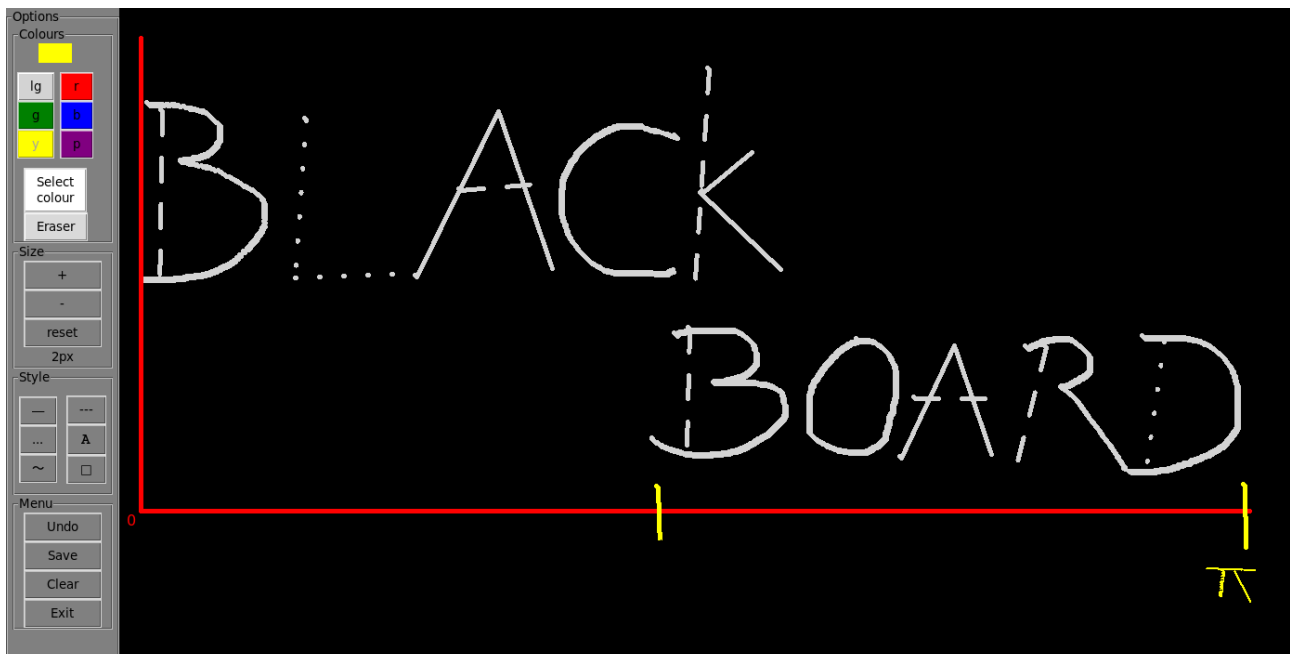


Project plan

Blackboard

The development of a digital school-board



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Flexible project

Hogeschool van Arnhem en Nijmegen

Version 1.1

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Introduction

This project plan has been created for the Hogeschool van Arnhem en Nijmegen as part of the Flexible Project in Semester 6.

This project is being conducted by a single Embedded Systems Engineering student and is meant to lay a foundation for the development of an open-sourced, drawing program, specifically designed to be used for online teaching. The project will be evaluated by Ton Ammerlaan and Remko Welling.

The program is being designed to be used as an alternative to the user-unfriendly versions that are currently available, like Microsoft Whiteboard and Paint. It is also intended to be used on a wider range of operating systems, like Linux, Windows and OSX. It aims at simplifying the drawing of the most used figures. The project will also look into the usage of devices, other than the standard trackpad or mouse, to further increase the ease of usage.

The competences to be developed during this project, include the ability to document code clearly and document the workings of the program for both developers and non-developers to understand the program.

The project has the following criteria to be evaluated on:

Documentation

- The documentation should include hyperlinks to be able to easily navigate through the code of the program.
- The documentation should include a to do list or advise chapter to allow future developers to continue the coding of the project.
- The documentation should include guidelines for other programmers to follow, in order to maintain uniform styling in the code.
- The code should include comments to explain itself.

Functionality

- The program should be able to be used to draw free figures.
- The program should be able to accept written text to use for notes.
- The user should be able to use templates for formulas, graphs and other important templates.
- The program should simplify drawing basic shapes like lines and circles.
- The user should be able to store figures to be reviewed at a later stage.

The stakeholders for this project are the following:

- Students
- Teachers

- Universities
- Developers

The next chapters provide the project plan for the Blackboard project. The first chapter will go over the problem, specifying the existing base for the project and the challenge it means to solve after the completion of this project. After this, the project will be analysed to formulate the goals and sub-goals and to create a base to start researching. The next chapter is the research plan, continuing from the project analysis and formulating research questions based on the goals and sub-goals, while also providing a justification for the research. Finally, the limitations and conditions will be dealt with.

1. Problem orientation

This project is being developed following the development of a small personal project. This personal project involved the creation of a simple drawing program, where the drawings could be saved and which would be easy to operate and work with on a Linux based system.

