System Test Plan

For

Cyber Analysis Tool (CyberTool)

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1. Introduction

1.1 Purpose

CyberTool's main purpose is to create a website that simplifies the process of selecting cybersecurity tools for end-users. By understanding the specific needs of the user, whether they are commercial enterprises or individual users, the website will provide tailored recommendations to suit their requirements. This document describes how the team will be testing our website to ensure adherence to all product owner requirements.

1.2 Objectives

- Delivers personalized tool recommendations tailored to each user's requirements
- Uses a database of cybersecurity tools to ensure accurate and current tool suggestions
- Allows users to compare prospective tools
- Design a user-friendly interface

2. Functional Scope

The Modules in the scope of testing for the CyberTool System Testing are mentioned in the documents attached in the following path:

1. The System Requirements Specification document: https://github.com/illusion173/CyberToolAnalysis/blob/main/docs/SRS.md
2. User manuals: https://github.com/illusion173/CyberToolAnalysis/tree/main/docs

3. Overall Strategy and Approach

3.1 Testing Strategy

CyberTool System Testing will include testing of all functionalities that are in the scope (section 2) identified. System testing activities will include the testing of new functionalities, modified functionalities, screen level validations, workflows, functionality access, testing of internal & external interfaces.

The testing types of section following this one will be discussing what needs to be tested. However, this section will describe how the types will be tested.

3.2 Function Testing

Test Objective: The application's navigation data entry, processing, and retrieval work according to the specific requirements in the SRS (System Requirements Specification).

Technique: Execute use cases from the use case diagram -> when valid data is given then the corresponding result is given, when invalid data is inputted then the expected warning message should show

Completion Criteria: When all use cases have been tested and all defects have been mitigated

Special Consideration: Access to the AWS (Amazon Web Services) dashboard, and the corresponding System Requirements Specification document

3.3 Database Testing

Test Objective: Ensure data is accurate, consistent, and accessible during any operations, such as insert, update, or delete.

Technique: Test with data values that are in/out of bounds

Completion Criteria: After using insert, update, or delete, the data in the database matches the expected values and there are no unexpected changes in data.

3.4 Performance Testing

Test Objective: The user will be able to log in, ensure recommendation algorithm can read, calculate, and write values to a report (PDF, wasm).

Technique: Execute the recommendation algorithm, compute values read in JSON, and write the values to a new report (PDF or wasm).

Completion Criteria: Report will be available for download via a presigned URL. Report should be viewable via a PDF reader/web browser.

3.5 System Testing Entrance Criteria

To start system testing, certain requirements must be met for testing readiness. The readiness can be classified into usability testing, functional testing, and data and documentation testing.

3.6 Testing Types

3.6.1 Usability Testing

User interface attributes, cosmetic presentation, and the content will be tested for accuracy and general usability. The goal of Usability Testing is to ensure that the User Interface is comfortable to use and provides the user with consistent and appropriate access and navigation through the functions of the application (e.g., access keys, consistent tab order, readable fonts, etc.)

(Login Page) System Requirements Specification, 3.1.1: “The system shall provide input fields for the username.”

(Login Page) System Requirements Specification, 3.1.2: “The system shall provide input fields for the password.”

(Login Page) System Requirements Specification, 3.1.3: “The system shall accept a string between 6 and 20 characters for the username field.”

(Login Page) System Requirements Specification, 3.1.4: “The system shall accept a string between 6 and 20 characters for the password field.”

(Login Page) System Requirements Specification, 3.1.5: “The system shall provide a ‘forgot password’ link beneath the password field.”

(Login Page) System Requirements Specification, 3.1.6: “The system shall provide a ‘Login’ button.”

(Login Page) System Requirements Specification, 3.1.7: “The systems shall provide a ‘Sign Up’ button underneath the ‘Login’ button.”

(Login Page) System Requirements Specification, 3.1.8: “The systems shall provide a ‘Continue as guest’ link next to the Signup button.”

