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The youPlanner

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The youPlanner

A Thesis

Presented to

The Honors Faculty of The University of Akron

In Partial Fulfillment

of the Requirements for the Degree

Bachelor of Engineering

As a

Williams Honors Scholar

Taylor C. Burgess

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CHAPTER

INTRODUCTION

As an adult, life is busy and chaotic. It is especially true if said adult also happens to be a college student. I find it challenging to keep track of my classes, work schedule, extracurricular activities, and social life during each semester. Currently, I am using several methods to keep track of everything. I have a physical wall calendar to keep track of class due dates. I also have a phone calendar that holds appointments and extracurricular scheduling. My workspace has a million sticky notes that briefly detail all sorts of random information. I also have my note app on my phone filled with similar information. There are reminders and alarms set up on my phone to help me remember to get places. I have journals and books filled to help me set goals and remember my days. From the perspective of a computer science student, my data storage strategy is redundant, inefficient, and unreliable.

I needed an easy way to help organize my thoughts, plans, and goals. I decided to turn to the internet to find something that could aid me in my endeavors and inexpensive because I am a college student in debt. However, after searching the web, I could either find a free, partially fulfilling tool or an expensive all-in-one tool. Thus, I decided to

create a web application that could do everything I needed and only at the expense of my time. The application is called the youPlanner.

There were two purposes of the youPlanner project. First, implement best practices studied in software development and, secondly, create a four-tier web application entirely from scratch with an unfamiliar web application framework. As stated, I am a busy college student, and time was not on my side. After talking to my mentors, the consensus was that it would be best to downsize the application to a single, functioning concept from the original youPlanner idea that shows my use of software development and a four-tier web application. The portion of the youPlanner I decided to focus on was a fully functional online notepad - aptly named youNotes.

BACKGROUND

The youPlanner is a four-tier web application. Web applications are lightweight and typically easier to manage and maintain in comparison to other types of applications. There are four main parts to a four-tier web application: the client, the web server, the application server, and the database server. Figure 1.1 below shows a visual representation of a four-tier web application for reference (Xiao).

The client of the four-tier web application is the reason why anything happens. The client sends requests to the rest of the application and receives them.

The web server handles requests by the client for static content. In the case of a request for a web page, the webserver will find the page from a storage source, process it

through the application server if needed, then return it for the user's viewing. (IBM Cloud Education, 2020).

The application server is the bridge between the client and the server-side. The application server helps out the server-side with requests from the database and is what allows websites to be dynamic (IT Pro team, 2018).

The database server holds all the data on a website. For example, the youNotes webpage stores the time, the title, and the body of a note. The application server can grab whatever data is needed from the database and send it back to the client.

The four-tier website is a common model and tests developers to know how all the tiers interact with the others to make a hosted website work.

