Guidelines for the bachelor project Computer Science

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1. Introduction

This guide contains information about the course of events concerning the final project, the bachelor project. The guide also contains a planner and an assessment form so that all those involved know where they stand and various bachelor projects are supervised and assessed in a similar way. That is why this guide is used by both students and teachers.

2. Objectives of the bachelor project

The bachelor project completes the bachelor study of Computer Science. You should be able to apply the knowledge and proficiency you obtained during the bachelor period in a larger project. In the bachelor project, you will produce an independent piece of work that addresses a topic of choice within the domain of Computer Science.

The content of the bachelor project can be different per research group and per student and is established in agreement with the scientific supervisor. You can choose from the offered topics (these can be found on the websites of the research groups) or you can suggest your own topic within the research area. The content may be purely theoretical, as well as practical and contain, for example, programming work.

The bachelor project can be seen as a training in scientific work. This means that execution and research report of the project must answer scientific standards. Work with relevant literature forms part and parcel of the task, and this should be reflected in the thesis, together with a critical evaluation of the findings.

Expectations should be realistic: the scale of the project is not grand, and you are at the beginning of your path to science or profession. While we are naturally attracted towards interesting and exciting problems, we cannot, generally speaking, expect scientific breakthroughs from this project. What we can expect is that you show understanding of the problem, contribute to the extent possible, to its resolution, and that you can lucidly but concisely describe and evaluate the problem as well as any solutions.

After successfully completing the bachelor project you will be able to:

- describe a problem from the Computer Science domain,
- find and select relevant scientific literature,
- formulate a relevant and academically sound research question,
- develop a research design,
- carry out a research study using the chosen literature, data collection, and data analysis methods,
- give a critical reflection on both the scientific and practical contributions, as well as on your research limitations,
- report on your research for a scientific audience (both written and in an oral presentation).

In addition to the above objectives, the bachelor project aims to introduce you to research in the field of Computer Science and to contribute as much as possible to the research. The bachelor project also serves as an orientation for a possible master's specialization.

3. Place in the curriculum

The bachelor project is worth 15 ECTS. In the standard bachelor curriculum, the bachelor project takes place in periods 5 and 6 of the 3rd year.

4. Prerequisite

The bachelor project is meant to be the last part of the bachelor studies. This means that in principle you follow the bachelor project after completing all other courses of the bachelor stage. A dispensation is possible if you have earned at least 150 ECTS of the bachelor curriculum.

5. Time schedule

The table below gives an overall planning of the bachelor project.

Activity	Duration (weeks)
	15 ECTS
Starting and literature study	1
Work execution and analysis	7.5
Thesis and oral presentation	2
Total	***10.5***

The working hours are the normal eight-hour working hours as used in the research groups, e.g. from 9 am to 5.30 pm, including a half-hour break. In connection with the planning of the bachelor project, the completed Planner (see also Canvas for a digital form) must be submitted to the relevant supervisor no later than one month before the start of the bachelor project.

6. Find a project and a supervisor

Below you will find the steps to search for a project and a supervisor.

1. Consult the website of the research group http://www.cs.vu.nl/en/research to find a supervisor and a project.
2. Read the project descriptions carefully of the different sections before you make a decision.
3. Contact the corresponding person (researcher, professor, Ph.D. student) if there is a project in which you are interested.
4. Fill in the online form at https://goo.gl/forms/Yz5RLDsdivxto8sw2

7. Projects at a company

It is possible to do a project at a company or somewhere else outside the Vrije Universiteit. If you intend to do so, you should make sure

a) that you have a good and clear project plan with a scientific research question, and
b) that the project plan is approved by both a VU-CS staff member who is also prepared to be your main (first) supervisor and the daily supervisor before you start the project.

The daily and second supervisor will be someone from the company.

8. Supervision

You will be individually supervised by a (permanent) staff member who sets the task. This is the person who is responsible for the supervision, the main (first) supervisor. In some cases (a part of) the daily supervision can be delegated to a postdoc or a Ph.D. student. The second reader may be a postdoc or a Ph.D. student. If you will do your project at a company, the daily or the second supervisor will be then someone from the company. Be sure that you arrange regular appointments with your main and daily supervisor to discuss the progress of your bachelor project. Use the planner for this.

9. Individual work or teamwork

Usually, the project is carried out individually, but in exceptional cases, you may work in a team of two or three students on a bigger project. In this case, each student delivers a thesis and gives a presentation separately. The latter should make it clear what the individual student's contribution is in the results.

10. Lectures

The list below gives an overview of the lectures which will help you in your research process:

a. literature study,
b. writing a scientific paper, and
c. reviewing scientific paper.

11. Oral presentation

The final stage of the bachelor project consists of an oral presentation and completing the bachelor thesis. The date and time of the presentation must be determined at least one week in advance between you, your main supervisor and the second reader. A rule of thumb is to keep the presentations at the end of June so that sufficient time is left to process any feedback and to grade the thesis. The presentation lasts approx. 15 minutes, finalized by a short discussion (5 – 10 min.) by the audience.