While developing this simple program, it was noticed that with, the now necessary, online teaching, teachers did not use any means of drawing, as was used previously on the University blackboards. The reason for this, as indicated by lecturers, is the poor usability of existing drawing programs. The programs that could be used made use of drawing with the use of a mouse, and made no corrections to the drawing. This meant Hogeschool van Arnhem en Nijmegen students could only listen to the teacher and read from the textbook, taking away an important visual aspect and thus debilitating students with a visual learning style.

To improve this deficit, lecturers and students agreed that a program is needed that is attractive and easy to use and preferably requires no additional hardware to be used, and only little, easy to setup and affordable hardware to improve the ease of use.

2. Project analysis

The goal of the project is to create a program that simplifies school related notes and drawings to allow teachers and students to easily and quickly visualise what is being explained, or handled during classes.

The program is to be used by teachers and students as the main target group.

The program should not require hardware to use it, but might provide improved user friendliness when certain hardware is used.

For this reason, the problems with the user friendliness of current drawing programs for this purpose should be identified.

Since making digital drawings with a standard mouse can be considered tedious by most, possible solutions should be found, either by software solutions or hardware solutions.

It should be affordable for this group and preferably be usable for free.

It should be different from standard drawing programs in a way that it is specifically designed for educational use and user friendly for this purpose. This means that drawing with a mouse should be made easier by, for example, shape correction, shape templates and other techniques to help users, since this is mostly not done in current programs and includes little to no support for university related shapes, such as graphs.

Finally, it is important to take the financial aspect into account and weight the solutions with these

aspects in mind.

3. Research plan

To be able to create a program that fulfils the requirements and narrow down the scope of the project, a main research question has been formulated and divided into several sub-questions. The main research question is the following:

What functionalities should a digital alternative to the traditional school-board include, to be user-friendly for the use of teaching and taking notes in education?

The main question contains some hard to define and subjective terms, which is why a number of sub-questions are used to specify the research. These sub-questions are the following:

- 1. What programs currently exist, that can be used for the purpose of teaching and taking notes?*
- 2. Why are current programs considered to be user-unfriendly for this specific educational purpose?*
- 3. What functionalities are missing or can be considered desirable for a digital school-board?*
- 4. What hardware can be used to improve the user-friendliness of the program?*
- 5. How can the program be used on various platforms?*

The combination of the sub-question is believed to hold the foundations for answering the main research question and help to design the program.

3.1 Research Methodology

The research justification will deal with the used methods, to answer the sub-question and the main question, formulated in the Research Plan chapter.

Firstly, the sub-questions will be handled, after which the main research question will be dealt with.

- 1. What programs currently exist, that can be used for the purpose of teaching and taking notes?*

To answer this question, a desk research will be conducted, using online resources to create a list of existing programs that could be used for the purpose of a digital school-board. This will include paid, free-to-use and open-source programs alike. The type of programs that will be researched are the following:

- Drawing programs
- Design programs

- Note/text editor programs

Mobile and tablet applications will largely be left out of consideration, since the program is meant to run on desktops and laptops. The usability for these types of applications is fundamentally different and is out of scope for this phase in the project.

2. Why are current programs considered to be user-unfriendly for this specific educational purpose?

To find out what users consider to be user-unfriendly when using the programs in the list created by the previous sub-question, online reviews for the five most popular of these programs will be analysed to determine if they are relevant to this research and will be listed. Once twenty or more reviews per program have been found to be relevant, they will be summarised and a conclusion will be drawn per individual program, followed by a single complete conclusion and answer to this sub-question.

3. What functionalities are missing or can be considered desirable for a digital school-board?

The resulting conclusion from the previous sub-question will be translated into a list of missing and/or desirable functionalities, after which a more qualitative research will be conducted in the form of a short and simple interview with a number of teachers and students. These interviews will be conducted to create another list of functionalities that are desirable. These lists of functionalities will be combined and will be analysed to research which of these are realisable for the project and which might be at a later stage. The results will be used to formulate requirements and possibly recommendations for future development.

4. What hardware can be used to improve the user-friendliness of the program?

It might not be sufficient to design a program that can only be used with a regular mouse or trackpad. To make sure that the user-friendliness of the program can be increased, the possibilities of using separate hardware like drawing tablets will be researched.

5. How can the program be used on various platforms?

To allow users to use the program on various platforms, it is desirable to create the program in such a way that it might be used on a large number of different platforms, without having to make adjustments to that particular system. This means that the program should not require the installation of any dependencies or other alterations to the system.

5. Limitations and Conditions

The project is bound to certain limitations and conditions, most of which are related to the project being funded and executed by a single Embedded Systems Engineering student. This causes the project to rely on a small budget and causes the development to rely on lower priced products. Also, the project is only supposed to take up around 80 hours, meaning that the development of the application might only be executed in part during the project and continued afterwards.

The condition, set by the development team itself, is that the project is freely available to all who wish to use it and open-sourced with the condition that it may not be used for financial profits in any way. Other developers are free to alter it, use it for inspiration, etcetera, as long as the programs remain free to use and open-sourced. For this reason, the project includes the GNU General Public License, which can be found in the source repository.

The software will be published using Github and PIP package manager. A manual for users will be made available on the Github page and the project will be concluded with a presentation of the final results.