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WEB-BASED BULLET JOURNAL INTERACTIVE BUILDER

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UNIVERSITATEA BABEŞ-BOLYAI CLUJ-NAPOCA

FACULTATEA DE MATEMATICĂ ŞI INFORMATICĂ

SPECIALIZAREA INFORMATICĂ ÎN LIMBA ENGLEZĂ

LUCRARE DE LICENȚĂ

APLICAȚIE WEB INTERACTIVĂ PENTRU PROIECTAREA JURNALELOR BULLET

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Abstract

This paper focuses on the topic of Bullet Journaling. It has become a trend to keep a bullet journal as of late because it goes beyond just having an agenda. It involves drawing and putting care into what you are creating to make the most aesthetically pleasing spreads. This trend has seen such a rise in recent years that there are whole YouTube channels, Instagram accounts and millions of photos on Pinterest dedicated specifically to this practice. However, its popularity has not brought forth any apps that are devoted specially to designing your spreads.

This paper discusses the implementation of an application specifically designed to help create spreads for the bullet journaling practice. The app creates the frame of a spread so that you can skip the tedious part of tracing your shapes by hand and go directly to the fun, creative part: the drawing. The application is web based and makes use of HTML, CSS, JavaScript and the many graphics libraries that JavaScript has, in particular Raphael.js.

Content

Introduction

Bullet Journaling is a method of organizing your thoughts. But it is also so much more than that. It is an outlet for your feelings as well as your creativity. And it is very customizable. You are the one that chooses what is most helpful to you and what you want to include in your journal. From daily to-do's, weekly or monthly calendars and habit trackers to the more spiritual pages like mood trackers and “One line a day” sort of pages that make you reflect on the previous day. It is considered to be a method to plan, reflect and meditate. The whole purpose of bullet journaling is to keep you organized and to give you something beautiful to look back on.

However, this is still a rather new practice, so most of the materials you will find when it comes to bullet journaling are tutorials. Most of the apps that exist, whether they be web or mobile, are focused on the to-do part of the journal. And they are not easily customizable. You cannot add more features to the app. You can find a few apps here and there that might track one specific thing (for example: habits, finances or mood). But, again, not all in the same app. Although some people may say that keeping a physical, paper journal is outdated, it is the most forgiving form since it allows you to design it in whatever manner you desire.

As a result, to help along the process of creating your weekly, monthly or yearly spreads, we created MyBulletJournal. It grants you the possibility of creating the frame for your next spread. Our app helps you draw the shapes needed for creating your spreads as well as write in cursive, which some people are not talented at. The best part about creating a bullet journal is personalizing it with a theme, colors and drawings. The goal of our app is to help you design templates that you can always return to and shift the focus from the repetitive action of drawing the same figures to that of designing beautiful journals and future memories.

The first chapter discusses in detail some of the available applications that are related to bullet journaling. The second chapter talks about all the theoretical parts that regard this paper. The third chapter describes the application, its features and how it can be used to receive the best results. The fourth chapter represents the conclusion of this paper.

Chapter I: State of the Art

1.1 Introduction

In this modern day and age, people are busier than ever and since the human mind cannot keep track of every little detail we need to remember each day, the need for organizational and productivity tools has been at an all-time high. Of course, this has been a problem for many years, so you could find a multitude of tools to help plan out your week and keep track of all the tasks you need to get done in a day.

Bullet Journaling is one of those tools. It is a newer concept related to journaling and involves a bit of creativity as well. It does not just help keep you organized, but also allows you the freedom to personalize it with your own drawings. It was originally meant to be done directly on paper, but the era of digitalization has brought along quite a few apps that grant you the possibility of keeping your bullet journal directly on your phone or computer. We will be taking a look at what is on offer at the moment.

Bullet Journaling, as a practice, involves drawing as well. But there are plenty of apps out there that just keep track of your daily tasks. As a result, if you are not interested in the creative part of this entire process, this could be for you. There are thousands of such apps, each catering to you in diverse ways. The main idea of them all is that you have something that keeps track of your daily tasks, then the add-on functionalities and their specific interface are what makes each app special. Of course, we can also find web-based apps as well as phone-based ones. And from there, we can find subscription-based apps, as well as free ones. It depends on how much you are willing to spend and invest in bullet journaling.

1.2 Web-Based Apps

1.2.1 Bullet Journal

One of the classiest options would be Bullet Journal. This is the simplest form of keeping track of your tasks that you can find on the internet. It contains a one page spread with the days of the week, the weekend and then 2 more panels are found at the bottom of the page meant for taking general notes for this month and the next. One of its advantages would be that it does not require

an account to be able to use, however none of the information you write down is remembered from one use to another. The best way to use this app is to simply take a screenshot, print the layout and use it physically. One cool detail this app has is that it changes the light theme to fit the one set on the browser.

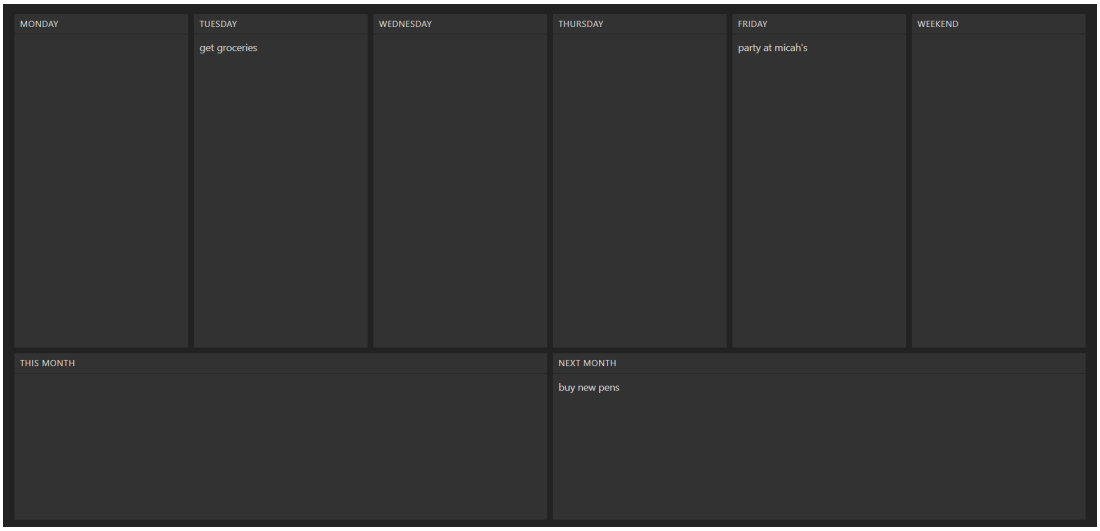

Figure 1: Screenshot of Bullet Journal web application [1]

1.2.2 Bullet Buddy

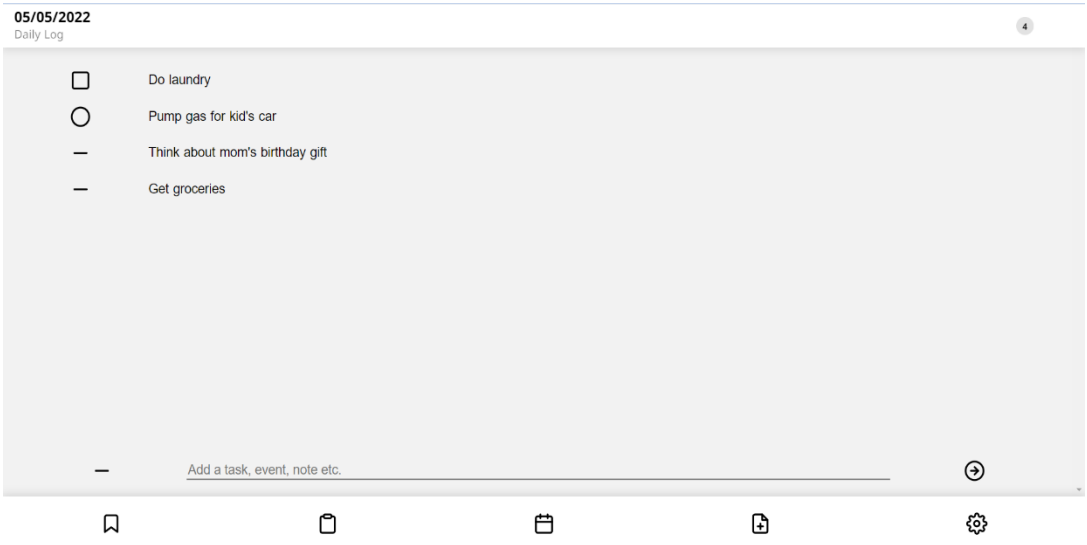

Figure 2: Screenshot of Bullet Buddy web application [2]

One of the most basic apps out there is Bullet Buddy. It has a pretty sparse interface and does not offer much besides task tracking. You can have daily, monthly or future logs and they are then displayed in a list. It allows you to customize the icons of each task you add so that you can keep easier track of the type of task you added. One of its massive downsides is the fact that it does not allow you to remove just one task. You can also not check off any of the items added to your tracker. There is also the fact that the daily, monthly and future logs are not separated into different folders. Another downside of it is that some of the features seem to not work at all. Although the app is not very elaborate, it does get the job done of keeping track of what needs to be done, but does not allow for much personalization. It also has a lean learning curve since the interface is so simple and clean.

1.2.3 Vue Bullet Journal

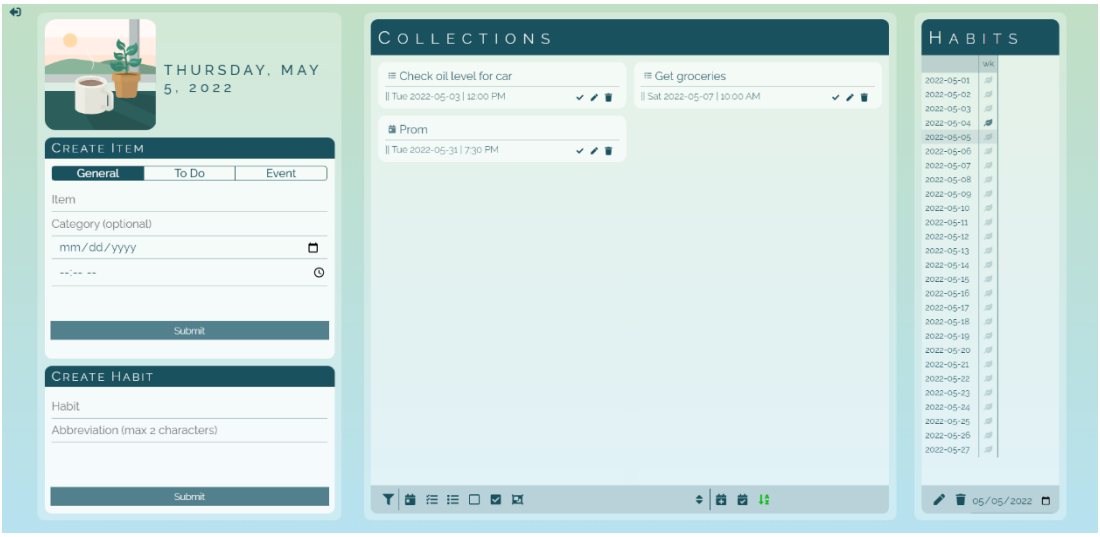

Figure 3: Screenshot of Vue Bullet Journal web application [3]

Another relevant option is Vue Bullet Journal. As the name suggests, the application was built with the help of Vue, a trending JavaScript library for building web, mobile and desktop apps. It has a user-friendly, aesthetically pleasing and relaxing user interface. It allows you to add 3 types of activities that you need to get done: general, to do and event. You can add a category (if you find it necessary), the date of the activity and the time. The activities have different icons when shown in the list so that you can recognize what each stands for. They can then be edited, removed or checked off. They can also be filtered by the type, by whether they have been checked off or

not as well as sorted by name and date. What really distinguishes this app is the functionality of keeping track of habits. You can add things in your life you would like to track monthly like how often you work out or the days you go on a walk. As an advantage and disadvantage of the app, you need an account in order to be able to enter the main page. It is a powerful addition since it allows you to save your progress even if you close your browser, but it also means you cannot just use it as is for a fast to do list. It also allows you to add many habits to your list, but it sizes down the Collections panel.

