Tenjin Tech

by

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in Partial Fulfillment of the Requirements for

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Abstract:

Simple technology questions get asked every day. There are thousands of tools to help technically inclined people get further in their careers and in their knowledge. Tools for learning the basics of computer literacy are either reading documentation or watching videos, nothing that allows for user interaction. Tenjin Tech aims to solve this by giving users interactive challenges for basic computer skills. The team created a website with links to other learning platforms and knowledge. The website also allows for users to access the web application and select specific lesson plans and launch into lessons that ask them to solve a simple challenge. The Covid-19 pandemic has made it even more important to know the basics in computer skills. Tenjin Tech allows those who may have felt that technology was getting past them to learn in a fun and safe environment.

Introduction:

Project Summary:

Tenjin Tech is a web application that aims to make the educational process for basic computer literacy fun and accessible to all. Tenjin Tech has a website for users to create an account and learn through its knowledge base. The website is also how users access the web application. This web application offers a virtual computer environment that allows users to learn computer skills; phishing emails, document recovery, spam, browser settings, Windows settings, etc. The skills that users learn through the web application are directly applicable to classrooms, workplaces, and home environments. Tenjin Tech hopes to directly impact the lack of tools in this space and give those who might be frightened by the speed at which technology changes a chance to learn the fundamental basics about it.

Problem Statement:

There are few non-technical resources to increase computer literacy. This scarcity of resources combined with gaps in the current educational system make it difficult for people to learn skills needed for their development. In a statement made at the International Scientific Conference regarding challenges for the future, the system "mustn't guarantee only basic literacy. Education has to provide access to technologies, opportunities for new ways of using these technologies and equip the students with interactive tools" (Novak 2021). These are areas that companies are struggling with as well. The resources provided by tech companies are either technical help pages that non-technical users struggle to read, or paid training programs that rely heavily on videos. The lack of computer literacy diminishes the productivity of the workplace, and a lack of productivity ends up losing the company money and ultimately could lose people their jobs (Leonard 2019). The Nation Skills Coalition found that "38 percent of workers with no digital skills have jobs that require either moderate or complex computer skills"(Bergson-Shilcock, 2020). Those with technical skills are likely to seek out new opportunities, while those without them may get overwhelmed by their lack of knowledge.

Solution:

Tenjin Tech is a free web application education tool that utilizes a simulated computer environment to teach users through a game-like and interactive experience. The belief is this will fill a gap in the market due to the lack of interactive, computer learning tools. Users will be able to create an account through the website. This account will track what progress the user has made and what challenges they have completed. Through the website users will launch the web application and select the lesson plan and then the subsequent lesson they want to learn. Users will be provided with an objective by the previously selected lesson and must navigate the simulated scenario to complete their task. Once they successfully navigate to the objective and

complete the task the simulation will end and provide the user with points. The points are a form of accomplishment for the user and can be used to “purchase” digital items like wallpapers or avatars from the web shop. The user can follow along with a lesson plan with a common theme or fulfill objectives in any order. For example a lesson plan could be Windows 10 and a singular lesson could be changing the desktop background. The website will also supply help pages and helpful hints for the user to assist them with their education. The goal of this product is to increase knowledge of basic computer skills to help with productivity in the workplace and creativity amongst students.

Project Source:

Noah Hamilton was approached by teachers in Cincinnati Public Schools for resources to continue their technological education. There were none that stood out to him as being particularly helpful in giving basic computer help. Noah completed the preliminary requirements analysis and gave his pitch to the others in Senior Design Management. The Tenjin Tech team was formed after this project pitch and the others on the team decided that the problem was a large one and there was a need in the current marketplace to create an education tool to help with this.

Discussion:

The goals and objectives that Tenjin Tech hopes to achieve by the end of this project are listed below.

Project Objectives/Goals:

- Landing Page
    - Give a brief introduction of features
    - Help page
    - Developer Contact
    - Helpful shortcuts and links to other free learning options
- Web Application
    - Virtualized window machines to test skills
        - Regedit is used to monitor system settings
        - Deepfreeze to reset
    - Phishing emails examples and solutions
- Security
    - OAuth Integration
        - Securely access the site via login
    - OWASP Top Ten
        - Follows OWASP top ten guidelines to try and mitigate certain vulnerabilities

- Ex. SQL Injection

Project Scope:

The scope of this project is mainly based on the creation of the website and web application for learning opportunities. The website will have the following features: a usable sign up button for account creation, a lesson plans section where the web application can be accessed, a knowledge base for the user to get helpful hints and links to other learning tools, a contact Tenjin Tech page where users can submit bug reports. The web application will have the following features: allow users to select specific lesson plans and subsequent lessons, a virtual interface for users to interact with and solve these lessons, user progress saving after completion and exiting. Overall, the security features that will be implemented are Oauth for the login information, encrypted data for the SQL database and fuzz and injection testing through security applications.

The audience is for those who are in early-mid education levels and those who might not have had the opportunity to learn these skills in a school or any other environment. The content offered by the web application will cover a broad range of topics and will get more in-depth as users get further into a lesson plan. Eventually, Tenjin Tech wants to make it possible for those who use the application to submit their own questions.

A simpler view of the scope is shown below:

- Website
    - User accounts
    - Easy to navigate
    - A general help section
    - Lesson plans
    - Developer Contact
- Web Application
    - Virtualization
        - Windows
        - Browsers / Internet
        - Common Applications
- User Accounts
    - Login Information
    - Web Application container configuration
- Security
    - OWASP web application model

Quick Project Timeline:

Table 1: Project Timeline

Task #	Task Name	Duration(weeks)	Start Date	End Date
0	Contract	3.5 weeks	8/24/2021	9/20/2021
1	Find Resources	2 weeks	9/20/2021	10/10/2021
2	Base Website	4 weeks	9/27/2021	10/25/2021
3	Configure Cloud Setup	4 weeks	10/25/2021	11/15/2021
4	Refactor to React	7 weeks	1/10/2022	2/28/2022
5	Web App	11 weeks	1/10/2022	3/28/2022
6	Full Website	10 weeks	2/28/2022	4/12/2022
7	IT Expo	1 day	4/12/2022	4/12/2022

Technologies Used:

Frontend: HTML, CSS, & ReactJS
-Used HTML and CSS to create a dynamic homepage. ReactJS was to make certain elements on our website interactive and allowed the team to make the site more user-friendly.