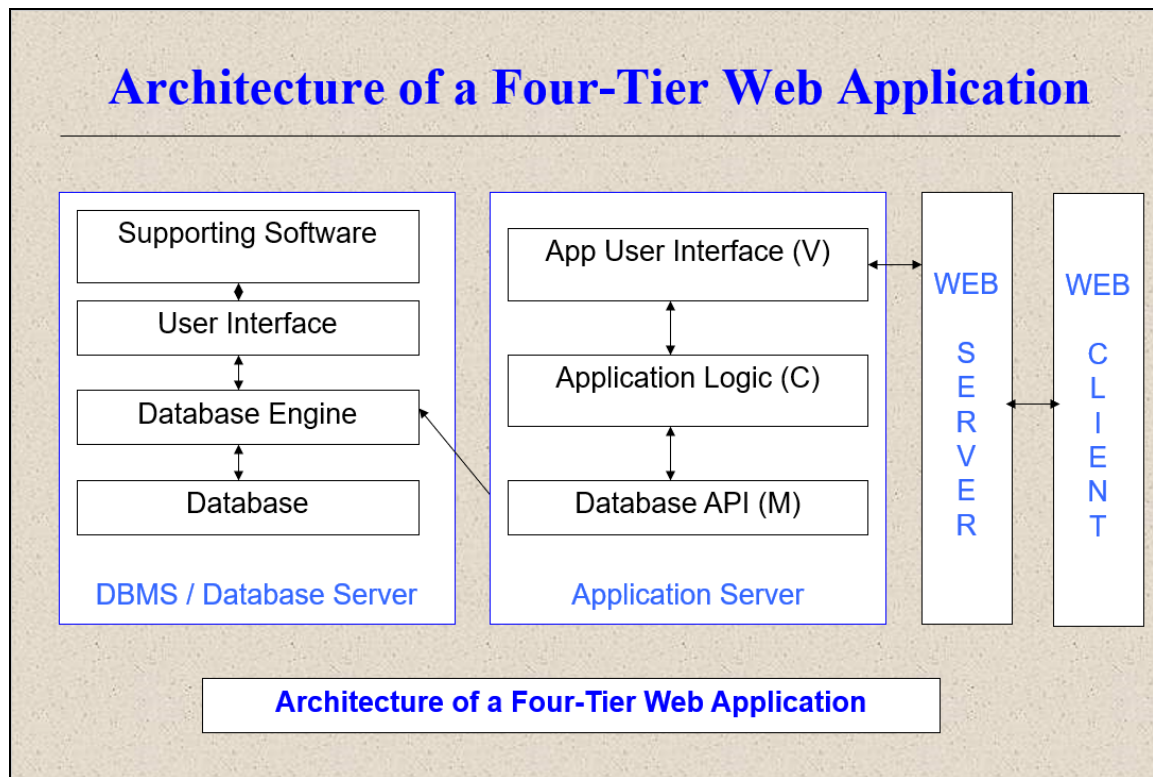


Figure 1.1: Architecture of a Four-Tier Web Application

IMPLEMENTATION

The strategy for the youPlanner application was to utilize agile practices learned from software engineering. The agile methodology is the best strategy for software development in the industry. A few practices for agile development include a team of developers, creating user stories, software should work at all times, and welcoming changes to the process (“The 12 Agile”).

A principle in agile development is that it works best with a small team of developers. The cycle of software development relies on feedback and critiques from fellow team members. However, there was only one developer. For feedback, the project was reviewed throughout the semester by a mentor almost every other week. The team, feedback loop, and timeline for the project are now as definite as agile allows. After the project proposal, the next step was to define the website's appearance and functionality. The best way to outline the website is to create a wireframe. For the youPlanner, a free, online resource that allows users to make wireframes utilizing UI/UX practices called WireframePro Mockflow was used. A wireframe was made that was visually appealing with a consistent interface for users. An example of the website is represented below as figure 1.2. After the wireframe was approved, the application moved onto the next stage.

With a clear visual representation of the website, definitive functionalities were next to describe. User stories are another main principle for agile development. A user story is a way to capture a feature on a website from the user's perspective (“What is User Story?”). With the user stories, developers have a good idea of what the user wants and

can now determine what functionally needs to happen and how long it will take to make it work. Trello is a free, online tool used for the organization of user stories for the youPlanner. A screenshot example is provided below as figure 1.3.

At this point, there is a clear goal in mind and a specific way to get there. Now that coding could start, I set up GitHub for version control. With the principle of always having a working product in mind, setting up a repository on GitHub ensures that there always is a functioning application assuming there are appropriate pushes to the repository.

After an extensive amount of planning, coding took place. The front end consisted of HTML, CSS, and Bootstrap. Using Bootstrap made the website look stylish and professional. The application middleware was written in PHP. PHP is a web development language (“What is PHP?”). PHP was used for the youNotes page because there is a plethora of information available as it is 26 years old (“PHP”, 2021). Although the language is relatively old, it is still relevant today and easy to learn (Didenko, 2021). PHP also excels at working with a database with ease which was another positive. For the backend of the youNotes page, MYSQL was used as the language as it is compatible with PHP and the web server WAMP. To launch the website locally, WAMP was used. WAMP is a software stack standing for Windows, Apache, MySQL, and PHP (Arturas, 2021, para. 3). WAMP sets up Apache as the web server and handles requests between the front end and back end. WAMP allowed the languages to work together to create the youNotes web page.