1.2.4 Trello

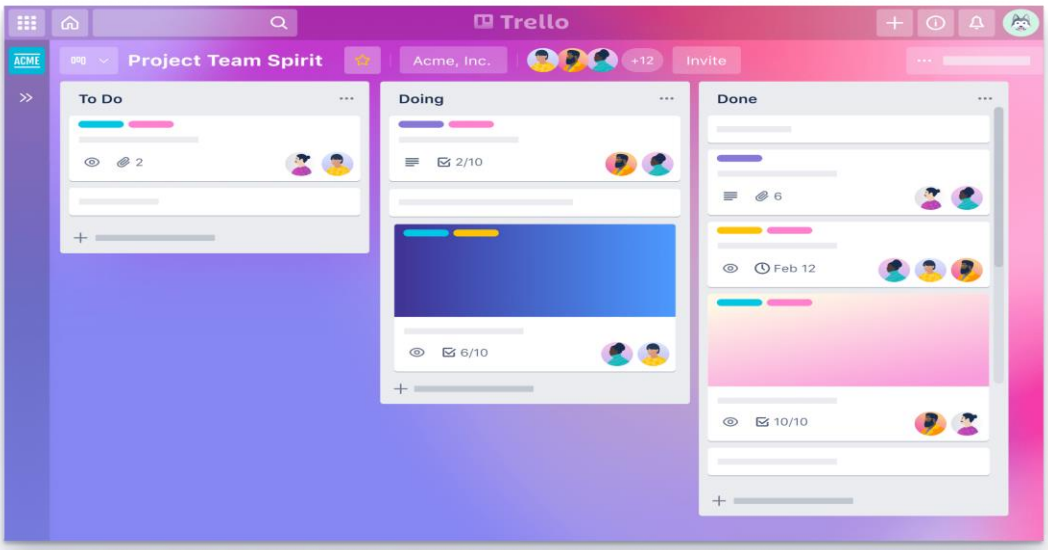

Figure 4: Screenshot of Trello web application [4]

For those needing to organize their group project at work, you can use Trello. It is a web app as well as a phone-based app, so you can take it with you anywhere you go and keep track of the tasks you need to get done on your projects. To start, you can add all your colleagues to the project. The app is then organized in cards with lists that go on your board. You can set deadlines and name the people that are working on a specific task. The interface is easily customizable, flexible and has a drag and drop feature to make managing your tasks easier. It allows you an unlimited number of cards and members, but only 10 boards. It also has templates for easier setup so you and your team can get straight to work. One great advantage for those using this for work is that it has two-factor authentication so you can be sure your work is being kept safe and secure.

While this app is most useful for those needing it for work purposes, you can also use it to keep yourself organized in your day-to-day life. However, one great disadvantage, regardless of what it is used for, is that it also offers a premium subscription. This means that a lot of its best features are most likely kept from the general user.

1.2.5 Asana

For an app that takes your work above and beyond, you can look to Asana. This has pretty much left the realm of Bullet Journaling and gone straight into intense work mode, but it is worth mentioning for its impressive features. At first glance and without paying anything, this is remarkably similar to Trello. What really makes this web app as well as phone-based app stand out are the paid features. To help you visualize all the work that you are doing and keep track of all the tasks and the team members, it uses charts of productivity, a timeline chart to better envision the deadlines, a workflow chart and so forth. You can also set up rules for each task and automatic assignments to make handing in work so much easier. While these are all stellar features that make organizing your work faster, they are not free. Another disadvantage of Asana is that the interface seems rather complicated. Having so many features is extremely helpful, but figuring out how everything is set up would be a lengthy process. Of course, once everything is put together by the project manager, everything becomes clear, but it would take time and effort on the manager's side to learn how to use the platform.

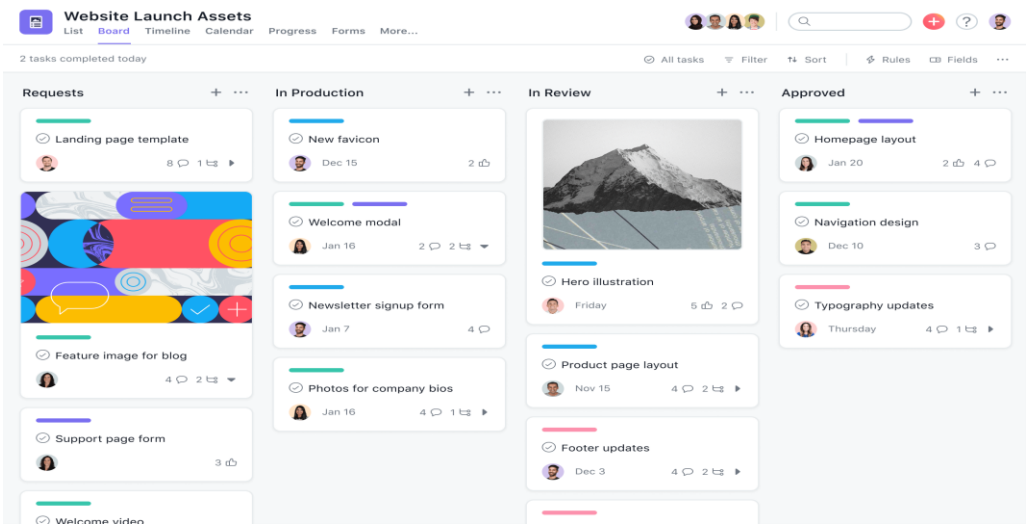

Figure 5: Screenshot of Asana web application [5]

These were a few of the apps that you can find online that somehow relate to the practice of bullet journaling. You can find more of the same kind, varying in colors, sparseness, features and practicability either by searching Google or on GitHub. Bullet journaling, being such a new trend, has garnered the attention of the IT community and brought forth quite a lot of programmers trying their hand at creating such websites. Some of them succeeded, some less so. That being said, the projects you can find on GitHub often have problems and functionalities that do not work properly, as is the case with Bullet Buddy. They also require you to personally install dependencies, backend or frontend, as the case may be with each, and configure the project on your own computer. Although this is not necessarily a terrible thing, it is a more complicated process than simply accessing the website and logging in with your credentials.

1.3 Mobile Apps

1.3.1 TickTick

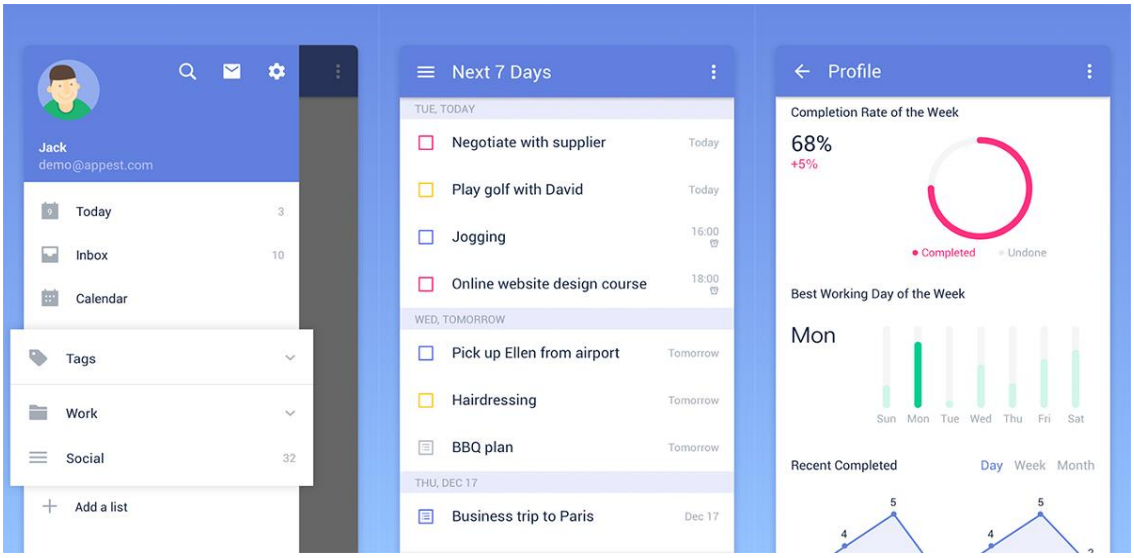

Figure 6: Screenshot of TickTick mobile application [6]

One of the most highly recommended phone-based apps is TickTick. As with all the previously presented apps, TickTick also has a to-do list feature. You can add tasks with due dates and follow your progress as your day goes along. While keeping track of your tasks, it also works a bit like an alarm clock, allowing you to set timed reminders and repeat a task daily, weekly and so on. You can also transform an email into a task or voice input it if you are on the go. Its best

feature by far is the synchronization with calendar type apps. However, this is not included for the everyday user, it requires payment. Some of its other features include a Pomodoro timer for productivity and to go along with it, white noise to help you focus. To keep you motivated, it also keeps track of the number of tasks you have completed, the more things you achieve on the app, the higher a level you reach. You can also view your statistics in terms of productivity and time spent working towards your goals.

1.3.2 Week Planner

The next app that we will consider is Week Planner. It is one of the simplest mobile applications when it comes to interface and resembles the idea of a real-life diary the most. The screen is split into two by the "binding" of the diary. Each screen has 7 panels that resemble sheets of paper for each day of the week. You can move between the "pages" of the diary by swiping left and right on the screen. Taking notes allows you to customize the font and color, as well as highlight the most important ones. You can, of course, mark a task as done and a tick will appear before it.