Backend: Auth0
-Auth0 and its databases are being utilized to authenticate users for access to the app properly.

Tools and Services: Virtual Box, Guacamole, Registry Live Watch, & Python
- Virtual Box is used to house the Windows 10 VMs that the users interact with. Guacamole is an apache web service that allows users to use a web browser to RDP into the Virtual Box. Registry Live Watch monitors Regedit to confirm when the user has changed the correct setting. Python is used for various scripts running on the VM. This includes the end flag that stops the RDP connection and an automation script for Registry Live Watch.

Security: Deepfreeze & Group Policy

-Deepfreeze is a security application for the Windows 10 VM that resets the VM to a previously specified state. This resets any changes the user would make on the VM. Group policy is used to restrict the user on the VM from accessing actions like the command line or signing out.

Cloud Services: Google Cloud Platform
-Google Cloud is used to host our web server and utility server. Google Cloud's firewall is utilized to help restrict traffic between the DMZ web server and the internal utility server.

Technical Architecture Diagram:

The technical diagram below shows the basic architecture for Tenjin Tech. It shows a user connecting to a web server and then from the webserver accessing the specified lesson plan through the utility database. The web application then creates and shows the user a simulated environment where the user is able to complete a specific lesson and then exit the scenario.

Figure 1: Technical Architecture Diagram

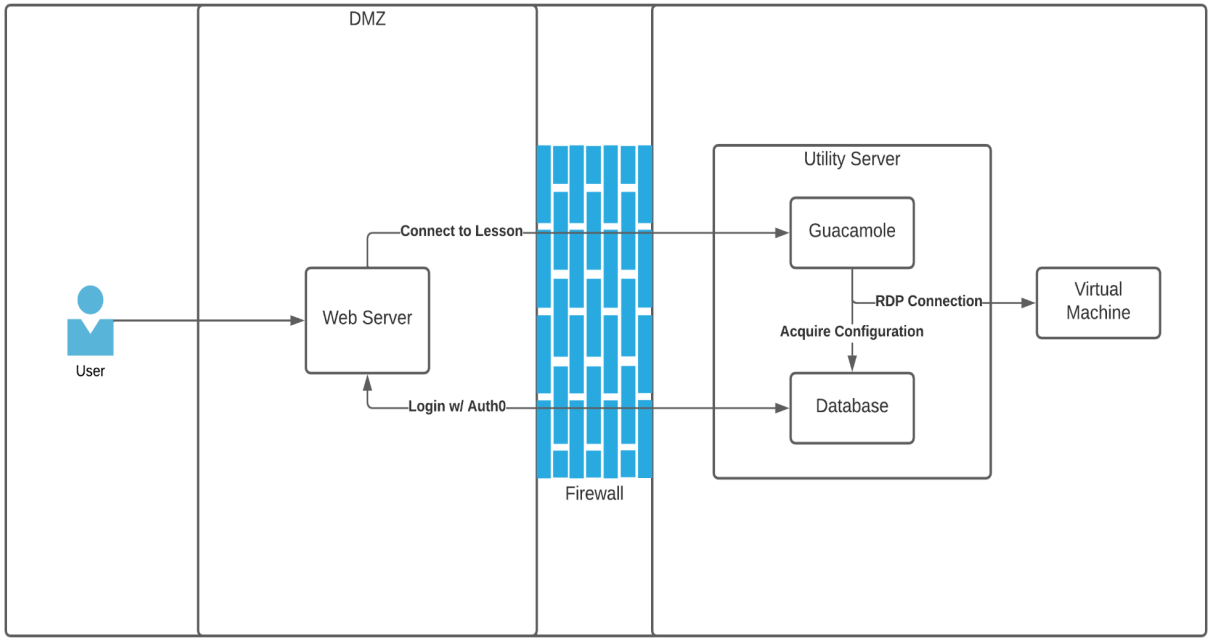
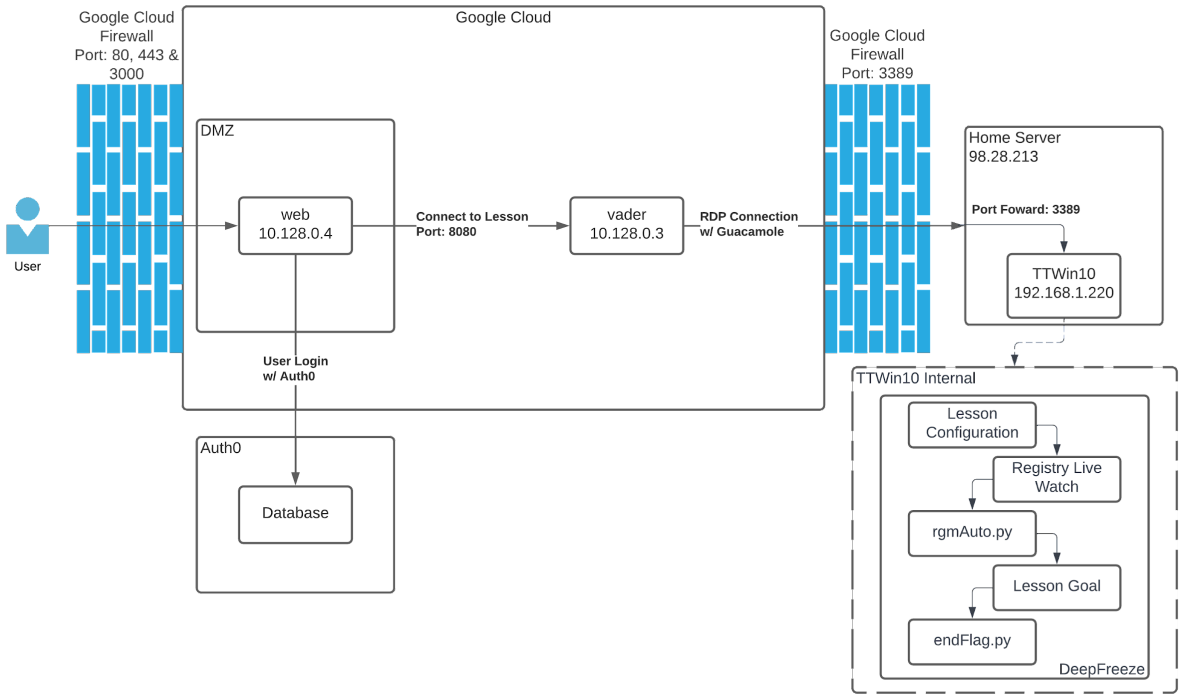