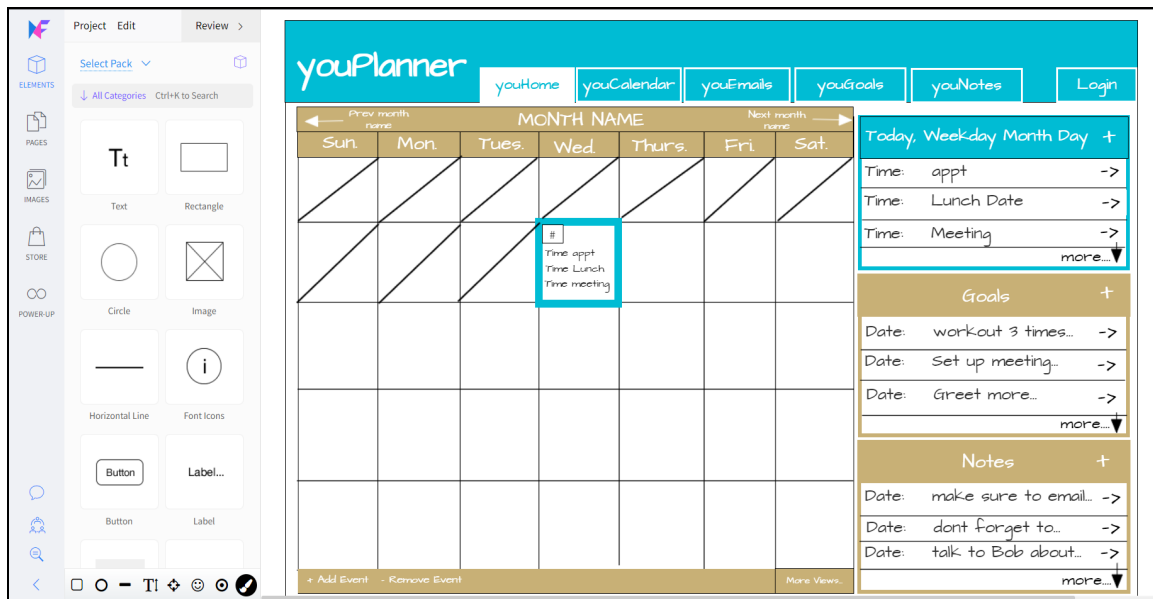


Figure 1.2 WireframePro Mockflow Screenshot Example

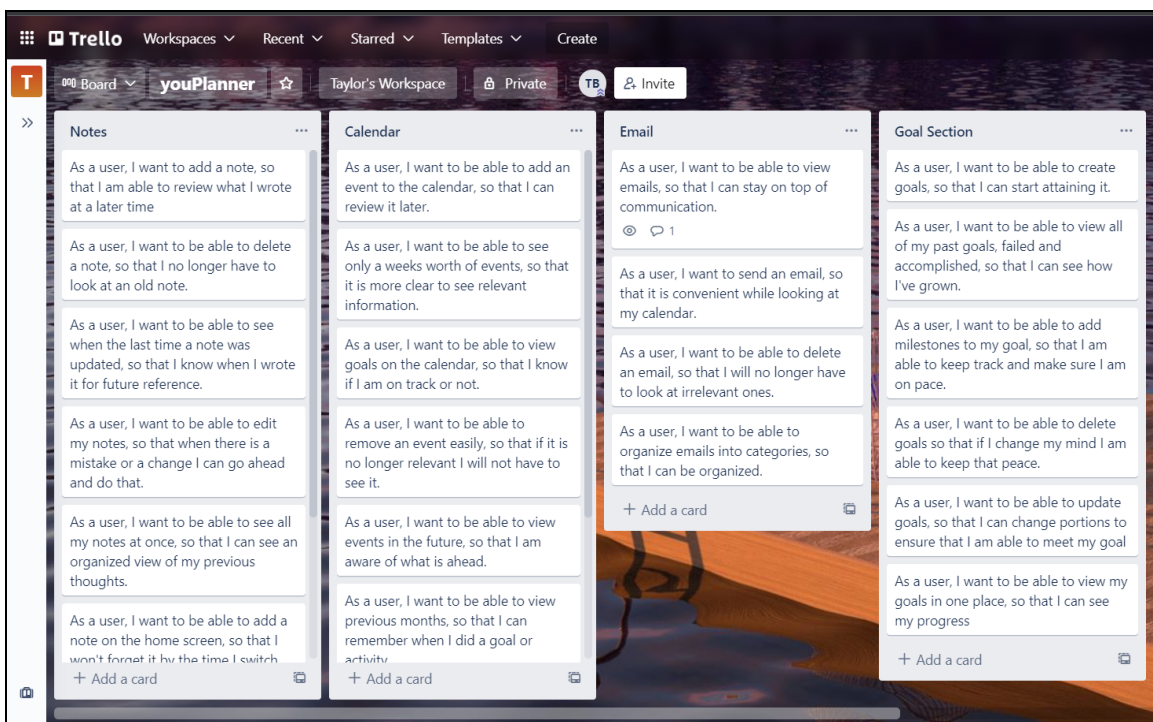


Figure 1.3 Trello Screenshot Example

RESULT

A four-tier web application was successfully created but not to the extent of the original plan. Originally a multi-page website application was planned and designed to increase organization and productivity. The complete youPlanner was going to be accomplished using Flask, which is a Python web framework, and SQLAlchemy, a SQL mapper to Python. Flask is a relatively new language with little documentation and examples in comparison to other languages. There was difficulty learning the new languages and how they work together to create a four-tier web application. The larger application was worked on for over a month with little progress. The strategy for the application, at this point, was to finish all the front end, then worry about the back end later. However, based on how much time and care put into the front end, the project was not going to finish in time at the current trajectory. Also, agile development practices started to slip. Keeping track of user stories and code commits became sloppy. This was more so because of absent-mindedness and trying to keep up with the new way of thinking with no manager. The application quickly started to become overwhelming, and the deadline was approaching.

Eventually, there was a meeting with the mentor, and it was decided to downsize the application to be an attainable goal and still have a four-tier web application. Another principle in agile development is to always welcome a change in the application even if it is close to the deadline. The youPlanner went from a multipage organizational tool to a single-page notepad. The language was also changed to PHP and MYSQL because it is more familiar and more mature in comparison to Flask (“Flask (web framework)”, 2021).

With the language switch and downsize, the new goal to create a single web page that can interact with the database was successful. Bootstrap was used for the front end and is still very similar in design to the original youPlanner, as if it is a smaller version of it. The youNotes web page can add, update, delete, and display notes that interact with a database. Below are screenshots from the application. Figure 1.4 is a screenshot of when the application is first running; like the homepage to show what the application looks like at rest. Figure 1.5 is a screenshot of viewing a single note body while also highlighting how to add a note using the button in the top right corner. The notes are organized in a table of accordions. The next screenshot, figure 1.6, shows if users were to click the add button. A new page is displayed for users to add a new note. Figure 1.7 shows a very similar page for the updating of the note. The only difference is that the information that needs to be updated is already in the text fields. The last screenshot for the youNotes page, figure 1.8, shows that the note was deleted and is no longer in the list. The final four-tier web application was smaller but it is a springboard to begin future work.