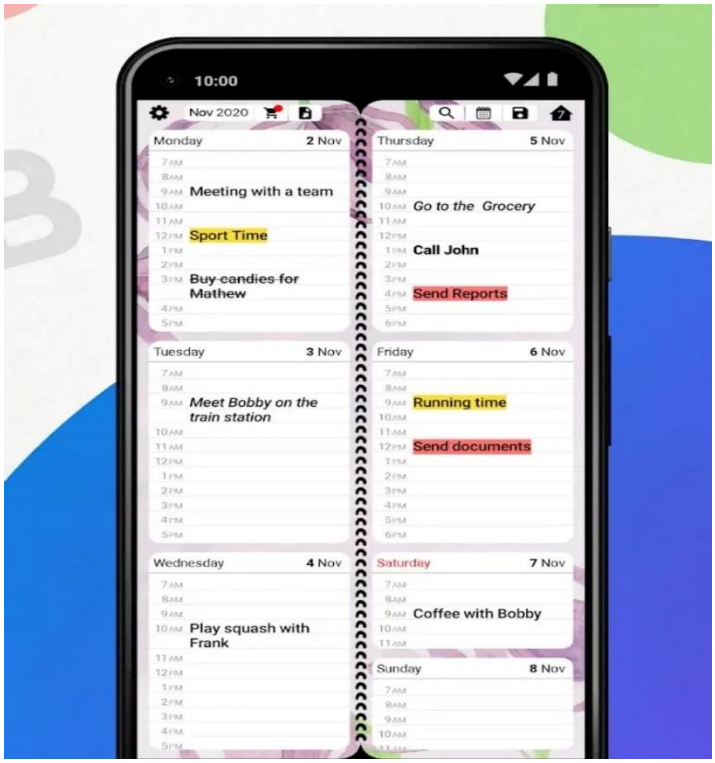

Figure 7: Screenshot of Week Planner mobile application [7]

1.3.3 Journal It!

Journal It! also resembles the idea of a personal diary as it is more targeted towards keeping track of the things that have already happened in your life. You can, naturally, set the journal up so that it fits more to the idea of a task tracking app, depending on your personal preference. It allows you to organize your content in sections (ex: “Work”, “Health”, “Career”). In each section, you can then create notes, checklists, gratitude logs, future logs or track habits, activities and so on. To keep you organized, you can color code everything by your own rules. There is a calendar feature as well, allowing you to write down notable events and add any notes on them. It also allows users to upload photos to better immortalize an important moment in their life. However, one of its downsides is that the interface can look a bit cluttered depending on the way you choose to have it organized. It also offers a paid option, which means that not everyone can benefit from some of its best features. The other disadvantage this app has is that it can only be found on phones with an Android operating system.

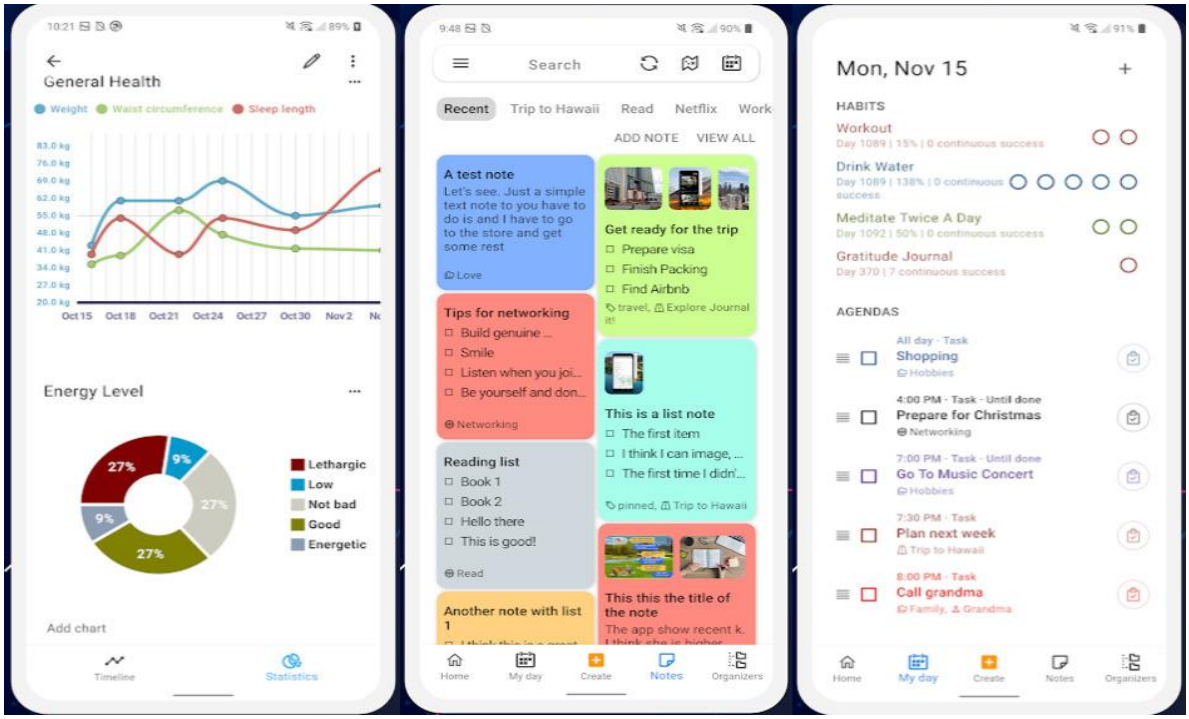

Figure 8: Screenshot of Journal It! mobile application [8]

1.3.4 Grid Diary

We will also be taking a look at Grid Diary. As the name suggests, the interface of the app is split into a grid with panels made to look like sheets of paper where you will be keeping your notes. While this app offers, as all the ones mentioned above, features that help you keep your life organized, its most impressive feature is the guided writing prompts. The purpose of this is to help you better focus on your goals, gain insights about yourself and reflect upon the most important parts of your life. The app has an integrated AI (Artificial Intelligence) that can suggest specific prompts to your goals and the time of the day, but you can also come up with your own. The idea is for it to be as customizable as possible. Since the app also has a mood tracker, along with the prompts and everything else you record during the week, it can tell you some statistics like your level of productivity and responsiveness. However, it does also offer a paid option so you can expect that some of its features will not be available to all.

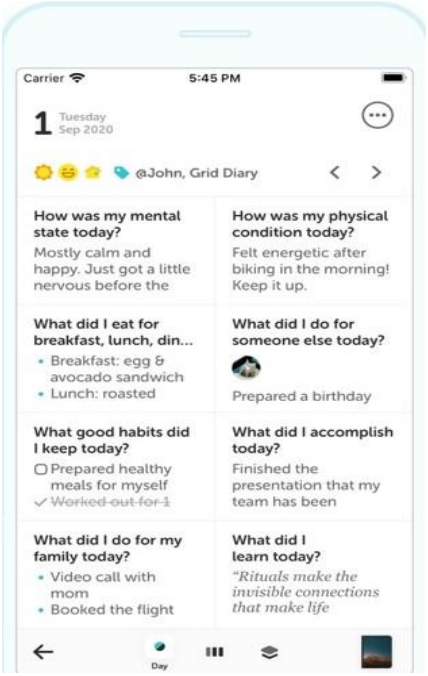

Figure 9: Screenshot of Grid Diary mobile application [9]

1.3.5 Good Notes

The last app we will be looking at is Good Notes. As the name says, the app is specifically created for making digital note taking so much easier. However, the features it includes make it

easy for you to also create bullet journal spreads with it. This app might be the closest thing to an actual bullet journal. Essentially, it resembles a Paint application since you can draw out or hand write anything you wish. This is especially helpful since it gives it that hand-drawn feel, like you are working on real paper. It is also easily customizable: you can change the "paper" you are working on, the cover of your journal, the color palette you are using, the type of pen and brush stroke and so on. It also allows you to save small drawings or such for later use. Although, its most impressive feature is shape recognition. You can draw any shape with your pen and the app will recognize it and draw the straight lines of it. You can keep yourself organized by placing each of your spreads in different folders. Searching through all the spreads you created is at a click away since the app includes powerful handwriting recognition. While all these features sound amazing, the app has many disadvantages. For one, it is only available on Apple products. Another downside is that the app should be used with a pen tool to help in the drawing process, which costs quite a lot of money. That also shows that the app is best used on a tablet since a phone has too small a working surface and the computer does not have a touchscreen. However, the biggest disadvantage of this app by far is that most of its features require payment.

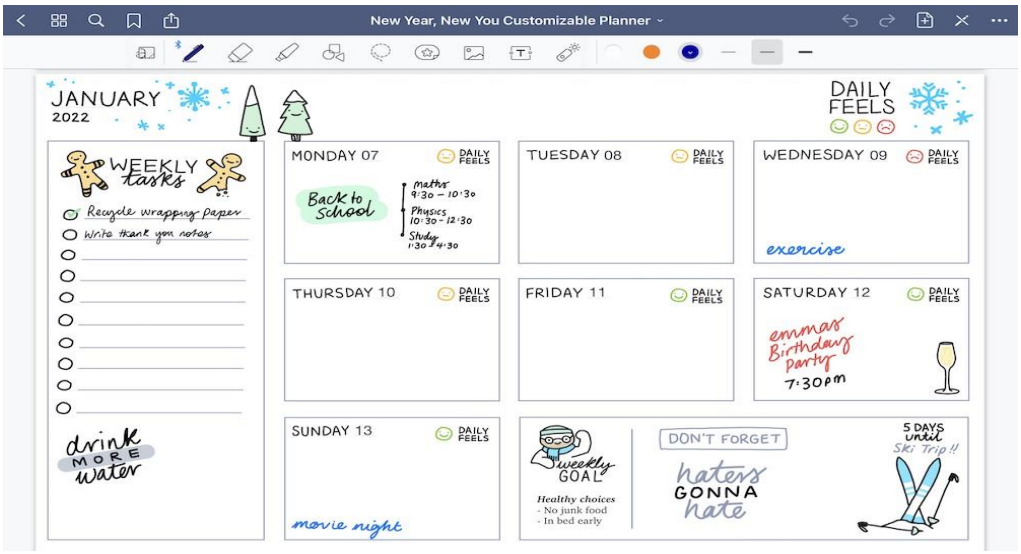

Figure 10: Screenshot of Good Notes mobile application [10]

1.4 Other options

As far as Bullet Journaling goes, there are still a few options that we can consider when building new spreads. You can buy already made templates. There are a few sites that cater to that, for example: Etsy, Notebook Therapy, Archer and Olive and possibly Pinterest etc. While this is still a practical option, Etsy is payment only and probably allows for some customization. The next two sites sell stationery (specifically bullet journals) and so also offer templates for them. They are free, but not customizable at all. The theme, the way things are arranged on the page and the size of the page is already set. Some of the templates come for free, some are also in exchange for money. Although the real downside to this approach is that the content of the page is really limited: you can find templates for only the most popular spreads (for example: Calendar, Habits, etc.). There are, most likely, other sites that sell ready-made templates, but these were the most recommended options.

1.5 Conclusion

As a conclusion, besides one app, none of them truly follow the real practice of Bullet Journaling. None of the apps allow you to freely draw on the page to personalize the sheets of paper in your own way. They allow for customization by way of providing different themes and stickers, but no actual hand drawing. And none of them allow you to customize them in such a way that you could have any type of tracker or any type of spread that you could come up with.