Figure 2: Detailed Diagram



User Personas:

The following personas were created as the base subjects for using Tenjin Tech. They were created based on the target audience for the web application and website. These are personas created by the Tenjin Tech team and may not reflect the actual status and usability of the product from these age groups and occupations. Any likeness to an actual person is purely fictional and should be seen that way.

Table 2: User Persona Fiona

User Persona: 1

	Title: Teacher
	Name: Fiona
	Age: 45
	Gender: Female
Behavior	Fiona feels comfortable enough around computers to teach this class. She knows the basics and has some intermediate knowledge.
Pain	Fiona's pain is trying to help others become more computer literate.
Needs & Goals	Fiona's goal is to ensure people have a grasp on basic computer skills such as; installing google chrome, copying and pasting, basic computer configuration settings, the basics of phishing scams, the benefits of having a strong password.

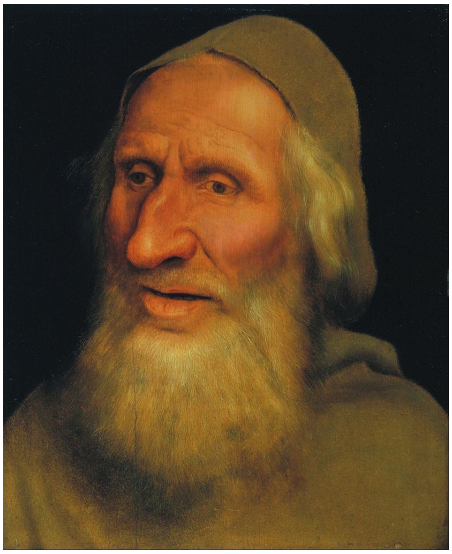
Table 3: User Persona Martin

User Persona: 2	
Picture (can be an animation, does not have to be a real person)	Title: Student

	Name: Martin
	Age: 10
	Gender: Male
Behavior	In a classroom setting with other students. Enjoys learning about other basic topics like math, science, social studies, etc. Martin has a short attention span and likes to do things quickly. In his spare time he plays video games.
Pain	Martin does not know the basics of using a computer. There are settings and potential security threats that he does not know about.
Needs & Goals	Martin needs to learn about computer settings and how they can be changed. He also needs to learn about basic security topics like spam and phishing attacks from dangerous links to protect him while using the internet.

Table 4: User Persona Bernie

User Persona: 3

	Title: Elderly Name: Bernie Age: 54 Gender: Male
Behavior	Easily intimidated and standoffish of technology. Bernie wants to stay away from technology because he feels it is progressing too quickly for him to even learn the basics.
Pain	Bernie's pain is that he has shunned technology for decades, and only now has he been forced to have a reckoning with computers.
Needs & Goals	Bernie needs to be able to complete standard tasks like starting up and shutting down a PC, updating the OS and the anit-virus suite, and safely surfing the Internet to pay his bills.

Use Cases:

The following use cases were created as specific scenarios when people were accessing Tenjin Tech through the website or using the web application to access a certain lesson plan.

Table 5: Use Case 1

Use Case ID	TT_1
Use Case Name	Standard User
End Objective	Learn basic functionality of computer settings and features. Learn about security threats via phishing and spam links.
User/Actor	Web User
Trigger	Wants to learn about general computer topics or is asked to learn from a teacher.
Frequency of Use	3-4 times a week
Preconditions	User is accessing content
Basic Flow	1. Access the landing page website 2. Sign in or create account 3. Find modules or content that interests user 4. Access knowledge base to get help 5. Start the content or resume from where user left off 6. Get points for finishing content objectives 7. Take test to show mastery of content 8. Use points to buy content from web shop 9. Sign out
Alternate Flow	1. Access landing page website 2. User selects forget password link 3. User answers security challenge question 4a. User answers incorrectly and is not able to reset 4b. User answers correctly and reset password link is sent to user's email

	5. Access the reset password link and change password 6. Login to landing page with new password
Postconditions	The content has a mastery star next to it once completed. Shows a progress bar based on the content objectives completed.

Table 6: Use Case 2

Use Case ID	TT_2
Use Case Name	Teacher
End Objective	To ensure that her class has a basic understanding of how computers work and helpful tips/tricks
User/Actor	Web User
Trigger	Has a class of people that are unable to confidently use a computer.
Frequency of Use	4 times a week
Preconditions	Fiona is able to comfortably use a computer, but does not have the necessary tools to teach her class.
Basic Flow	1. Help students navigate to landing page 2. Ensure that they create an account 3. Assign modules for the day 4. Monitor students progress
Alternate Flow	
Postconditions	Fiona will have successfully provided her class with proper tools to gain computer literacy.

