

Practice sheet 7 – due on 2010-12-13, 2011-01-03 and 2011-01-10

Learning aims:

- Develop measures and understand and discuss measurement in the software development process with the help of the goal question metric approach (GQM).
- Gain experience with measuring and measures in the software development process by using the goal question metric approach in an OSS project.

Preliminary remark and time schedule: In the next three tutorials you will carry out your own study with the goal question metric approach, working in pairs. Proceed in the following way:

Time span	Tasks	Content of the tutorial
by 2010-12-13	Read the source of GQM, understand and visualize it. Choose OSS projects. Formulate/Establish possible goals (goals according to GQM). Tasks 7-1, 7-2	Present GQM. Discussion of possible goals and difficulties with the goal formulation.
by 2011-01-03	Establish goals. Further procedure according to GQM. Task 7-3	Preliminary results: Discussion of difficulties and preliminary successes.
By 2011-01-10	Continue and finish study. Task 7-4	Final presentation.

Task 7 – 1: autonomous research

Read up on the answers to the following questions. The article mentioned in the lecture by Victor Basili and David Weiss on the goal question metric approach (GQM) may be useful: *A Methodology for Collecting Valid Software Engineering*. You find the article on the lecture's website.

1. Why is it reasonable to proceed top-down and not bottom-up when using the goal question metric approach?
2. Why is measuring important in the software engineering process?
3. Which information sources may help to develop the goals' elements?
4. Which pitfalls remain for the data analysis despite the goal question metric approach?

Task 7 – 2: preparation of the study

Work on your study in pairs of two or three. Divide the task where appropriate! **Pay attention to the remarks on the following page!**

1. Choose an open source project on which you would like to concentrate for your study.
2. Formulate/Establish possible goals for your study. Describe how to reach these goals and what you have already done in this respect!
3. Plan how to proceed further (see time schedule).
4. Note down your central insights, questions and problems. **We'll talk about them in the tutorial!**

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Task 7 – 3: first steps according to GQM

You should be prepared to give a preliminary report in the tutorial concerning your progress:

1. Formulate your goal with the elements: Object of measurement, goal, quality focus, perspective, context.
2. Name the questions formulated so far and the corresponding metrics.
3. Which tools do you plan to use?
4. Note down your central insights, questions and problems. **We'll take about them in the tutorial!**

Task 7 – 4: final presentation

Prepare a presentation (~10 minutes) touching upon the following points:

1. Short introduction of the project you deal with.
2. Which goal did you chose and how did you find it?
3. How did you develop your questions? Where there changes? Why?
4. Which metrics did you develop for your questions?
5. Which tools did you (not) use to study your metrics? How do you evaluate these?
6. Which answers concerning your GQM questions could you find? Present your data for this in an appropriate form (possibly with graphics).
7. Which statements concerning your goals can you make?
 - a. In which way do the answers to your questions contribute to the goal? Which assumptions did you make and should one believe you?
 - b. Which constraints apply? Why?



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Remarks:

Study the program code, VCS¹ entries or the mailing lists (or rather what else you might need) of an OSS project² with the help of certain metrics. The metrics are, however, not determined by the task, but should be determined by you with the goal question metric approach. Pay attention to the following:

- First you need one or several goals, i.e. you need to think about which improvement goals you would like to reach with respect to the software/project (possibly based on business or project goals). This is no easy task. Try to find out whether there are certain points which pose special problems to the project or are considered as future challenges. Most likely you need to deal with the project maintainers or the mailing list.³
- Normally, one should be completely free in establishing these goals. However, as we do not want to burden ourselves with possibly creating the data base on our own for this task, you should have in mind that mostly only the program code and VCS entries are available when establishing your goals. (If you like, you may also use the bug data base, feature requests or mailing list. It will, however, be more difficult to make the data "processable"!) Despite the perspective in this task do not forget that at this stage this is not necessarily a standard procedure according to GQM.
- Follow the path determined by GQM to gain appropriate metrics.
- Now you need tools to evaluate your metrics. You may find a list of tools for static code analysis at
 - http://en.wikipedia.org/wiki/List_of_tools_for_static_code_analysis or
 - <http://java-source.net/open-source/code-coverage>

You can use StatCVS, StatSVN or CVSanaly (also for Subversion) to evaluate the version control systems. **Additionally look for tools suited for your needs and test them.**

You may possibly **write your own analysis tools**. With the programming language R (<http://www.r-project.org/>), which was developed for (static) data analysis and graphics, you can easily perform analyses which resemble those in the article *Two Case Studies of Open Source Software Development: Apache and Mozilla* (see last practice sheet).

- On the basis of the established "values" you now need to answer your GQM questions and make statements concerning your goals!

¹ VCS – Version Control System, e.g. CVS and Subversion.

² This should be big enough (see last practice sheet) and provide adequate data! You may also choose JabRef.

³ Dare to enquire in detail (concerning goals and problems (in the product but also in the process)). Only then you get information matching the chosen project and may establish adequate metrics.