While our app does not allow actual drawing either, that was its purpose. It allows you to draw the skeleton of a spread so you can then later personalize it yourself in however way you wish. That means coloring, leaving it blank, adding stickers, washi tape, painting using actual acrylics and so on. Since we are creating just the frame for the spread, that means they can become anything you need them to in order to best serve you in keeping your life organized and your mind focused on the tasks that need to be done.

Chapter II: Theoretical aspects of the application

2.1 Bullet Journaling

Bullet journaling is “a handwritten combination of calendar, to-do list, habit tracker, and journal designed to organize personal information.” [11]. However, that is not all that it is. As we have mentioned before, a bullet journal is supposed to be easily customizable and while it does contain the above mentioned, you can add to it anything that you would like. Having a bullet journal implies continuous work towards finding the best combination of spreads to best fit your needs, as well as the way the information you wish to save is represented and decorated [11] [12]. This means also changing your monthly/yearly spreads to work around the constant changes that life usually brings. Therefore, the information that you can find in a bullet journal is highly personal and reflects memories, current plans and future goals. It is also highly selective. Since this is a self-reflective tool as well, you do not want to include impersonal details and clutter your pages with information about the people around you (for example: family chores). It is also important to set boundaries between the information you write down, do not mix work related matters with social ones. Setting these boundaries is crucial for a person in order to better focus and separate work from home [11].

We should also talk about the benefits of keeping a bullet journal. Being an organizational tool above all else, maintaining a bujo (bullet journal for short) pushes you to keep up with your tasks. Being organized is generally a good practice in life, it reduces stress [11] [12] [13], which we anyway have enough of in our day-to-day lives. It also increases productivity and efficiency, for obvious reasons. Knowing what you must do and being able to plan everything ahead of time will help you stay on top of your tasks, whether that be at work or at home. It also helps with anxiety, feeling overwhelmed by the amount of things you need to do often leads to anxious feelings. [11] It is also a known fact that writing things down and being able to cross them off after being completed helps with reducing stress and anxiety. It also, as a result, offers a boost of confidence and sense of satisfaction in seeing you accomplished something, however small that task may be [13]. Having all your tasks laid out before you also makes them seem less daunting overall. Being organized could also help you develop a habit, for example drinking more water or getting up from your desk more often [12]. The biggest advantage being organized brings is being

proactive in your life. Having everything planned out can help you recognize potential problems before they manifest entirely.

There are, of course, some benefits on the spiritual level as well. Since you are actively tracking your moods, feelings, thoughts and actions on a daily basis, it should become easier to be more self-aware [14]. This would be especially helpful if you feel you are no longer true to yourself. You will start recognizing patterns and you will be able to change something in your life if you realize you are not completely satisfied by the way things are going. You will become more mindful in everyday life, “bullet journaling is presented by the inventor as a “mindfulness tool disguised as a planning tool”” [11]. It is also considered a reflective and mindful practice because it is a slow process that implies drawing and writing things manually and does not require actively thinking about what you are doing, allowing the mind to focus on other, possibly hidden, problems [14].

We should also take into consideration the creative part of keeping a bujo. Bullet journaling can be a creative outlet for those in need of a way to express themselves [14]. While this is not necessary, it is included most times. Personalizing your journal is what makes it appealing to the user to keep coming back to it, at least to some extent. It is just like decorating a home: it is fine without anything in it, livable, but it is so much better and welcoming when you put a personal touch to it. Bullet journaling gives the user the opportunity to include more creativity in their life [11] [15] and it is a method of self-expression. Bringing life to your spreads using all sorts of creative tools is also a bonding experience, the journal starting to feel increasingly like an extension of yourself [11].

As a conclusion to the complete process of keeping a bullet journal: it is something physical that tracks everything in your life, or at least as much as you will allow it to. And as a result, it is something you can look back on. It contains all your memories, little notes, your worries, everything. It is a thorough record of your life [15] that you can look back on and reminisce about the good and the bad [14].

2.2 The importance of drawing

Drawing has remarked itself as one of the oldest and most popular creative outlets. Even before we knew what drawing was, people used to sketch animals and other people on cavern walls to leave behind their mark, their history and also express what they were feeling and how they were affected by current events in their lives. It is an activity that should bring us peace and pleasure. Drawing is also important in personal development because it encourages creativity, it makes you an overall more expressive person, it enhances motor skills and develops your problem-solving skills, although it may not seem obvious at first glance. It has multiple other benefits too, like being a way to relax and decompress and allowing you to touch base with your inner self after a long day at work.

Moreover, drawing requires little resources; you can get creative with the tools you use for drawing. From using literal coffee or wine to drawing on walls or the pavement. It is a low effort, inexpensive hobby. The internet can provide you with a multitude of innovative props and ideas, as well as help you along in your drawing journey. There is an abundance of tutorials, master classes and people ready to offer their advice and help on how to improve your drawing skills, paid or otherwise.

The application developed in this research paper strongly relates to drawing. While our website is not specifically about drawing, it leads up to it. It allows the user to create a frame for their next spreads with very little effort. Bullet journal spreads are made up of shapes and beautiful calligraphy and curved lines, but what really gives character to someone's bullet journal is what they draw over those basic shapes and lines to bring the page to life. That is when their true creative genius really comes out to play. What our website really helps with is creating as many copies as possible of the same page, which means that if you get it wrong and do not like how your design is turning out, you can easily throw it out and just start again. Creativity is a trial-and-error type of process, as there are no set rules to be followed. However, for those that use it as a relaxation device, it does not need to become a frustrating exercise. This application comes as an aid in eliminating the frustration of having to redo your work over the same page and allows one to start fresh.

2.3 Drawing as art therapy

Everybody experiences anxiety on some level during their lives [16] [17]. Some feelings of worry and fear are expected, quite healthy and helpful since they can motivate you to perform better or help you prepare responses to future threats [16]. However, they become a problem when you can no longer control them. And unfortunately, it is not just adults that experience anxiety. Children, teenagers and young adults find themselves stressed and full of anxiety from the pressures of today's society, school testing for example [18]. There exists an expectation, no matter the age of the individual, to perform to the best of one's capabilities. Unfortunately, anxiety can hinder someone's capabilities to such an extent that it is "affecting their performance and effectiveness in certain situations" [16] [18]. Not to mention the stress caused by unplanned events, like hospitalization [19], exams [20], etc.

There are many disadvantages to having anxiety. Starting from an early age, children that experience anxiety have been proven to change their behavior towards the outside world and their peers and it can affect their coping skills [19] [21]. Teenagers and young adults are plagued by test anxiety most often since there is so much importance placed on it [16] [18]. It was also shown that out of all the population, college students have the highest level of anxiety due to the instability of their new environment and the new challenges they are now facing [16]. This, of course, can lead to "higher stress in other areas of life and a weakened immune system" [20]. Other side effects of anxiety in teenagers and young adults may include "inability to focus, shakiness, or mind blankness" [18], a lower self-confidence, fewer social skills, lower performance rates [16] [18]. It is important that we correct anxiety as young as possible so as to not develop into a serious disorder later in life [18] [21]. It is usually treated with medication, but that does not solve the root problem, it only suppresses the symptoms.

Art therapy is one of the solutions that have been proposed for treating anxiety. It involves the expression of one's feelings and allows the person to better communicate their problems [16]. It is also a really easy to use tool for therapy since it is flexible, any age group can take part and it does not require hard to find materials [16]. There are other forms of therapy that have also been proposed, for example play therapy for school children. However, this necessitates more than one person, space and some props as well. It has also been proven that this form of therapy is not more effective than art therapy [22]. Another proposed method is an extension of art therapy: mandala

coloring. This was proposed so as to help refocus the person coloring and divide attention from their inner problems because it provides a calming and healing effect [16]. Although it proved to be an effective method in reducing anxiety levels, multiple studies have shown that coloring mandalas and simply drawing have about the same effect [16] [17] [18]. Other forms of therapy that proved to be useful in reducing anxiety are drawing and writing, as a combination, tested on children undergoing cancer treatment. “The drawing and writing technique has been reported to be particularly effective, especially for finding out the views of children” [19].

While drawing in general is a great creative outlet and helps you develop all manner of creative skills, it can also be therapeutic. There is solid evidence that drawing, in any of its forms, is useful for reducing anxiety [23]. One of its biggest advantages is that you do not require any artistic abilities in order to be able to partake in art therapy. There is also the added bonus of it not being an expensive form of therapy since it requires little preparation and few materials. It is a flexible way of expression and does not limit the people that can participate by their age.

2.4 Accessibility

What is accessibility? Frankly, it is the practice of making your website accessible to as many people as can be achieved. When people talk about a website being accessible to everyone, they usually have in mind people with disabilities, but any method applied for making your site more accessible will, in the grand scheme of things, help everyone using your app. Let us take an example: when having videos playing on your website, it is important to provide a transcript or captions or both in order to help those with hearing impairments, but that could be useful to anyone that is listening to the video on mute for any reason. We need to consider the fact that the person talking in the video might not be easy to understand because of an accent or because he/she is speaking extremely fast or that the person listening simply does not understand the language of the speaker properly or at all.

Accessibility is considered a basic human right nowadays and because of that, some countries around the globe have laws in place for not enforcing these guidelines. We can think of this as giving everyone the same equal chance to learn something new, despite their disability. While there are 4 big groups of impairments (visual, hearing, motor and cognitive), these disabilities can vary in all sorts of ways.

However, providing accessibility in some cases is just not possible. As is the case with our website, it is a tool for designing, you need to be able to see in order to evaluate what you have created. While the website covers some impairments such as hearing and cognitive (to some level) by design, others are simply impossible to implement. Visually impaired people, especially those with blindness, have no way of using the website, but they would also not be able to enjoy the practice of Bullet Journaling in general. Some visual impairments are covered, like color blindness for example, but there is not much we can do in terms of accessibility for the rest of the population dealing with such a disability. People with motor impairments would also be affected by this, depending on the specific disability they have. You need to be able to move a mouse in order to place shapes and move items around on the app, at least to some degree. Although, the app does come with a few helpful tools: everything that is placed in the template has snapping qualities and when moving objects, they will drag themselves and scale uniformly.

At the moment, the tools that are available to people with visual and motor impairments would not permit them to use this app as they cannot enjoy the Bullet Journaling technique in their day-to-day life. That is why, for the time being, we have decided to not include accessibility tools in our app until further research is conducted that will reveal new methods of transcribing information for visually impaired people or those with motor disabilities.

2.5 UX/UI

UX/UI, while usually found together, are quite different to one another in reality. They do go hand in hand, but they define completely different things when it comes to the actual design of an app.