Table 7: Use Case 3

Use Case ID	TT_3
Use Case Name	Tenjin Tech Dev Team
End Objective	Maintain website and application, manage users, and update products.
User/Actor	Network admin, user admin, web admin.
Trigger	Ticket is entered for staff
Frequency of Use	Daily
Preconditions	User requests update, or bug
Basic Flow	1. The ticket is assigned to the appropriate Tenjin Tech team member. 2. The team member assesses the ticket and finds the resources he will need to access in order to evaluate the problem. 3. Reaches out to other team members that own the resources necessary. 4. Information is provided and the team member assigned is better able to understand the problem. 5. Assigned team member creates a solution and submits it to their superior. 6. The solution is evaluated and accepted or denied. 7. Work is drafted for the next iteration.
Alternate Flow	5… Assigned team member is able to resolve the solution without a new solution needing to be drafted and created 6. Resolve the problem, document the solution, and close the ticket.
Postconditions	The solution is documented and submitted to the team's knowledge base.

Use Case Diagrams:

The following use cases were put into a diagram to show how a standard user and how a Tenjin Tech developer or admin is able to access the information on the website and on the Web application.

Figure 2: Standard User

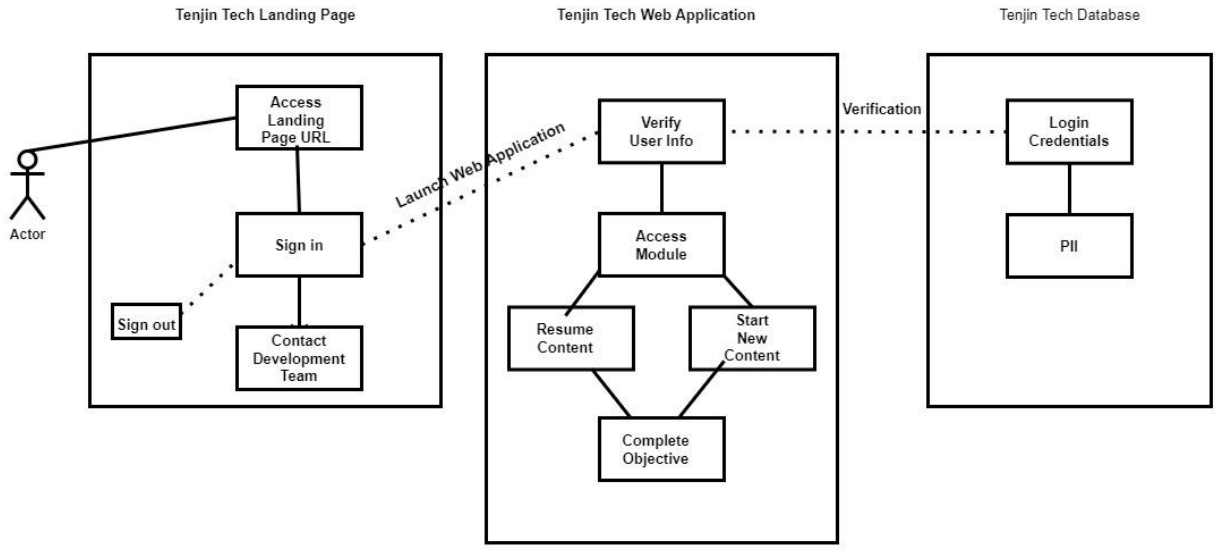
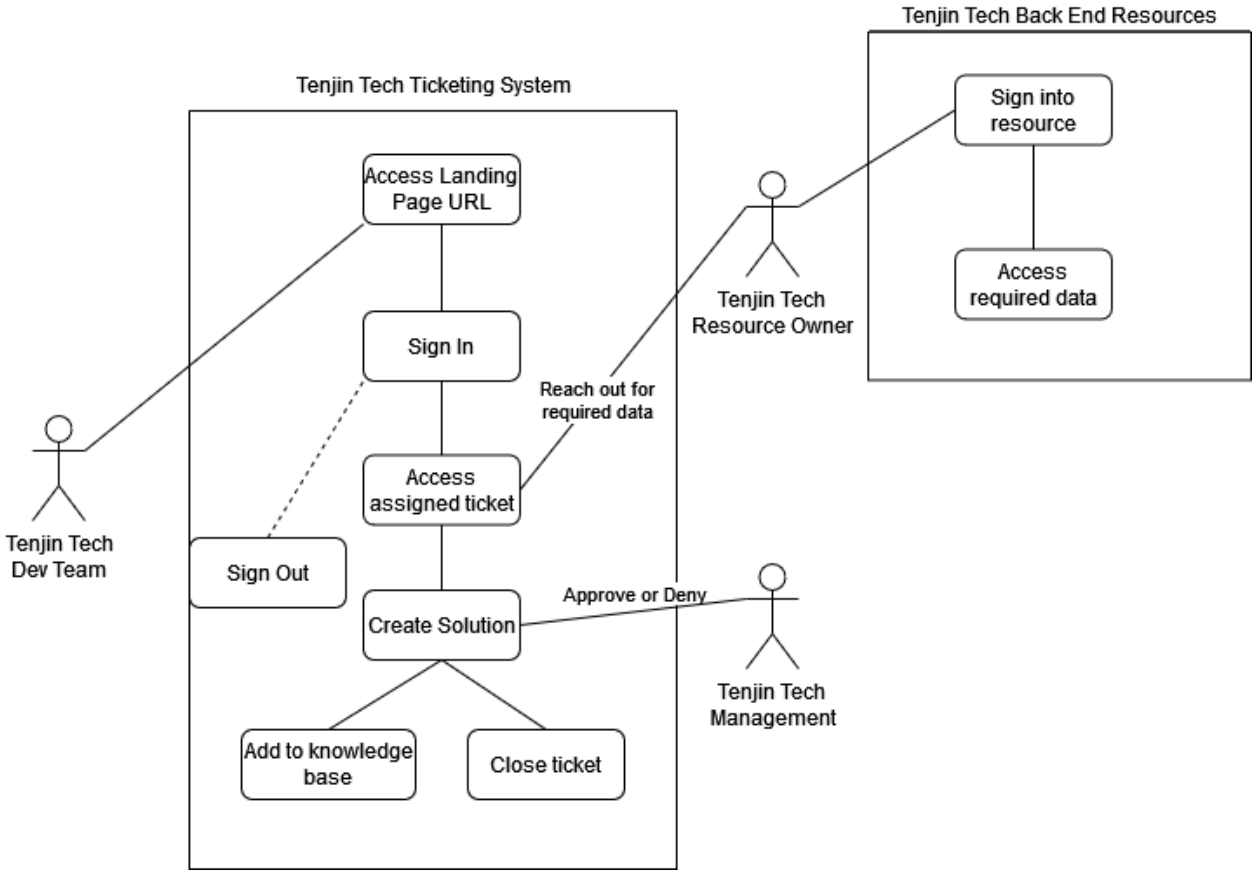