| youNotes | | |
|--------------------------------------|--------------------------------|------------|
| Last updated | Notes | + Add Note |
| November 10, 2021 04:32 pm | Packing List | ▼ |
| November 01, 2021 11:31 pm | Christmas List | ▼ |
| November 01, 2021 11:29 pm | Favorite songs | ▼ |
| November 01, 2021 11:27 pm | Grocery List | ▼ |
| November 01, 2021 03:57 pm | My To Do List: | ▼ |
| November 01, 2021 05:07 pm | Bucket list for winter 2021/22 | ▼ |
| November 10, 2021 04:49 pm | Movies to Watch | ▼ |
| November 01, 2021 11:30 pm | Class Schedule | ▼ |
| November 01, 2021 11:29 pm | Fav movies | ▼ |
| << First < Prev Next > Last >> | | |

Figure 1.4 youNotes Home Page

| youNotes | | |
|----------------------------|---------------------------------|---------------------|
| Last updated | Notes | |
| November 10, 2021 04:32 pm | Packing List | ▼ |
| November 01, 2021 11:31 pm | Christmas List | ▼ |
| November 01, 2021 11:29 pm | Favorite songs | ▼ |
| November 01, 2021 11:27 pm | Grocery List | ^ |
| | -apples -oranges -bananas | |
| | | * Update - Delete |
| November 01, 2021 03:57 pm | My To Do List: | ▼ |
| November 01, 2021 05:07 pm | Bucket list for winter 2021/22 | ▼ |
| November 10, 2021 04:49 pm | Movies to Watch | ▼ |
| | Class Schedule | ▼ |

Figure 1.5 youNotes Note Display

youPlanner
youHome
youCalendar
youEmails
youGoals
youNotes
Login

youNotes

* Add Your New youNote *

| | |
|----------------|---------------------------------|
| youNotes Title | Type your youNote title here... |
| youNotes Body | Type your youNote body here... |

Add Note
Cancel

Figure 1.6 youNotes Add Note Page

youPlanner
youHome
youCalendar
youEmails
youGoals
youNotes
Login

youNotes

* Update Your youNote *

| | |
|----------------|---|
| youNotes Title | Grocery List |
| youNotes Body | <ul style="list-style-type: none"> -apples -oranges -bananas |

Update Note
Cancel

Figure 1.7 youNotes Update Note Page

| youPlanner youHome youCalendar youEmails youGoals youNotes Login | | |
|--|--------------------------------|------------|
| youNotes | | |
| Last Updated | Notes | + Add Note |
| November 10, 2021 04:32 pm | Packing List | ▼ |
| November 01, 2021 11:31 pm | Christmas List | ▼ |
| November 01, 2021 11:29 pm | Favorite songs | ▼ |
| November 01, 2021 03:57 pm | My To Do List: | ▼ |
| November 01, 2021 05:07 pm | Bucket list for winter 2021/22 | ▼ |
| November 10, 2021 04:49 pm | Movies to Watch | ▼ |
| November 01, 2021 11:30 pm | Class Schedule | ▼ |
| November 01, 2021 11:29 pm | Fav movies | ▼ |
| November 10, 2021 04:42 pm | Projects due soon | ▼ |
| << First < Prev Next > Last >> | | |

Figure 1.8 youNotes Delete Note

FUTURE WORK

The future of the youNotes web page and the youPlanner as a whole is very bright with some more time and determination. The ultimate goal would be to complete the youPlanner application and host the website for the public. The first thing to do would be to continue work on the youNotes page, then the youPlanner webpage as a whole.

After reviewing the youNotes page with my faculty advisors, they had suggestions to add to the youNotes webpage. One faculty member noticed that when a note is deleted, there is no indication of whether it was a successful delete or not and there is no way to undo the deletion after it takes place. To solve this, it would be beneficial to add a notification letting the user know that the delete was successful and give the user the option to undo

the operation if necessary. Another issue that was caught was that there was no ability to search through the notes. This functionality would be especially handy if there was an annoying amount of pages to scroll through to find a specific note. Another addition to the web page could be a better text interface when users create or update notes. For example, adding a checklist or bulleted list feature would be helpful if users wanted to make a to-do list or a grocery list. Also, features like adding a highlight, bold, or italics for emphasizing words could be helpful to users as well. Currently, the youNotes page does not have an organized way to display notes. When a note is added now, it seems almost random where it is added in the display. It would be nice if users could choose to organize the notes either alphabetically or chronologically. Another possible way of organizing notes would be by creating a priority or categorical feature. The introduction of these features would finalize the youNotes page.