UX stands for User Experience design and refers to the general flow of the app and the way the user interacts with it. The root of this concept is the user. The UX designer needs to first identify the target audience and then research their needs and expectations for the specific project they are designing. A lot of the work that a UX designer does is research. They also stand by 3 disciplines:

- Interaction Design: looks at how the user interacts with the system and with the interactive elements (buttons, animations, page transitions), as well as measuring the efficiency of the application;
- User Research: deep understanding of the end-user and the end-goal of the application, it involves collecting feedback from users and drawing a conclusion to make a well-informed design decision;
- Information Architecture: the practice of organizing information and content on the app in such a way that it maximizes accessibility, usability and functionality.

UI stands for User Interface design and is more focused on the visual experience of the user, the way a product looks and feels to a person. UI deals with the graphical layout of a page, or more specifically, with how that layout will look once animation, transitions, colors and fonts are applied to it. The best practice when designing a user interface is to keep it simple and to the point. As Martin LeBlac said "A User Interface is like a joke. If you have to explain it, it is not that good" (quoted from LeBlanc's personal twitter page). A UI designer ensures that the layout of the app is cohesive, that the elements can stand on their own and still look good as a whole and that it is properly themed to match the purpose of the application.

UX designers manage how the user interface works while the UI designers manage how the user interface looks. The way that these 2 concepts come together is what makes an app truly exceptional. You cannot have one without the other because there would be an imbalance. An app without UI would be horrible to look at even if it achieves its purpose UX wise, while an app without UX would be impossible to navigate even if it is a visual masterpiece. Building an application should be a combined effort between the two designers. The best way to describe the finished product between the two designers is "Good design is obvious, Great design is transparent" which basically says that you cannot tell when an application is perfectly designed, you just know it by the ease with which you are able to use it.

Now that we have established what clever design is, we can evaluate the application we have created. White the website has a minimal user-interface, it is designed that way so that it resembles the real-life experience of putting down the first outlines of your next bullet journal spreads. Which means just the blank dotted page and the black lines of shapes and lines. This being an application for building templates, it does not require much navigation, it is a drawing tool. It

has a simple menu containing all the items one would need to start building a frame for a new spread and a few buttons that do not navigate to different pages, just open other menus or options on the current page. It is quite simple to navigate and has similar elements to other popular drawing tools so as to not confuse the user.

2.6 Alternative graphics libraries

In order to talk about any website, we need to first look at what is at its core: JavaScript. As it might be expected, the programming language is used in parallel with 2 others: HTML and CSS, which come in layers. HTML elements represent the foundation, while CSS styles overlap these elements in order to supply personalization, JavaScript then acts as a means of controlling the behavior of these elements. These 3 are the basis of any website nowadays and are the reason websites are aesthetically pleasing. It is true that CSS is used for styling, but that can only get you so far. JavaScript allows you to animate images, control multimedia, create 2D/3D graphics and, most importantly, dynamically update the content on the page.

JavaScript has gained a lot of traction over the years and evolved a lot from its first edition when it was not even considered a proper programming language. It is now one of the most popular and the most used programming languages worldwide. With its popularity and the fact that it has been around since 1995 comes one of its best advantages: it has a lot of support. From tutorials, support tools and other community benefits to a lot of libraries created for all sorts of usages.

In this paper, we will take a look at graphics libraries and all they have to offer. There are many such libraries, each with their own pros and cons. The most important part to note about them is that most of them have thorough documentation and are constantly updated by the creators and the community, as well as having an abundance of useful tools developed based on them.

2.6.1 SVG versus Canvas

Before we can talk about any library, we should talk about what they are working with, what they are manipulating specifically. Scalable Vector Graphics, or SVG for short, is, as the name says, a vector-based and XML-based image format used for defining two-dimensional graphics for the web. It is composed of shapes that can be manipulated [24]. Canvas is an HTML

element used for drawing graphics with the help of scripting, most often with JavaScript [25]. It works like a container and the script is what draws the graphics [26]. It manipulates rasterized images pixel by pixel.

Having defined what each is, we can now compare them. SVG has better scalability than Canvas, which means that SVG is better suited for printing at a high resolution, scaling or rotating the original image [26]. SVG performs better when working with a smaller number of objects or an exceptionally large surface, while Canvas best works in the opposite way: substantial number of objects and an exceedingly small surface. This happens because Canvas is a single DOM element within which graphics are being built, while for SVG each element is separately drawn, which can result in slower performance over time as more and more elements are added. This also means that Canvas "does not support interaction with individual objects" [26]. However, if handled correctly, SVG could manage larger visualizations as well [24]. One of the biggest advantages SVG has over Canvas is that it can be modified through CSS. Since SVG has individual elements, it is easy to add animations and styling to them. Canvas does not allow that unfortunately, you are required to write custom animations if you wish to use any. Since SVG works with individual elements, they are also easier to select and debug if necessary [27]. On the upside, Canvas is great at rendering impressive and immersive 3D graphics if you have the patience for it, that is why it is also particularly good for gaming applications. SVG is not especially targeted towards that.

There are benefits and drawbacks to both SVG and Canvas, it all depends on the personal needs of the application you are building. However, SVG is usually preferred over Canvas. It is easier to learn, more flexible and requires less effort when developing than Canvas, as well as allowing CSS styling [27]. Even though Canvas has better performance in bigger projects, SVG is being continuously invested in by the community, having wide-spread support as well as a multitude of libraries built to enhance it [27].

Our project uses SVG because it is efficient enough for what the app needs. Since we need to be able to print the templates we created, we make use of the fact that SVG has incredibly good resolution for maintaining the original image. We are also expecting to work with a relatively small set of objects. Styling was also a requirement when building the project.

2.6.2 D3.js

While researching what JavaScript libraries would be best suited for our project, D3.js seemed to be the most popular choice [28]. D3 comes from Data-Driven Documents, the 3 D's basically, and it is used for producing highly interactive and dynamic data visualization and graphics for the web. Even if it is referred to as one single library, D3.js has split into mini, modular libraries that can be used independently of each other. The libraries combine SVG, CSS and HTML. We will be looking at some of its best features, as well as some of the advantages and disadvantages of this library.

Because the library was split into smaller modules, you can probably tell that it is really complex overall and has many utilities. Having so many functionalities, we can split them in 3 different areas of interest: visualization creating, interaction and animation and lastly, data and visualization utilities [29]. We will discuss each of them separately. Visualization creating, as the name suggests, deals with transforming your data into something that you can visually interpret. These are the features that work with creating and customizing charts, maps, pies, hierarchies and so on to help you better visualize your data. The next area, interaction and animation, handles the part of making your visualizations interactive, immersive, dynamic and more powerful. While the last area, data and visualization utilities, allows the user to load, add, remove, manipulate and change their data in whatever way, shape or form they desire. This area works with individual HTML elements or a selection of them, as well as data loaded from an external source.

We will now present some of the advantages and disadvantages of this library. As a result of incorporating SVG, all graphics created with D3.js stay crisp and at high resolution [30] because SVG has incredible scalability. As a downside, you need previous knowledge in SVG and, additionally, in CSS, HTML and JavaScript in order to be able to use the library. Another disadvantage to the library is that it does not have a pre-built module for charts or graphs (what D3.js is most famously known for) and requires you to write your own functions from scratch. Although, there are tons of examples and community support for this library, so there is a high chance that you can find something similar already implemented and just need to adapt and integrate the example into your project [31]. Another great fact about the library is that it has unrivaled flexibility when it comes to the way you display your data. As long as you can code it, D3.js can display it for you [31]. However, it does not do that well with maps when zooming and

planning, despite using SVG. And as mentioned before, you need to personally code everything and that requires time and a lot of research into how the library can be and is used. The documentation also leaves a lot to be desired when it comes to more high-level graphics and visualization. However, the community makes up for that, providing a lot of support on GitHub and other comparable sites. D3.js strictly follows web standards, which means that you will not encounter problems with plugins or other needed technology no matter the browser you are using, it also avoids dependencies on specific frameworks [28] [32]. Despite this, "certain features fail to display in older browsers" [31]. As this is a library mainly targeted towards representing data, one of its advantages is that it handles well large sets of data and in a timely manner, being quite fast to load [33].

As a conclusion, D3.js is quite a convoluted library. As mentioned before, it requires a lot of patience and time to properly comprehend what it can do in order to use it. Despite that, it is one of the best JavaScript libraries targeted towards data visualization [32]. "D3.js outperforms all other Java Script based tools as it offers versatile functionalities like data manipulation and transformation" [31].

2.6.3 two.js

The next library we will be taking a look at is two.js. Its name comes from what the library specializes in, two-dimensional drawing. It is targeted towards modern browsers and it is a renderer-agnostic library, which means that it can render your graphics in multiple contexts, in this library's case: SVG, Canvas or WebGL. While we are mostly interested in the SVG aspect of the library, we should also talk a bit about what kind of advantages being a renderer-agnostic library brings.

Firstly, let us have a look at some of the features the library has to offer. The library is mainly targeted towards motion graphics and, as a result, its main objective is to "make creation and animation of flat shapes easier and more concise" [34]. You can also group shapes under a common name in order to make it easier to change their attributes and properties. It also relies on a scenegraph that the library keeps stored in the memory and that you can apply numerous operations to anytime during development, such as scaling, rotating, positioning, translation, etc. [34]. Since the main point of the library is motion graphics, it has various animations that you can

apply in your project, as well as an animation loop that can then be paired with other animation libraries, if needed [34]. It also enables an SVG interpreter that allows you to build SVG elements in external programs and bring them into your two.js scene [34]. This is especially useful if you have other work already done and would like to incorporate it into your current project or if you commission an SVG element and want to also include it in your project. The library also allows bitmap imagery and provides “easy-to-use features to handle and render bitmap images” [34].

With this in my mind, let us now talk about the benefits and drawbacks of this library. One great advantage this library has is that it can support a multitude of browsers and platforms (web or mobile) since it is renderer-agnostic. With a few test renders of all 3 previously mentioned technologies, you can quickly gather which one would be best suited for your situation. It is really all about speed here and which of the technologies renders the fastest in your preferred browser. Whatever you choose to work with, you have the added advantage of being able to export your work as an SVG. As we said before, SVG is preferred when downloading or printing because it retains a high quality of the image at all times. However, if you are looking for a gaming library, this is not the best choice. Two.js works best with geometric figures and while that might be enough in some cases, if you are looking for more advanced gaming graphics, this library simply could not handle that. Another disadvantage is that it is a rather simplistic library and the documentation, while nicely organized, does not explain what each function does all that well. It is great for creating content that has smooth animations and renders in various browsers, but that is about all it can do. That is not necessarily a terrible thing, it really depends on the sort of library you need. While simplistic in nature, it is great at creating fun motion design easily and it is most widely known for interactive art.

To conclude, the library is open source and free and still being updated by the creator. It has also seen great contributions from the community over the years, with hundreds of examples using the library. Thus, you will have no problem in finding assistance or materials to help your project development further. However, as mentioned above, the library has a very distinct utility, motion graphics. Coupled with the fact that it is renderer-agnostic, this library could be just what you need to bring your objects to life with animations in all manner of browsers.