Figure 3: Tenjin Tech Admin



Testing Plan:

Overview:

Testing will be done at various points of development. There are different approaches for different types of testing methodologies. The team wants to utilize these approaches to make a product that is secure, functional, and accessible to users.

Test cases will be determined by the team and will be used to ensure the product is in line with project goals. Further testing will be done throughout the course of Spring semester 2022 until the date of the IT Expo 2022.

Methodology:

Integration testing will be done when new components are added to the landing page and web application to test the authenticity of the connections. This kind of testing will be done at various points of development. For example when the database connection is made to the

landing page. This type of testing was chosen to be able to verify that new components do not break previous features or the site altogether. There will be integration testing done when updates are made to certain connections as well. This will ensure a more stable product and overall will make it easier for the team to troubleshoot errors when they occur.

Unit testing will be done on a weekly basis based on features that are added to the web application and landing page. This will be done even if the complete feature is not fully completed. The verification of small snippets of code will be helpful in determining if the full feature is plausible or not.

Test cases will be determined by the team throughout the development cycle. Some tests will be determined at the beginning of the project to keep the project on target with the intended goals. Test cases will be updated if new functionality is added during a change.

User acceptance testing is the last part of Tenjin Tech's testing plan. This is where users will be asked to fill out a form created by the team and give basic demographic information like name, age, gender and education level. These users will then use Tenjin Tech and leave comments about any bugs or general issues they may run into.

Scope:

Website Testing - Verify that basic functions work correctly and looks as intended
Login Testing - Verify that the login credentials are being used/stored in a secure manner
Database Integration Testing - Verify that the database is properly connected to
Web Application to AWS testing - Verify connectivity between the team's web application and cloud services
Unit Testing - Verify that data entered into the various class models appropriately pass or fail respective of specific constraints.

Objectives:

a. All major features and use cases need to be accounted for
    aa. Website will have a functional login system
    ab. Website will have connectivity to the VM or virtual interface
    ac. Web application will create or connect to a virtual interface where users can interact
    ad. Cloud service is able to host the website, web application and VMs
b. All use cases must account for all the user roles
    ba. User is able to create an account
    bb. User is able to access content based on their account
    bc. Tenjin Tech developer is able to access and edit configurations to lesson plans
c. All major bugs need to be resolved before IT Expo
    ca. Have user acceptance testers report their issues or bugs

Test Logs and Procedures:

Table 8: Test Logs and Procedures

Item #	Test Case #	User	Role	Expected Output	Actual Output	Pass / Fail	Reason	Date
01	01	Standard	Teacher	Clicking on Homepage brings you back	The Security page loaded instead	Fail	Bad link	9/24/21
02	02	Dev	Admin	Commit with new HTML and CSS is added to site	Update successfully committed	Pass	Success	10/03/21
03	03	Standard	User	Clicking on the Sign up button takes you to user creation	User is able to create an account	Pass	User created an account successfully	10/22/21
04	04	Dev	Admin	Commit with new HTML and CSS is added to site	Update successfully committed	Pass	Success	10/24/21
05	05	Standard	User	Clicking on the lesson plans link takes the user to lesson plans content	Lesson plans are loaded correctly	Pass	User is able to load lesson plans	11/17/21
06	06	Dev	Admin	Commit with new HTML and CSS is added to site	Update successfully committed	Pass	Success	11/21/21
04	04	Dev	Admin	Connecting the website with the VM via Guacamole allows for	The bridge was misconfigured and did not allow	Fail	Unable to interact with the VM over	11/23/21

				connection between the two	for proper connection		the Guacamole bridge	
05	05	Dev	Admin	Select Security course and see the options for Phishing and Security awareness	Phishing section is listed	Fail	Security awareness and CSS styling need to be changed	1/31/22
06	06	Dev	Admin	Selecting the difficulty of phishing email launches new tab with that specified difficulty	After selecting easy the user is opened to a new tab	Pass	User was taken to the correct page based on their selection	2/2/22
07	07	Dev	Admin	The security html page opens up correctly with the Tenjin Tech logo in the center	After selecting the Security page users can view the courses under that selection	Pass	Users can see the information under the security page	2/5/22
08	08	Dev	Admin	The HTML and CSS are in the process of being refactored into React and pops up with the relevant information from the original website code	The styling and some of the usability from the original HTML code does not work and will require further testing and improveme	Fail	Usability requirements	2/27/22

					nts			
09	09	User	User	User is able to login to the website using their Google account via Auth0	User is unable to connect through their Google account therefore leading to failure	Fail	User should be able to utilize Auth0 to login	3/1/22
10	10	Dev	Admin	User is prompted with an end flag after finishing the task and is then removed from the VM	User is prompted with a small popup that also shows the command line and does not get disconnecte d	Fail	User should get a prompt and then disconne ct after doing the task at hand	3/1/22
10	10	Dev	Admin	The React website is up and running with the correct parameters and functionality of the old HTML with some improvements	The website works and the other sections like Phishing and about us load up properly	Pass	Website is up and running locally and just needs to be pointed at GCP before Expo	3/20/22
11	11	User	User	User is able to login to the website using their Google account via Auth0	User is able to use their Google account via Auth0 to login to the website and	Pass	The impleme ntation of Auth0 works correctly and	3/25/22

					create an account		users can create accounts using Auth0	
12	12	Dev	Admin	User is prompted with an end flag after finishing the task and is then removed from the VM	User is prompted with an end flag of the proper size and with no extra information and after finishing the task is then disconnected from the VM	Pass	User gets a prompt and then disconnects after doing the task at hand	3/28/22