12. Thesis

The final thesis is evaluated by the main supervisor and a second reader (see assessment form) and should be no longer than approx. 16 pages (including literature and your research results). Use the following settings if you are using MS Word; font type: Calibri, font size: 11, line space: 1,15, no columns. If you have, e.g. software, in addition to the thesis then the thesis can be slightly shorter (this should be approved by the supervisor). Hand in the draft thesis approximately two weeks before the presentation to your supervisor.

13. Grading

The main supervisor defines the final grade based on

a. the work executed (50%),
b. the thesis (40%), and
c. the final/oral presentation (10%).

The second reader takes part in the grading of the thesis.

14. Checklist for assessment

Below is a checklist with criteria that give you an idea on which you will be assessed.

- *Work executed*: insight, results, creativity, precision, effectiveness, independence, initiative, collaboration, planning
- *Thesis*: introduction and problem statement, summary, presentation of the results, discussion and conclusion, organization, readability, literature assessment, making use of supervisor(s)' advice
- *Presentation*: introduction/conclusion, presentation of results, clarity, organization, use of media, discussion

15. Roadmap

7.1. Orientation: kickoff meeting - period 4:
- explanation of what a bachelor project is
- answering students' questions
- explanation of method and form

7.2. Search for topic and supervisor

7.3. Planning (see Planner):
- title of the project
- task and work plan
- setting a timeline for work plan execution
- allowing for break time (for vacation, exams, etc.)
- daily supervision, the frequency of appointments with supervisors
- the language of the thesis and presentation

7.4. Actual work on the project:
- most of the work is done in period 5 and 6 but you can start earlier
- nominally you have 10 weeks
- start the thesis as soon as possible and discuss current versions with the supervisor

7.5. Three lectures (April/May):
- Literature study
- Writing a scientific paper
- Reviewing scientific paper

7.6. Draft thesis and planning oral presentations
- hand in the draft thesis approximately two weeks before the presentation to your supervisor
- the thesis is in principle no longer than approx. 16 pages.
  NB: if you have, e.g. software, in addition to the thesis then the thesis can be slightly shorter (this should be approved by the supervisor)
- use the following settings if you are using MS Word; font type: Calibri, font size: 11, line space: 1,15, no columns.
- study of the relevant literature is part of the project and a recognizable part of the thesis
- the thesis is also evaluated by a second reader
- determine at least one week in advance a date and time with your main supervisor and second reader for an oral presentation (preferably in the last week of June)

7.7. Oral presentation
- the duration of the oral presentation is 15 minutes
- there is time for discussion with the audience
- language: English or Dutch

7.8. Grading

- the work executed and the thesis are graded by the main supervisor and second reader
- the main supervisor determines the final grade
- the assessment form (see also Canvas for a digital form) is filled in by the main supervisor who delivers it together with the thesis to the Education Office (resultaten.beta@vu.nl)

16. Problems

In case of any problems concerning the bachelor project, contact the coordinator of the bachelor project or the academic advisor. If they cannot find a mutually acceptable solution, the Examination Committee may be asked to arbitrate.

Planner bachelor Project

Computer Science

Credits: 15 ECTS

Name student: ..... Student number: .....

Daily supervisor: ..... Second reader: .....

Main supervisor: .....

a. Provisional title of the assignment

.....

.....

b. Start date: ..... End date (Presentation & thesis completed): .....

Pause: from ..... to .....

c. Frequency meeting with daily supervisor: ... . Frequency meeting with the main supervisor: .....

d. Assignment and work plan

Signature student Signature main supervisor

Date: Date:

Assessment form bachelor project

Computer Science

Name student:	.....	Student number:	.....
Daily supervisor:	.....	Second reader:	.....
Main supervisor:	.....		
Credits:	15 ECTS	Course code:	XB_40001

EXECUTED WORK	Weight	Grade	Remarks
Result Quality of the achieved results.	50%		
Insight Level of academic thinking, creativity and critical reflection on the work.	30%		
Planning Timeline and meeting of deadlines. Contact with the supervisor(s). Response to feedback.	10%		
Independence Independence and initiative showed during the project.	10%		
Any further remarks			

FINAL GRADE EXECUTED WORK:

THESIS	Weight	Grade	Remarks
Research question Description of the research question. Explanation of its importance and relationship with the area of interest. Description of and comparison with the relevant literature.	20%		
Content The motivation for the chosen research approach, a description of the work, and analysis of the results.	40%		
Readability Quality of the academic writing style. Use of illustrations and examples. Consistency and logical flow of the argumentation. Structure, organization, and layout of the thesis.	20%		
Conclusion Discussion of and critical reflection on the work, as well as its limitations and possible future work.	20%		
Any further remarks			

FINAL GRADE THESIS:

PRESENTATION	Weight	Grade	Remarks
Presentation skills Clarity and organization of the presentation. Use of media. Use of language and non-verbal communication. Duration.	60%		
Content Mastery of the subject matter. Quality of the content. Response to questions and final discussion.	40%		
Any further remarks			

FINAL GRADE PRESENTATION:

FINAL EVALUATION

Final grade executed work: ..... **(Weight: 50 %)**

Final grade thesis: ..... **(Weight: 40 %)**

Final grade presentation: ..... **(Weight: 10 %)**

Final grade: .....

Any further comments:

Signature main supervisor	**Signature second reader**
.....	.....
Date:	**Date:** .....