2.6.4 Snap.svg

The most popular library for working with SVG is Raphael.js, but it is also rather outdated at this point in time since its main objective was to be useful for drawing in older browsers, as old as IE 5.5. Snap.svg was built to be its successor, being developed by the same person that built Raphael.js in the first place, Dmitry Baranovskiy. With the knowledge and experience of developing Raphael, the author created Snap.svg to cater to newer browsers with great new technologies.

Firstly, we will be taking a look at what features this library has to offer. “Snap.svg is designed for modern browsers and therefore supports the newest SVG features like masking, clipping, patterns, full gradients, groups, and more” [35]. The library is focused on graphics and animation. It allows you to easily create and manipulate SVG, as well as import SVGs created in external software such as Adobe Illustrator, Inkscape or Sketch [35]. Since its focus is animation, there are multiple options available when it comes to creating it. You can also group objects and apply changes to them as a group, whether that be animations, transformations or CSS properties. With that in mind, the library has many other functionalities to offer such as event handling, useful for interactive graphics, filters, etc. and they are all documented on the official website of the library.

Secondly, we can now discuss some of the advantages and disadvantages of this library. One of the great benefits the library has is that it is targeted towards modern browsers, which means that it has to offer a more complete set of SVG features and advanced characteristics. However, with that benefit comes the drawback of there being no compatibility for older browsers. Another advantage for the library is that it has a syntax similar, to some extent, to that of jQuery. This could prove to be helpful to someone that has used jQuery before and is just getting started with SVG manipulation. This library’s development is also supported by Adobe, which can mean constant updates are being made to the library and constant attention being brought to it from outside sources, leading to a higher interest and commitment from the community. However, with that in mind, it has been reported that SVGs exported from products that do not belong to Adobe do not work well with the library. The documentation of the library is also rather confusing. It is extensive, but nothing is organized in subcategories of features or particularly explained. On the other hand, the library’s website has a tutorial on how to get started with some of its key features,

as well as numerous resources online to help you start your own project. In addition to that, you can find various other tutorials and examples online for more advanced projects. Another disadvantage of the library is that it is low-level, which means there is no way to implement data visualization if that is what you desire.

Altogether, this is an open source and free library. Moreover, the development being backed by Adobe means that the library's development is constant and most likely funded. The main developer, Dmitry Baranovskiy, also has great experience in working with SVG since he also created Raphael.js, "the most popular library for working with SVG" [35]. You can also find help on a few already set-up channels of communication, such as Slack, Google Group or Twitter [35]. Additionally, you can find plenty of ready-made examples and materials online provided by the community as well.

2.6.5 A comparison to Raphael.js

Having now discussed some of the alternatives that we could have used in this project, we should also compare them to the library we ended up using, Raphael.js. In order to do that, we should first take a look at the library's features. Raphael.js is written purely in JavaScript, which makes it work seamlessly with any web page. Raphael.js also allows you to create and manipulate SVGs, having built-in shapes that you can get started with. Additionally, you can create your own shapes using paths, either by creating them yourself or building them in external software such as Inkscape, svg-edit, Adobe, etc. It allows you to create text and style it however you need it to as well. Moreover, you can apply and change the styling of any of the elements you created as long as you keep a reference to them. The elements can also be transformed, by scaling, rotating or translating. You can animate your SVGs with built-in animations, as well as make use of cubic braziers for more advanced easing functions. Lastly, you can add event handlers to make your elements more interactive [36]. These are its main functionalities, however, there is more that the library can do, depending on your specific needs. In addition to these, there are multiple extensions built on this library that could further help your project development.

All the libraries we have discussed most likely include these specific features and could have just as easily been used in the development of our app. However, we chose to work with Raphael.js simply because we did not need all the many functionalities the other libraries had to

offer. All of them create and manipulate SVG and allow some form or other of animation, but they go way beyond that. Raphael.js came highly recommended from quite a few sources, it is one of the oldest libraries to work with SVG and the most popular one as well. Since we did not need any extravagant functionalities when manipulating the SVGs, it did not matter much the fact that the library was more oriented towards older browsers and did not have more advanced features. Although we had some problems with the documentation, it not being properly organized by any criteria, that was a common problem between all the libraries discussed. Additionally, a more in-depth manual can be found that explains every functionality of the library, as well as provides examples for most of them [37]. Moreover, Raphael.js being such an old library, you can find numerous examples, tutorials and other materials you may need online. Raphael.js also has a multitude of extension libraries: for charts, for transformations, for exporting and many more.

As a conclusion, while the other libraries we have mentioned are more complex and can offer more development possibilities, Raphael.js was sufficient in order to develop our project. The other libraries would have needed more in-depth research in order to be properly understood before we could get started on the development process, which was a big enough disadvantage to us to not even consider them at all.

Chapter III: Practical aspects of the application - MyBulletJournal

3.1 The architecture of the app

3.1.1 HTML

At the root of any website, we will find HTML. It is a markup language that helps define the structure of your website. That means that it uses special elements, such as <head>, <title>, , etc., in order to display your work on the internet. These tags are the make-up of a web page, its building blocks. Similarly, this app has made the most use out of the <svg> tag throughout the development.

SVG is used to define 2D vector-based graphics for a web page. It is also an XML-based markup language and has its own special elements that work only within an SVG tag, for example <rect>, <circle>, <path> and many more. Since an SVG is defined in an XML text file, they can be created and edited with any text editor, as well as created online with specific software. They can then be embedded within your HTML document. They can also be accessed through the SVG DOM, which is a great advantage for making your SVGs interactive and aesthetically pleasing. That means that CSS styling and JavaScript event handling can be applied to any element within an SVG tag.

Our app also uses the tag in order to define and divide panels. Each panel houses either a menu or the actual canvas we are working on. The <svg> tag is then used to create all the shapes, text and lines we are using on the canvas in order to design our templates. CSS styling is applied to most elements, as well as JavaScript scripting through a library dedicated to working with SVGs.

3.1.2 CSS

CSS is a style sheet language used for describing the way a web page is supposed to look, from the color of an element to the way they are laid out on the page. This includes dealing with the way information on the page is displayed on various devices and screen sizes. It is a very powerful tool for designing your website. There are many things CSS can do, but its main purpose

was to separate content from presentation since HTML was never meant to deal with the way a website presents itself. CSS can also be applied to HTML or XML based documents.

We have used CSS to style all our HTML and SVG elements. We have applied it in order to color backgrounds and elements, set the sizes of our elements as well as set margins between them, set up fonts and font sizes and colors for text, allowed content to be scrollable, created drop-shadows for buttons to make it easier for the user to visualize when they are hovering over an element and, most importantly, designed the layout of the page between the wrapper elements we used.

3.1.3 JavaScript

JavaScript is a programming language used for defining behavior on web pages. It is one of the core technologies of the web, used alongside HTML and CSS and has become one of the most popular programming languages in recent years, according to GitHub. Everything that you see on a web page that is not static is owed to JavaScript. It allows you to dynamically update content, animate your content, create amazing graphics and make everything on your website interactive.

Therefore, we have also used it in order to create our app. JavaScript can change HTML content and attribute values, as well as change the CSS styling of elements, features we have also used. We have also used JavaScript to add event handling to elements in order to be responsive when being clicked on. We have also used it to remove or undo content in the app. Furthermore, we used the jQuery library for Ajax PHP calls to communicate with the web server and database. In addition to all this, we also made use of JavaScript libraries to help with manipulating SVGs specifically.

3.1.4 Raphael.js

Raphael.js is a JavaScript library used for creating and manipulating vector graphics with the help of SVG for most browsers or VML for older versions. The library is known for being backwards compatible with older browsers that do not support working with a canvas or SVG.

Everything drawn using Raphael.js is an object, which means that it can be accessed through the DOM and can be later changed using JavaScript, as well as made responsive using event handlers.

We used the library in order to create the initial canvas where all the templates would be designed. In addition to that, we created all the shapes, text and lines from the menus using the library, as well as styled them using their CSS attributes. Moreover, we used extension libraries to transform elements and inline text editing. The extension libraries allowed the shapes and text to be scaled and rotated once placed on the working canvas, as well as made possible for text objects to be editable for the user. We also added event handling to our shapes and text objects to allow for them to be removed from the canvas when they were no longer needed.

3.1.5 PHP

PHP is a server-side scripting language used most popularly for web programming, case in which it will run on a web server. It has many usages, such as generating dynamic page content, dealing with files on the server (create, read, close, delete, etc. them), interacting with a database (read, create, remove, etc. data). It can also handle form submitted data, set and access cookies, as well as encrypt your data. One of its great advantages is being very versatile: it can run on numerous platforms, it is compatible with most servers today, it is integrated with a wide variety of databases and it is friendly to beginners.

Thus, it was an excellent choice to use in our app. We are running it on a web server and connecting to our database in order to complete different tasks for our app. All user account related interactions are performed with the help of PHP: signing up, logging in, logging out, saving a template, loading the list of templates and opening a template. We need a database connection for all of those, thus we use PHP in order to carry them out. In order to also secure our app, we use PHP functions to encrypt all the passwords and a function that validates the hash with the given password at login. We also check against SQL injection when receiving any sort of input from the web page with the help of PHP functions targeted towards that.

3.1.6 phpMyAdmin

phpMyAdmin is an open source and free software written in PHP used for managing MySQL over the web. It has a web interface that allows you to perform operations while still being able to manually execute SQL statements. Besides normal database operations (create/drop tables, read, insert, delete data, etc.), it also allows you to import data under different formats as well as export it. You can also manage multiple servers at the same time, search your database globally, transform your stored data to other types and create detailed graphics regarding your database layout, etc. Additionally, you can back up your database in multiple formats as a layer of added security.

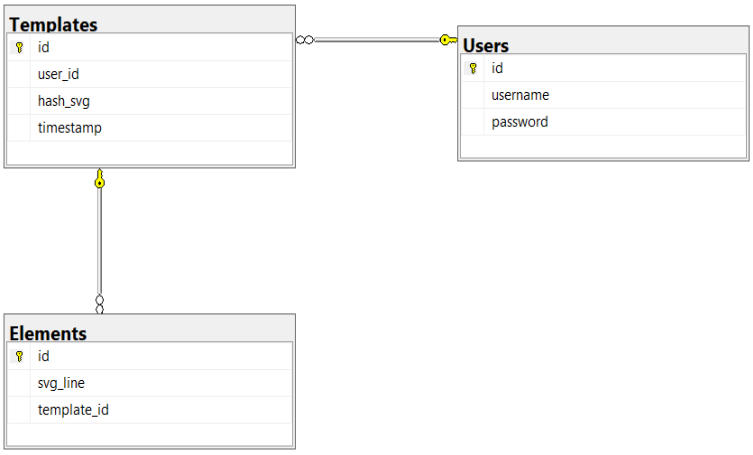

Figure 11: Database structure

We are using phpMyAdmin to store our database and perform operations on it. We have created 3 tables: Users, Templates and Elements. The Users table holds the credentials of each user: an identifier, the username and the password. The id is a unique integer and the primary key of the table, the username is a string having maximum length equal to 20 characters, while the password is a 255 characters long string. The username field is also unique in order to avoid any duplicate users.