Testing Review:

Table 9: Testing Review

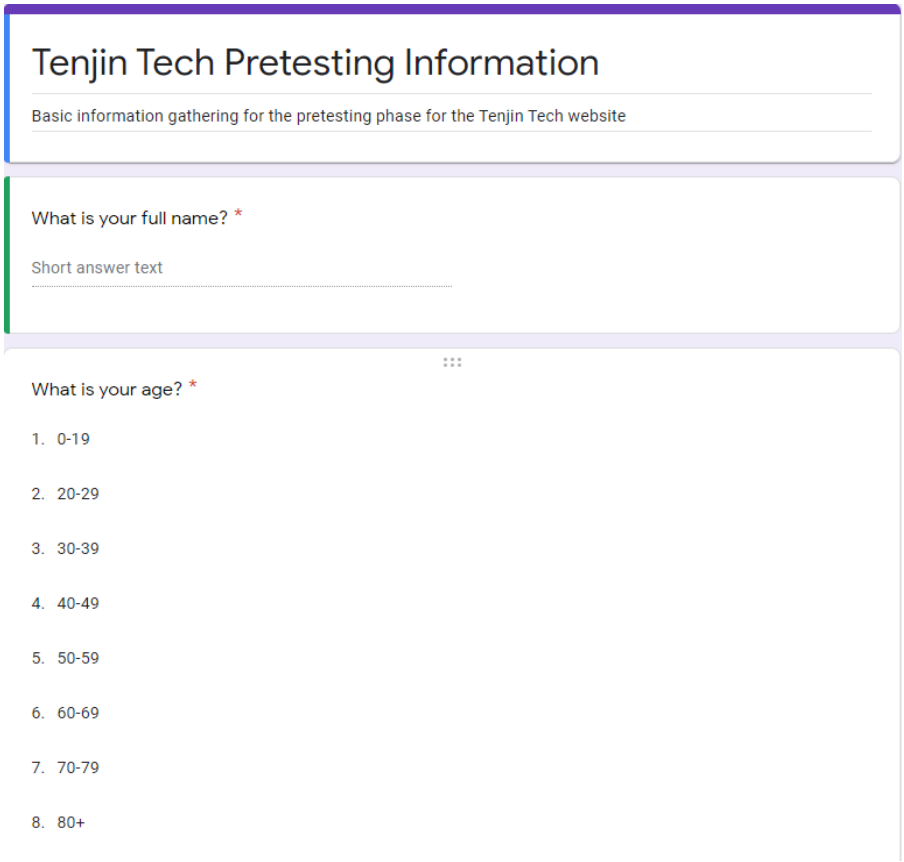
Item #	Case #	Pass/Fail	Retrospective Outcome	Future Considerations
01	01	Fail	Talked through possible reasons for failure as a team	Change the HTML to make sure the nav elements work correctly
02	02	Fail	Script to configure VM inside container failed	Try changing the parameters to successfully implement the architecture

03	03	Pass	HTML and CSS elements are configured correctly	Allow for easier access to certain pages for accessibility reasons
04	04	Fail	Docker file does not output the correct information	Run through further iterations of the Dockerfile and find out where it is failing
05	05	Pass	Cloud service successfully hosts the web page	Figure out exactly which cloud provider will run the web server before IT Expo 2022
06	06	Pass	Proof of concept for phishing email lesson plan successfully configured	Add API calls within the website to grab new templates and run simulations through
07	07	Pass	Team talked through best way to implement HTML email templates	Use CSS styling to get a cleaner view of the email and what the user should do with them
08	08	Pass	First phishing template is hosted on website and correctly displays what the user selects from the difficulty	Have multiple “easy” and “medium” selections so that users may view multiple templates.