After the youNotes page bugs are fixed, I would finish the originally planned youPlanner website. Creating the youNotes page was challenging because I had never made a four-tier web application before from scratch. I had to figure out how to set up a database, how pages interacted with the database, and then how pages communicated with each other. Now that I know how everything works together, it will be easy to extend what was accomplished with the youNotes page to the entire planned web application. A lot of the work for the youPlanner application has already been completed. I had wireframes of the entire website already made up and I already had begun creating user stories for the other pages of the website. Figure 1.9 shows the wireframe for a possible youPlanner home page. Figure 1.10 shows a wireframe for the youEmail page from the youPlanner. All that is left to do is to code. The pages I originally planned for

were a goal tracker, calendar, email, and a home page. After the pages are finished and working, I would then focus on login and security for the application. At this point, the application would be ready to launch, and I would only have to worry about maintenance and customer satisfaction.

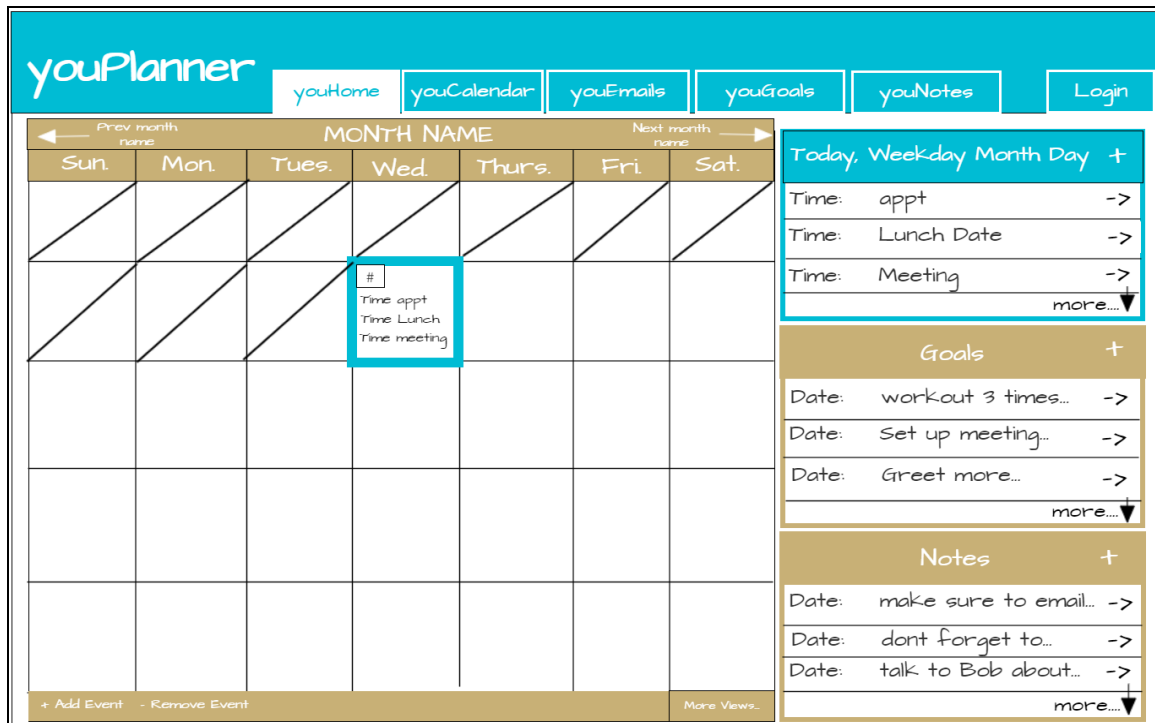


Figure 1.9 youPlanner Homepage Wireframe Screenshot

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