The Templates table is used for saving the templates. It contains 4 fields: an identifier, the id of the user that saved the template, the name of the template and a timestamp. As with the Users table, the id is a unique integer and the primary key of the table, the user id is an integer and the foreign key that binds this table to the Users table, the name of the template is a string with maximum length of 40 characters and the timestamp is datetime and is formatted as "YYYY-MM-DD hh:mm:ss". The id of the user and the name of the template are a unique tuple so that a user cannot label a template with the same name. There is a one-to-many relationship between the Users and Templates table: one user can save many templates.

The Elements table is a solution to the database having a maximum length constraint on string fields. We cannot save the whole SVG code into just one field because it is too long and it either results in an error or incorrect code (only half of it is saved). To solve this problem, we will be using the Elements table. The table contains a unique integer identifier, a string field for each element saved and a foreign key that binds the Elements table to the Templates table using the id of the template. When a template is saved, we take the given SVG, parse it by SVG tags and save each SVG element separately in the Elements table. As before, we can observe a one-to-many relationship between the Templates and Elements table: one template can have many elements.

3.2 Flows of the app

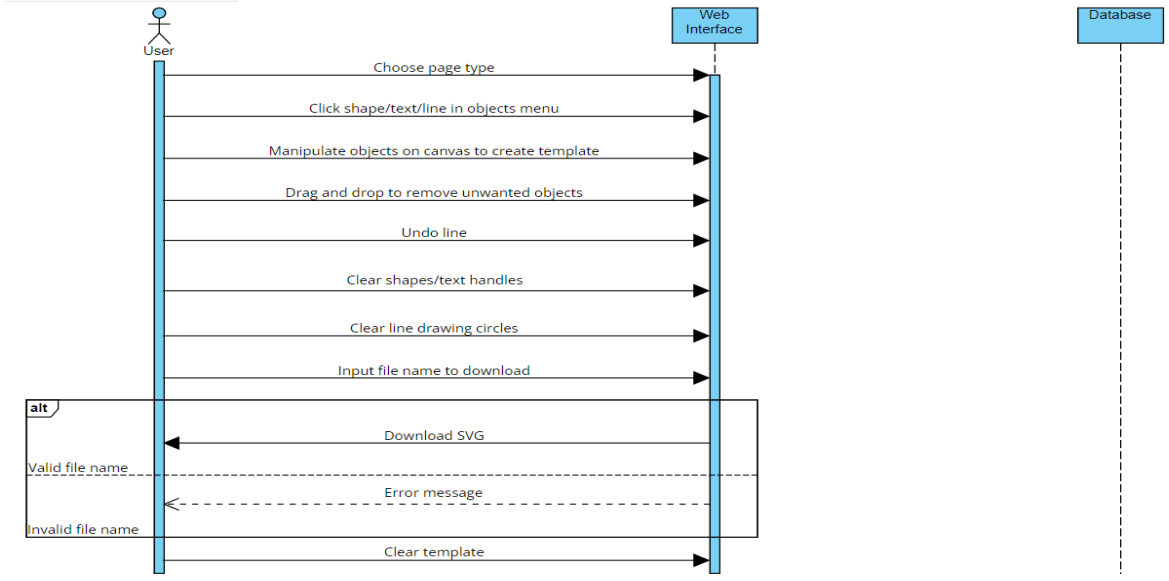

Figure 12: Flow without login/sign up

Figure 13: Flow including login/sign up

3.3 User manual

The app opens to the initial screen. It was designed in such a way that if you wish to use it without logging in, you can, but you will be missing some features: the save and load templates features. You can still create your spreads and use it however you wish, but you will either have to download your work or lose it forever.

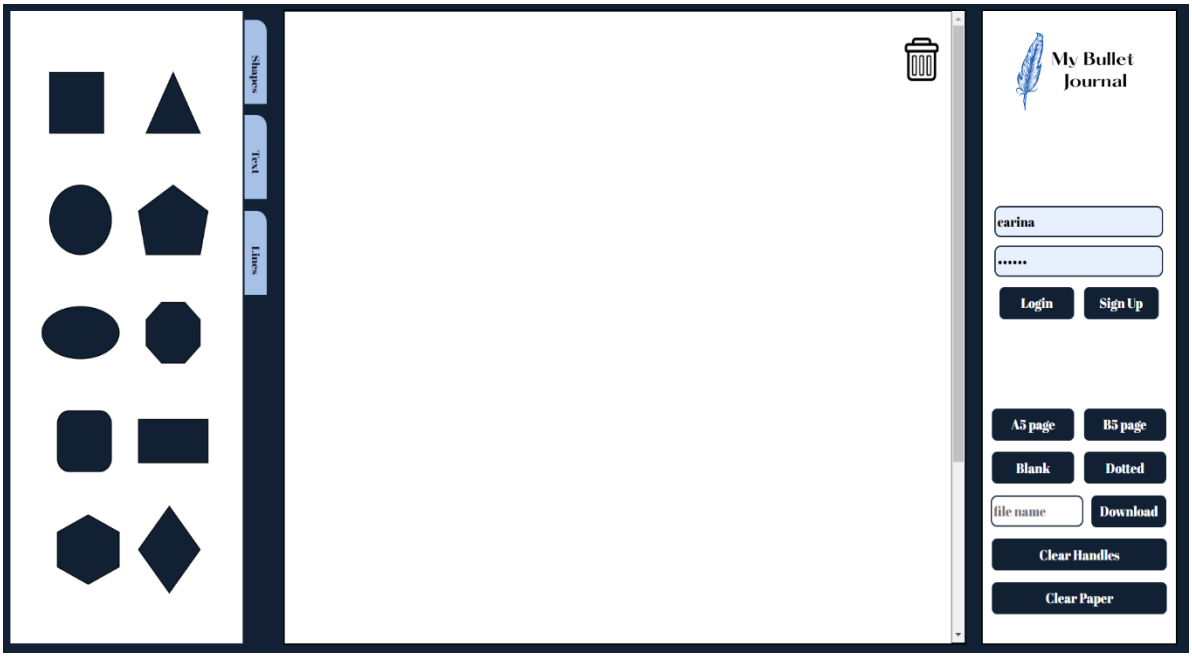

Figure 14: Screenshot of opening page of MyBulletJournal application

3.3.1 Sign up feature

In order to sign up, you just need to input a username and its associated password. The username must be unique, so in case there already exists a user with that username, the user will be notified. Once you are signed up, the panel will change to show you a welcome message, the save feature and a list of all your saved templates. You do not need to login after signing up, the app will automatically set your credentials on the session if the sign up was successful. On the session, we set up the user id returned from the database once the new user is successfully added, a boolean value (“true”) that shows that a user is logged in and the username.

3.3.2 Login feature

The login feature works similarly to the sign-up feature. They use the same input fields for username and password. Once the input is collected, it checks with the database to see if there exists a row with the given credentials. If yes, then we set up the credentials on the session: the user id, the boolean value (“true”) and the username. If the database does not return exactly one row, the user is alerted with a message of there being something wrong. If the login is successful, the welcome message, the save feature and the list of saved templates are shown to the user.

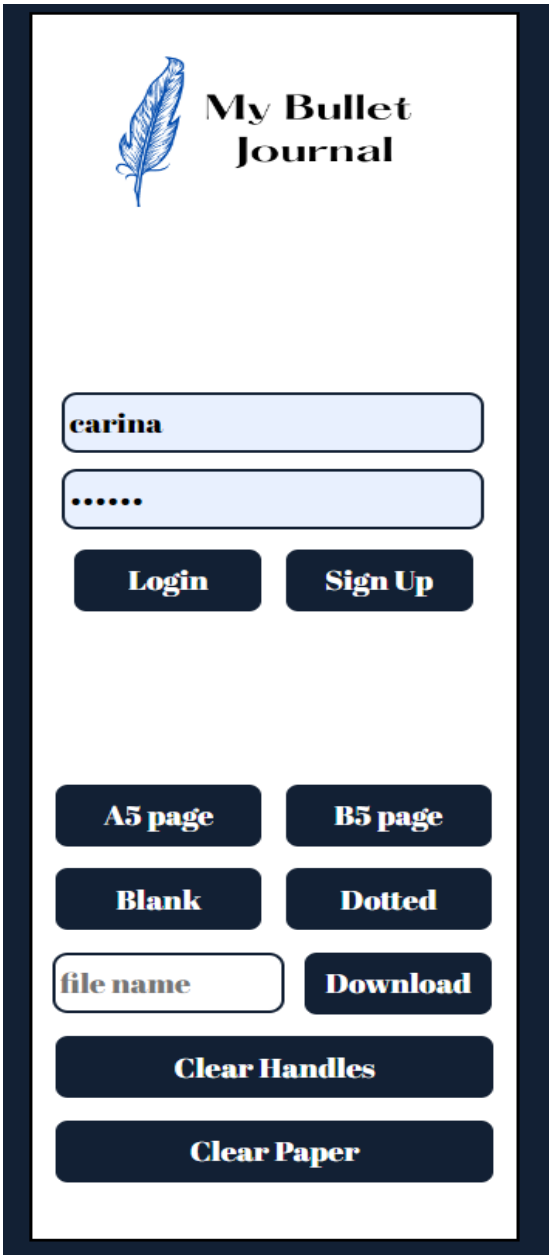

Figure 15: Panel containing the account menu

3.3.3 Logout feature

The logout feature simply sends the user back to the initial screen and destroys the session so that the previously saved credentials are removed.

3.3.4 Save template feature

For the save feature, you need to input a name for the file to be saved with. The file name input is checked to not be empty or null, case in which the user is notified of that error with a message. Clicking the save button will then result in the reload of the page and the template you saved will appear in the list below. You can only view the templates that you personally saved and only if you are logged in. They are brought from the database using the user id saved on the session. You can save any template that you wish, even an empty/blank one.

3.3.5 Load template feature

The load feature, along with the save template feature, was implemented in order to provide the user with the possibility of continuing work on a past template. While you cannot change what is already saved in the template, you can add more to it in order to finish it. Once it was saved in the database, that form was considered its final. Each user has access to all its past templates ordered by the moment they were saved from last saved to first. By clicking on one of the items in the list, the template will be loaded onto the page. You can then add anything you wish to the template and either download it or save it again with a different name.

3.3.6 Page type and size feature

In order to make this experience even more customizable and to allow the user to be able to use our website for other purposes besides bullet journaling, we have created the possibility to change the type of page you are working on. You can either have a blank page, which means just a white background, or a dotted page. The dotted page respects the bullet journaling practice and is useful as a guide when placing your objects on the template. Along with the type of the page, we have also included the possibility of choosing the size of the page. Bullet journaling is most

often done in A5 or B5 journals, so we created panels of those exact sizes that appear on the canvas to help you better visualize how it would look in your own physical journal.

3.3.7 Download feature

The download feature works much the same as the save feature does. You are required to input the file name under which you wish the SVG to be saved. The file name will then be checked to not be empty or null. If it is, the user is notified. Otherwise, the file will be downloaded with the ".svg" file extension.