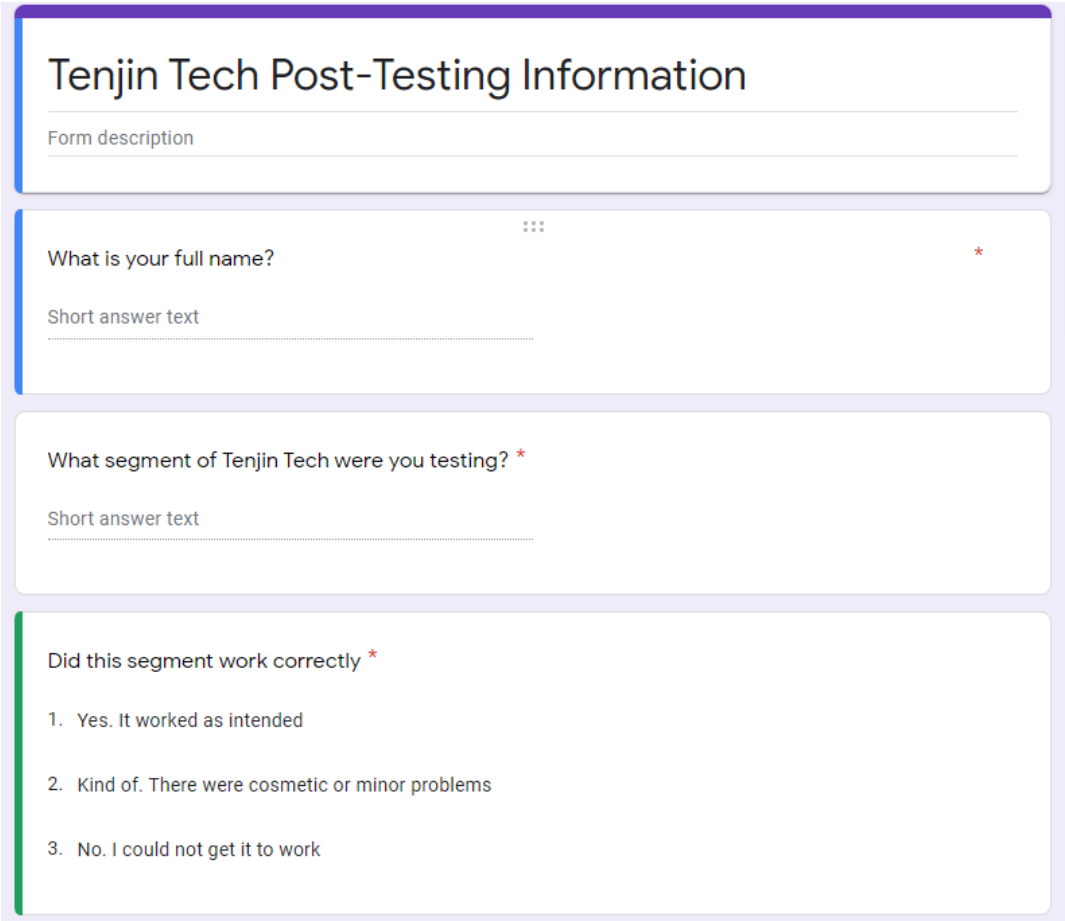
			dropdown	
09	09	Fail	Code is in the process of being refactored into React	Change the React to look and use more components that allow for usability of the HTML and CSS
10	10	Pass	Auth0 has been successfully implemented and is usable on the website	Use Auth0 to host the account information in a separate area
11	11	Pass	React code is successfully up and running locally	Point the website to the GCP web servers and have it running during Expo
12	12	Pass	The end flag is working as expected and after the user selects OK is disconnected from the VM to go on to the next course	Have the end flag set up so the user can see it for longer before hitting ok and being disconnected

User Acceptance Testing Forms:

These forms were used to collect data from different demographics of users.



https://forms.gle/TZDoPVizw6JTGL1c6



https://forms.gle/DWjPb1gYkY67pUtU9

Change Management Plan:

1. Purpose of the Change Management Plan

Any team member can suggest a change to the project. The team member must have a clear goal in mind for why the change is needed. The goal should address a problem the team member sees with the project. The goal should also lay out the benefits of following the new direction for the project.

2. Change Management Process

The Change Management Process will allow for a clear and concise way to evaluate possible changes to the Tenjin Tech project. This will allow team members to express concerns and solutions they view as important to Tenjin Tech. All change requests will be recorded within the team's google drive folder.

2.1. Requesting a Change

The team member suggesting the change should bring it up to the other team members in one of the meetings. They will present the problem, the goal, and the possible solution to the other team members.

2.2. Evaluation of Change
The requested changes will then be evaluated with the original problem statement in mind. The pros and cons of the new solution should be drafted up and used to help evaluate the solution.

2.3. Approval or Denial
A majority must be reached on whether the change should be implemented. If a tie is reached then the team will reach out to their advisor (Bander Henderson) for assistance.

3. Responsibilities

The team member requesting the change will be labeled as the Change Manager. The Change Manager will work with the Project Manager to create a new project plan for both the immediate work iteration and future iterations. Any necessary changes to the project plan will be created and documented.

Budget:

The areas included in Tenjin Tech's budget are the monthly fees for important services that Tenjin Tech relies on. The cloud services listed here were adjusted so that they would reflect the actual cost of the project even though the team is using the student version. The allocated budget for labor was based on the team's current pay at co-ops.

Table 10: Budget

							Budget Summary	
	This table was calculated on a yearly basis						**Budget**	**Actual**
							$ 78,000	**$ 77,017**
	Cost			**Fixed Costs**				
Tasks	Time	Rate	Total	Cost Per Unit	Units	Total	**Budget**	**Actual**
Services							**$ 2,000**	**$ 1,629**
GCP	1 M	$55.00	$660.00					$660.00
Deepfreeze	1 Y	$69.30	$693.00					$693.00
Auth0	1 M	$23.00	$276.00					$276.00
Hardware							**$ 6,000**	**$ 5,500**
Laptops				$1,100.00	4	4,400.00		$4,400.00
Home Server				$1,100.00	1	1,100.00		$1,100.00
Labor							**$ 70,000**	**$ 69,888**
Damon	1 H	$28.00	$17,472.00				$17,500.00	$17,472.00
John	1 H	$28.00	$17,472.00				$17,500.00	$17,472.00
Noah	1 H	$28.00	$17,472.00				$17,500.00	$17,472.00
Teji	1 H	$28.00	$17,472.00				$17,500.00	$17,472.00

Problems Encountered and Analysis of Problems Solved:

There were multiple problems and issues throughout the creation of Tenjin Tech. This section will feature some of the major and minor problems the team ran into in the duration of the project.

Major Problem 1: **Containers in cloud services**

The initial idea for this project was to host the Windows 10 VMs, that the users would remote into for lessons, within docker containers. We were hoping that docker would allow a quick, efficient method to configure and host multiple VMs. However, this proved to be challenging with the tools we could afford. Amazon's cloud service does not allow nested virtualization except for their most expensive models. Google Cloud allows for nested virtualization but did not allow for Windows 10 VMs. We instead decided to just host the VM on one of our home computers to allow for easy access.

Major Problem 2: **Spring Boot - Refactoring into React**

The web application was going to be built using Spring Boot. When Damon tried installing Spring Boot on the virtual machine, it would not install due to the VM using an ARM processor and not an AMD. The team found that React was more user-friendly, so the team decided to switch.

