>
<td>Any objective quality standards that the software must meet, in order to be considered ready for release. This may include things like stakeholder sign-off and consensus, requirements that the software must have been tested under certain environments, minimum defect counts at various priority and severity levels, minimum test coverage numbers, etc.</td>
</tr>
</tbody>
</table>
You will find a more complete list in The Standard. As a rule, your Test Plan should follow the structure of the standard, unless you find it appropriate to add or remove sections, in which case you should list the departures from the standard and justify them.

4. TEST SPECIFICATION

The Test Specification has a structure defined by The Standard. Its role is to describe the test suite and the test process.

IEEE 829-1998 defines three documents making up a Test Specification: Test Design Specification, Test Case Specification, and Test Procedure Specification. The description below includes elements that The Standard ascribes to all three documents. If you look up The Standard for more guidance, make sure to check the description of all three of them. For this assignment, we assume that you will combine them into a single document, called just “Test Specification” below. (You may use separate documents if you prefer, and more generally add to your delivery any document that you deem necessary.)

Each test case in the test suite specified by the Test Specification is a description of the sequence of steps that must be taken to exercise the test, and of the expected results. The description should provide information that is complete and precise enough to enable a third party (who is neither the software developer nor the author of the Test Plan) to run the test case and serve as test oracle, i.e. determine whether the test passed or not.

This means that each test case should include at least the following sections:

1) A name and a number, each serving as unique identification.

2) The requirement element or elements that this test case is exercising, indicated by precise references to at least one section, paragraph, sentence or other identified element (e.g. class, feature or contract element of the Object-Oriented Analysis) in the SRS.

3) Conditions that must be met (by the environment and the program state) prior to running the test.

4) As a special case of the previous item, any other test case that must be run prior to the current one.

5) The precise sequence of steps that must be followed by the tester to run the test case, including any interaction of the system with the tester (and, although this does not apply to our project, other elements such as hardware).

6) The precise outputs and messages, if any, to be produced by the test case to be considered passing.

7) Any property that the environment must satisfy on completion on the test for the test case to be considered passing.

8) A description of the how to report the results of running the test case. (Alternatively, you may include a Test Report document, separate from the Test Specification, as suggested in IEEE Std 829-1998.)

Although there is no imposed form, it’s common practice to use a tabular format to represent a test case with these elements (and any others that you find necessary).

To describe the sequence of steps (item 5 above), you must adapt the specification to the level of detail and the style of the SRS. If you have been given an SRS with a detailed GUI description, e.g. mockups of user interface views before and after specific operation, you should refer to these GUI elements. If the SRS is more abstract in its description of the functionalities, use the same level of abstraction. What counts is that a tester provided with the system and your Test Plan, plus the SRS for reference (in an industrial project it would be the user’s manual, derived from the SRS), can perform the test cases without any hesitation or need to ask further questions.
5. RULES

You must observe the following rules in preparing Your Test Assignment.

1. Your sole source of information about the Target Project is the SRS that has been provided to you. The Test Plan and test suite should entirely be based on the contents of that SRS. (Remember from section 2 that this includes all documents delivered as a result of Assignment 1, which may include more than a purely textual requirements specification.)

2. If you feel that you cannot provide precise enough test cases because of the lack of precision of the SRS, you may add explanations to the Test Specification document justifying the resulting limitations of the Test Specification and detailing what is missing in the SRS. Use this technique, however, only as a last resort. You should do your best to derive a Test Specification that is as complete as possible with the information given in the SRS.

3. In Assignment 4 you will be asked to carry out your own Test Plan and Test Specification to the evaluation of the system produced by the other group. You will be permitted to exercise only the tests that you have explicitly specified, but will be requested to carry out all these tests. Keep this in mind as you design the Test Plan and Test Specification: they should be as extensive as possible (to enable you to produce an interesting test report in Assignment 4, with as many relevant results as possible, ideally uncovering failures and faults), but also realistic so that you can indeed carry them out.

4. The mapping from Target Project groups to Test Assignment groups has been performed on a random basis. You do not and should not know who your Target Project’s group is. Do not try to find out, and do not take advantage of any information you might have about the work of other groups, whether it’s about their requirements or their own Test Assignment. The rule of the game for this assignment is anonymity; any attempt to lift this anonymity, even in part, will be considered cheating and will immediately result in failing the course.

The deadline is Monday, 11 May 2007, 20:00. Check the expected delivery technique (usually email) with your assistant.

As usual, the assistants are here to help. Don’t hesitate to ask any questions that you may have on this assignment.

6. GRADING

This assignment counts for 25% of the project grade (itself half of the course grade). It will be assessed as follows:

- 30%: Readability.
- 30%: Precision and level of detail of the description
- 40%: Test coverage

We hope you find this assignment full of useful lessons and wish you the best.