Figure 16: Panel after login/sign up

3.3.8 Clear handles feature

In order to drag and drop and resize shapes and text, the objects have handles that help with that. If you are done with your template or are sure of the placement of your objects, you can choose to delete the handles for they have no use after you have positioned and changed the elements to your liking. You can save a template and reload it to the page and you will still be able to remove the handles. However, once removed, they cannot be brought back, so be sure you are completely satisfied with the placement of your objects before clicking the “Clear handles” button.

3.3.9 Clear paper feature

As the name suggests, this feature allows you to remove everything you have on your template. It allows you to start anew on an empty canvas.

3.3.10 Shapes feature

On the left side of the page, we are presented with the shapes menu. We have chosen what seem to be the most used shapes in bullet journaling. While this is not an exhaustive list of shapes, it is a start. You can, however, still create your own shapes with the help of the lines menu. To use this feature, you click on one of the shapes and it will appear on your canvas. Each shape comes with 2 handles that allow the user to rotate and scale the shape they have chosen, while the circle in the middle of the shape allows you to drag and drop it anywhere on the canvas.

3.3.11 Text feature

The text menu enables writing in your templates. There is a selection of 21 fonts that you can choose from. We have remarked upon the fact that many creators use cursive fonts in their bullet journals and, while it is impressive to look at, it is a rather hard skill to pick up. As a result, we made sure to include a collection of them for the user to choose from. This feature works much the same as the shapes one. You click on your choice of font and an editable panel will appear on the template. You also have handles on the panel that allow the user to resize and rotate the writing as well as the circle in the middle that make it easy to drag and drop it.

3.3.12 Lines feature

We have also included a selection of lines for you to make use of. While we wanted to make the template black and white and allow the user to color it offline, we thought it a good idea to include colored lines so that you could build your own shapes in case you want them to be colored. Drawing out the shapes yourself is made easy by the little dots (bullets) on the page. Right now, there are 4 different colors available as well as 4 different types of thickness. You click on the line you would like to use and a small circle will appear in the top left corner that is the same color as the line you chose. Drag and drop it anywhere on the page you would like the line to start. You can start as many lines as you want by dragging a new little circle from the one in the top left corner. In case you have decided against one of the lines you drew, you can undo it by clicking the "Undo line" button in the lines menu until you are left with no lines at all. Once you are done drawing your lines, to make the little drawing circles disappear, you just click the "Line done" button in the lines menu.

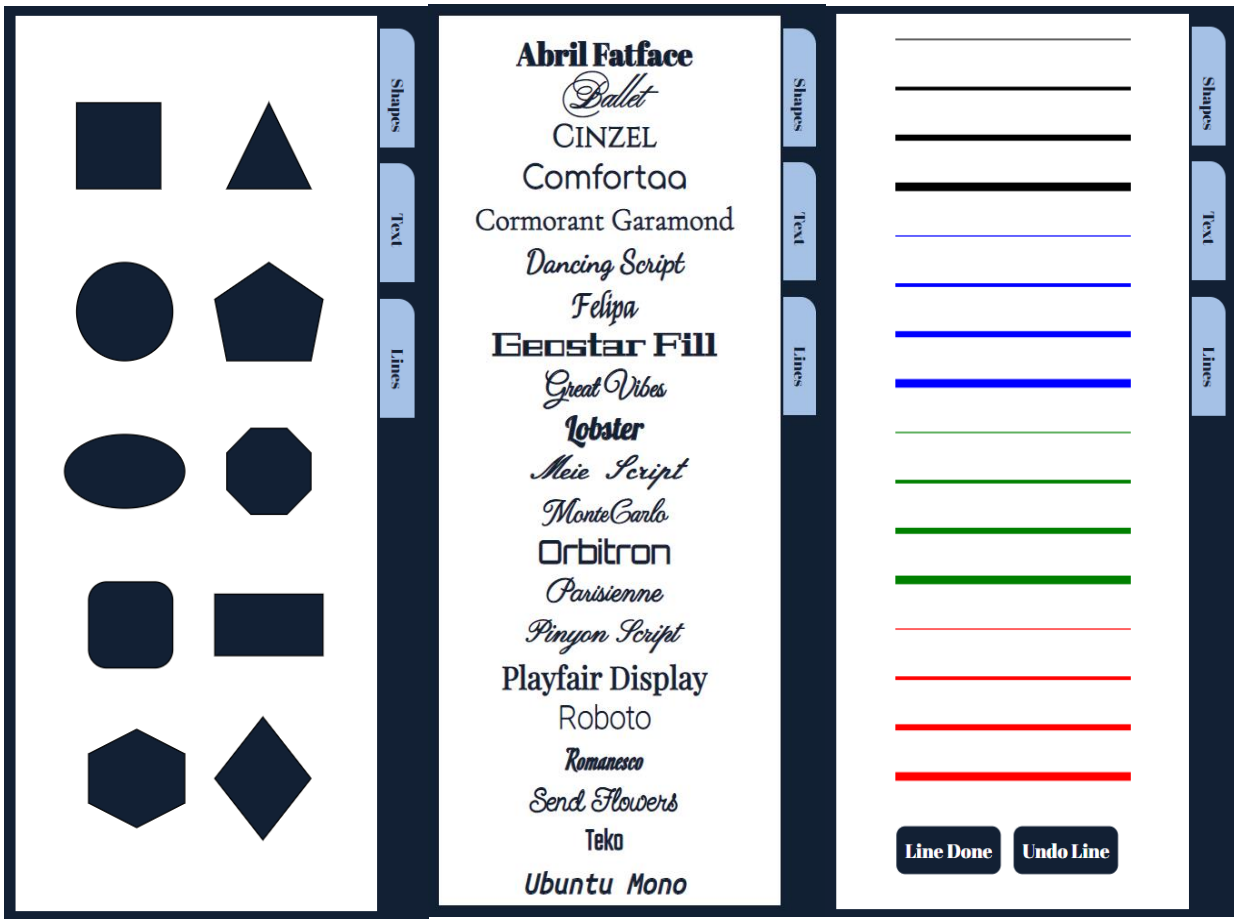

Figure 17: Shapes, Text and Lines menus

3.3.13 Bin feature

The bin feature is used for removing shapes and text from the canvas one by one. Since shapes and text objects can be dragged and dropped, if you hover one of them over the trash can icon in the bottom right corner of the template, the item will be removed permanently.

3.4 Future updates and related work

As with any app that is being developed, you would want to start small, with not so many features, and test how it is being received as you integrate more and more functionalities. That is the case with MyBulletJournal as well. This is just the starting product. Therefore, we should also discuss future plans for the app.

We have multiple ideas for the coming functionalities that could be implemented. One of them is snapping. To make manipulating your objects on the canvas easier, we would like to implement snapping for shapes. This means that when one shape is close enough (within a chosen interval) to another shape, they will align, vertically or horizontally, depending on where the shapes are positioned on the canvas, by their centers. This is a functionality that is already being developed. We have, so far, managed to calculate the center of each shape, no matter its type, and accurately tell which is the closest shape to the one that is being dragged at that moment by calculating the distance between the 2 points. We now need to focus on the actual snapping of the shapes to one another.

```
let pair;
for(let i=0; i<shapes.length; i++) {
    let circle = document.getElementsByTagName("svg")[3].getElementsByClassName("center " + shapes[i].getAttribute("class"))[0];
    if (Math.abs(circle.getAttribute("cx")-cx) > 10 && Math.abs(circle.getAttribute("cy")-cy) > 10) {
        let shape_cx = circle.getAttribute("cx");
        let shape_cy = circle.getAttribute("cy");
        const d = Math.sqrt((cx-shape_cx)*(cx-shape_cx) + (cy-shape_cy)*(cy-shape_cy));
        if (d<min) {
            pair = [shapes[i], circle];
            min = d;
        }
    }
}
```

Figure 18: Function for the minimum distance between 2 shapes

We have developed this app in such a way that no matter the template you create, you can print it black and white, there is no need for a colored printer. This was done so that it would reduce the cost of the overall template production. However, as a future functionality, we would like to

implement the possibility of importing your own images onto the template and using them as a sticker. This would mean that when you eventually print your spread, you would need colored printing.

Another functionality that we would like to implement would be the possibility to add your own shapes, that is your own SVG paths. You can find different software online that allows you to build more complicated and complex paths with all sorts of tools and then export it. In order to make our app more customizable, we would like to add this functionality so that the user would not be restricted to the few shapes we have right now.

Looking at the menus we have right now, we have thought of a few things that could be added to them. Firstly, we would like to add more shape types, as well as fonts to the existing ones. We would also like to implement the possibility of adding your own custom fonts. Secondly, we would like to also add more types of lines: curvy, dashed, zig-zag, curly and any other that would be useful or on demand. Another functionality we believe would be of great value is an eraser. This would allow the user to erase parts of shapes or lines in order to create half-moons, for example, or unclosed circles or squares. The space left could be then used for writing or a sticker. Additionally, we would like to allow for your writing to curve and bend so as to better fit with your designs.

These are the functionalities that, right now, we think would be useful to have. They may change over time depending on the response we receive from customers and on the suggestions made regarding the current functionalities.

Chapter IV: Conclusions

This research paper has followed the development of the web application, MyBulletJournal, both from a theoretical and practical standpoint. From a theoretical point of view, there is much evidence that points to the benefits of keeping a bullet journal. It is a way to keep all aspects and areas of your life organized, as well as a creative tool. Being organized can lead to the lessening of feelings of anxiousness, as well as reduce stress due to having all your tasks laid out in front of you. Moreover, using your bullet journal as a creative tool can reduce negative feelings as well as help with overall anxiety. We have also discussed accessibility, which unfortunately cannot be achieved in the case of our application for multiple reasons, the obvious one being that it is a drawing tool, it requires the user to be able to see and use their hands. However, that would be the case with a physical bullet journal as well. We have also mentioned UI/UX regarding our application. As mentioned before, this being a drawing tool, the user interface is quite straightforward and does not require much navigation. We have also touched upon some useful JavaScript libraries with similar and different utilities to Raphael.js, the library we used.

From the practical point of view, we have spoken a little about web technologies, such as HTML, CSS, JavaScript, PHP, etc. They have been an integral part of building this app. We have also presented the flows of the app, as well as an extremely detailed user manual in order to make the action of using our app as easy as possible. In addition, we also presented some other functionalities we would like to implement and what we are currently working on.

To conclude, the aim of this app was to make the practice of bullet journaling a much easier and faster process. The application comes as a solution to the problem of creating your daily/monthly/yearly spreads. The skeleton of the spreads, all the tables and charts that you keep in your journal, can be very time consuming when created by hand. Moreover, for someone that does not change the layout of their journal constantly, it can become a repetitive action, tedious after some time and could lead to that person dropping the idea of keeping a journal entirely. That is why we have come up with MyBulletJournal, it allows you to focus on the creative part while taking out the monotonous part of tracing your layouts every month.

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