

Master's Thesis

A Vue.js-based image editor for ad-hoc graphics on the web

Dipl.-Ing. Dr. Markus Weninger, BSc

Institute for System Software

T +43-732-2468-4361

markus.weninger@jku.at

Student: Marindo Beka, BSc

Advisor: Dipl.-Ing. Dr. Markus Weninger, BSc

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The coronavirus outbreak in 2020 strongly changed the way how teaching is performed at universities. Most classes switched to an online teaching mode – including digital exams.

While teaching mostly went back to teaching in presence, a number of exams are still performed digitally. Even though digital exams prove more useful than “paper exams” in certain situations (for example by providing syntax highlight when writing source code) they also have certain downsides. For example, most online examination tools miss drawing features.

Thus, the goal of this thesis is to develop a web component that can be used to produce simple images. It should be integrated into the online examination tool Xaminer developed at the Institute for System Software at the JKU.

Xaminer heavily relies on Vue.js, a frontend framework to easily perform data-driven DOM manipulation. The web component developed in this thesis should also use Vue.js at its core. It should allow users to create simple SVG graphics that consist of various visualization primitives (shapes) such as rectangles, circles, texts and arrows. Above the drawing area a toolbar should allow the user to, for example, place new shapes on the canvas. The users should also be able to undo and redo changes, i.e., a command pattern has to be implemented. Once placed, the user should be able to select elements by clicking on them. Multiple objects should be selectable by dragging the pressed mouse across them (i.e., rectangular select). Control-clicking elements to select multiple elements should also work. Certain properties of selected elements such as font, color, or arrow shapes should be customizable for selected elements. Also, selected elements should be movable, resizable, and deletable.

It is of paramount importance to strive for ease-of-use. For example, a user should be able to add text to an image by just clicking on an empty space and start typing. Another usability feature is that arrows should “snap” to existing shapes and should resize if these shapes are moved. One caveat to keep in mind is that the student has to think about to handle overlapping elements and their order, for example two circles that intersect each other.

To evaluate the tool, the student should think of typical exam question such as drawing the UML diagram for a certain software pattern. The image editor should be used to create these expected drawings to evaluate if the current state of the image editor provides enough features, flexibility, and usability.

Modalities:

The progress of the project should be discussed at least every three to four weeks with the advisor. A time schedule and a milestone plan must be set up within the first two weeks and discussed with the advisor and the supervisor. It should be continuously refined and monitored to make sure that the thesis will be completed in time. The final version of the thesis is expected to be finished before the 30.09.2024.