



Software Quality and Dependability

DEI-FCTUC, 2022/2023

Assignment 1

Survey on software quality and dependability concepts, terminology and software fault tolerance techniques

The goal of this assignment is to produce a survey on software quality and dependability concepts and terminology, including an overview on software fault tolerance techniques.

A traditional survey¹ paper is a document that provides the reader with a condensed view on a given subject or set of topics. It is used very often in the context of research activities, to provide a view of the state of the art on a given topic, but it is also very common in the industry and in professional contexts to provide an updated abridged report on the selected topic. Very often, these surveys are requested by project managers or head of divisions of companies with a goal of getting a quick overview on a given subject (which means that the author of the survey is implicitly under evaluation 😊).

A good survey should have a set of well-known features:

- Should be a good entry point for the reader to learn a given subject (the subject of the survey).
- Should work as a “roadmap” to guide the reader in subsequent readings, to get a deeper knowledge on the topic(s) addressed in the survey.
- Should reflect the author’s view on the topic. That is, the survey should provide the author’s interpretation and conclusions on the topic. Note that the survey results from the study of several sources and, very often, these sources are not totally consistent, thus the author’s conclusion and interpretation are essential.
- Should cover all the relevant material for the selected topic in a complete way, although the level of detail should be carefully selected to provide useful information and maintain the condensed view expected for the survey. It is also frequent to have surveys that concentrate on a given sub-topic or just explore a certain angle in the analysis of the area addressed by the survey.

In this assignment, the survey can be delivered in **two possible formats**:

- A written survey, which is the traditional format of technical surveys. The document should have no more than 10 pages, using font size of 11pts.

¹ Note that the word survey is often associated to a “research survey”, which consists of a structured set of questions to gather data from a group of people on a specific subject. This is obviously a totally different meaning for the word survey, not related to the present assignment.

- A video in MP4 format with no more than 10 minutes. I will leave it to your imagination to decide the best descriptive/narrative strategy for the video, provided that the actual content corresponds to a technical survey on the proposed topics.

The surveys must be written/recorded in Portuguese or in English (but do not mix both).

The very first step in the preparation of your survey is to explore the subject and select the papers, book chapters and other material that should be read and studied by the authors of the survey.

Since the theme “Survey on software quality and dependability concepts, terminology and software fault tolerance techniques” is very broad, it is recommended to decide what you are going to cover in more detail in your survey. It is wise to start with the general overview before focussing on a possible subtopic. This is essential to provide the reader with a clear view on where the subtopic focused on your survey is in the context of the whole theme.

To summarize the current state of the knowledge on a given topic you need to study the topic of interest in detail. It means that before writing the survey (or plan and produce the video) on the proposed topic, you should learn and know the topic in detail. In other words, an essential step of this assignment is to learn software quality and software reliability concepts, the established terminology and the main techniques used to assure that software works in a reliable way. As mentioned, you are totally free to choose a given sub-topic to address in more detail.

There are plenty of papers and documents available on software quality, software quality attributes, software reliability and software fault tolerance techniques. An important aspect of the survey is to clarify and provide a structured view on the main concepts and the used terminology to express such concepts. As usual in many areas, in software quality and computer dependability, the terminology is not fully stable and different terms are used to express the same concepts. It means that one important goal of the survey is to provide a structured view on the relevant concepts and terminology.

The typical structure of a written survey includes the following elements:

- Title
- Abstract
- Introduction
- Body of the document (this is not a section name; the body of the document could contain several sections, depending on the approach used for the survey and on the subtopic you decide to focus the document)
- Conclusion
- References

In the video format, the way the material is provided to the viewer is very dependent on the video narrative strategy. In any case, the notion of introduction of the topic or topics is also valid for a video, as well as the idea that the video should provide a conclusion at the end.

Very important: The survey must be fully written by the authors with their own words.

Although the students are going to learn the concepts from documents collected from the Internet, it is not possible to simply copy and paste entire passages of the original documents and reference the source. The survey must be the result of your view on the topic and must be expressed in your own words. Violation of this rule is considered plagiarism.

Group and calendar

This assignment must be done by a group of 3 students. Groups of 2 students are also accepted. The group composition should remain the same for the entire course (i.e., in Assignment 2 the groups should be the same). If, for any reason, it is necessary to change the group composition, that must be reported to the teacher immediately.

The outline of the calendar is the following:

- February 16 – The Assignment is available at UCStudent and Inforestudante
- February 23 – The composition of all groups must be defined by this date. To do this, the students should submit the group composition at Inforestudante (as a “Submissão de Trabalhos” called Group composition). The students should simply submit a PDF file with the identification of all the members of the group.
- Until April 8 – Help on this assignment will be provided by Henrique Madeira (henrique@dei.uc.pt). Since the lectures (T classes) are planned for 1 hour (or less), we will have some time at the end of each T classes for questions and doubts about the assignment.
- April 8 – Deadline for the submission of the assignment (Inforestudante).
- April 13 and in other days of that week – Assignment defences. Students’ groups will select the day and time for their defence among many choices.