Minor Problem 1: **Setting up a web server through Google Cloud Platform.**

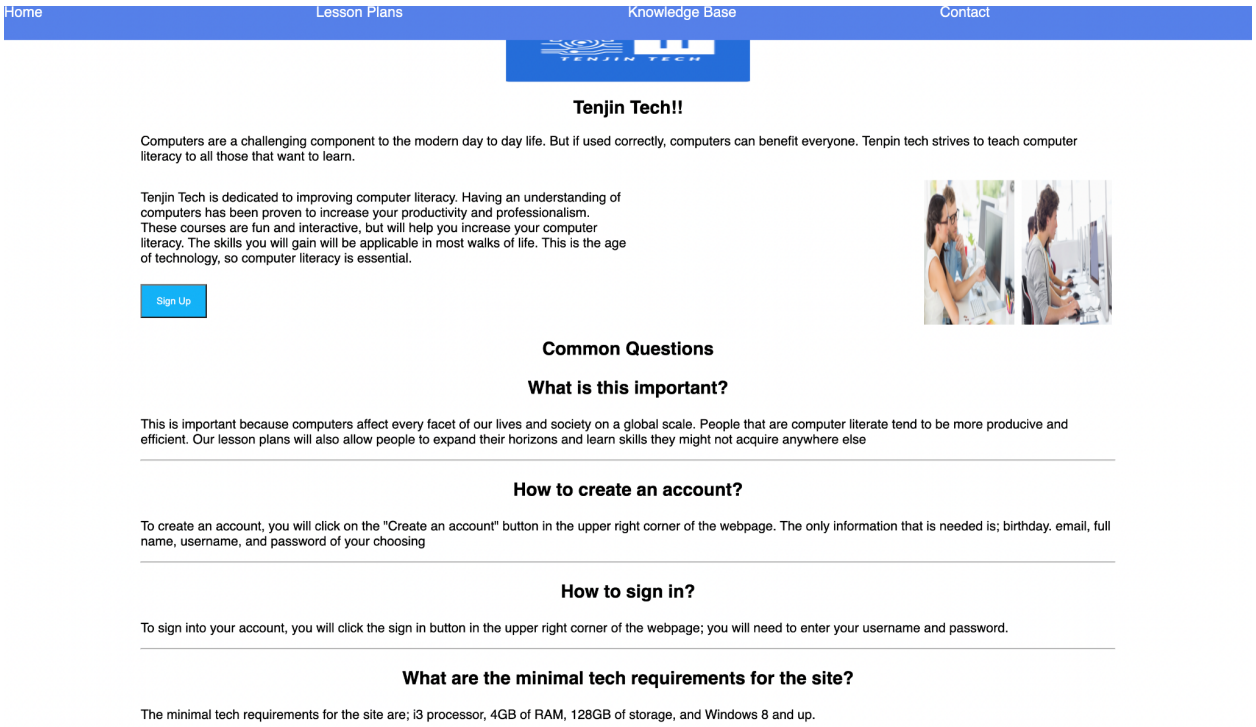
There were issues getting the webserver to be accessible through the Google Cloud Platform. The team had been successfully hosted by AWS for months before the end of the semester, however, the team decided to switch over to GCP for the webserver and for the virtual machines because of the fact that AWS did not allow for nested virtualizations.

Minor Problem 2: **Creating a web interface through HTML and CSS with the required functionality**

The website was being used to host our lesson plans. The entire team has knowledge of HTML and CSS.

The issues that the team ran into were with design; too much space between the tabs in the top nav, pictures not showing up on the landing page, the logo appearing to be pixelated, and the lesson plans not appearing as a vertical menu.

When adding the common faqs to the landing page, they are supposed to appear as dropdown boxes; but they were just appearing as paragraphs at the bottom of the page. After some research, it was determined that there was an issue with the javascript being integrated into the HTML.



Minor Problem 3: **Finding a tool to monitor Regedit**

We needed to find a tool that would autonomously check when a user has done the correct setting changes within the VM lesson. We found that checking the Regedit would be the best solution, but there were not any tools that did this in a timely manner. The most common tool is used by cybersecurity experts to take a state of the Regedit and compare it to a previous version. However, this method was slow and required multiple checks throughout the lesson. We were then able to find the Registry Live Watch tool which would actively monitor a section of the Regedit and run a program when any changes were made to it. The problem was it was created in 2008 and was only GUI-based. We were able to get around this problem by creating a Python script that inputs the Regedit section to monitor and start up the program.

Conclusion:

There were many challenges and skills acquired during the formation of Tenjin Tech. There are still many challenges to come during the Spring semester. These are some of the lessons learned by the team over the course of creating Tenjin Tech.

Lessons learned:

- Web development skills and challenges
- Docker container configuration and challenges
- Cloud service hosting
- Virtual machine configuration and challenges
- Project management hurdles
- Importance of staying connected with teammates

Skills Developed:

The team developed better communication skills through online media since it was difficult for everyone to meet up in person all the time. Web development skills also definitely increased as only one team member worked with HTML and CSS on a regular basis before Tenjin Tech. A couple of the team members became much more familiar with Docker containers and how to configure them via Dockerfiles and other configuration methods. Although Tenjin Tech was unable to get the Dockerfiles to work with the configuration needed for a secure learning environment, the team still utilized these skills when working on the virtual machine environment. Tenjin Tech relies on having a virtual environment for users to connect to, so an important skill the team learned was securing this virtual environment through the use of group policies making it so the user could not access certain portions of the environment like the command line and making changes to the password. Tenjin Tech also relies heavily on cloud services to host the webserver and the initial virtual machines for users to connect to through the web application. Backend Java spring boot dependencies were researched and utilized by the team over the course of the semester, however, the team did not get them up and running in Tenjin Tech itself due to some dependency errors. The team spent time learning how the React framework worked with HTML and CSS to make them more usable while adding functionality to the site. Tenjin Tech as a project allowed the team to learn how to present information in a solution that everyone can understand and not just those who are technically inclined. Since all members of the team work with technology on a day-to-day basis, learning how to present information at a base level was a helpful skill to learn. Overall Tenjin Tech from a project perspective allowed the team to grow and learn numerous skills that can be utilized from a professional standpoint and for the team's own curiosity going forward.

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