(Login Page) System Requirements Specification, 3.1.9: “The system shall allow authenticated users to take survey”

(Login Page) System Requirements Specification, 3.1.10: “The system shall allow unauthenticated users to view CyberTool page”

(Login Page) System Requirements Specification, 3.1.11: “The system shall allow authenticated users to be directed to survey page”

(Login Page) System Requirements Specification, 3.1.12: “The system shall allow authenticated users to view main

page”

(Login Page) System Requirements Specification, 3.1.13: “The system shall detect if an input field has not been filled out”

(Login Page) System Requirements Specification, 3.1.14: “The system shall detect if a username is incorrect”

(Login Page) System Requirements Specification, 3.1.15: “The system shall detect if a password is incorrect”

(Signup page) System Requirements Specification, 3.1.16: “The system shall provide a signup page”

(Signup page) System Requirements Specification, 3.1.17: “The system shall provide input fields for the username.”

(Signup page) System Requirements Specification, 3.1.18: “The system shall provide input fields for the password.”

(Signup page) System Requirements Specification, 3.1.19: “The system shall provide input fields for the ‘retype password’ field.”

(Signup page) System Requirements Specification, 3.1.20: “The system shall provide input fields for the email”

(Signup page) System Requirements Specification, 3.1.21: “The system shall accept a string between 6 and 20 characters for the username field.”

(Signup page) System Requirements Specification, 3.1.22: “The system shall accept a string between 6 and 20 characters for the password field.”

(Signup page) System Requirements Specification, 3.1.23: “The system shall accept a valid email for the ‘email’ input”

(Signup page) System Requirements Specification, 3.1.24: “The system shall ensure the ‘password’ and the ‘re-type password’ are the same”

(Signup page) System Requirements Specification, 3.1.25: “The system shall provide a ‘Sign Up’ button”

(Signup page) System Requirements Specification, 3.1.26: “The system shall provide a check box for the user agreement”

(Signup page) System Requirements Specification, 3.1.27: “The system shall detect if an input field has not been filled out”

(Signup page) System Requirements Specification, 3.1.28: “The system shall detect if check box has been checked”

(Signup page) System Requirements Specification, 3.1.29: “The system shall detect if an email is already in use”

(Signup page) System Requirements Specification, 3.1.30: “The system shall detect if password is UTF8 characters”

(Signup page) System Requirements Specification, 3.1.31: “The system shall allow authenticated user to view main page”

(Signup Page) System Requirements Specification, 3.1.32: “The system shall allow authenticated users to be

directed to survey page”

(Survey page) System Requirements Specification, 3.1.33: “The system shall provide check boxes”

(Survey page) System Requirements Specification, 3.1.34: “The system shall provide questions for user”

(Survey page) System Requirements Specification, 3.1.35: “The system shall allow users to check off box”

(Survey page) System Requirements Specification, 3.1.36: “The system shall detect if a box is not checked off”

(Survey page) System Requirements Specification, 3.1.37: “The system shall allow authenticated user to be directed to main page”

(Survey page) System Requirements Specification, 3.1.38: “The system shall provide a ‘Continue’ button”

(View Tools Page) System Requirements Specification, 3.21.39: “The system shall provide a list of cybersecurity tools”

(View Tools Page) System Requirements Specification, 3.1.40: “The system shall provide the name of the cybersecurity tools”

(View Tools Page) System Requirements Specification, 3.1.41: “The system shall provide the version of the cybersecurity tools”

(View Tools Page) System Requirements Specification, 3.1.42: “The system shall provide the status of the cybersecurity tools”

(View Tools Page) System Requirements Specification, 3.1.43: “The system shall provide the launch date of the cybersecurity tools”

(View Tools Page) System Requirements Specification, 3.1.44: “The system shall provide a search bar on top of the cybersecurity tools”

(View Tools Page) System Requirements Specification, 3.1.45: “The system shall accept a string between 1 to 20 characters in search bar”

(View Tools Page) System Requirements Specification, 3.1.46: “The system shall show numbers of cybersecurity tools shown on page.”

(View Tools Page) System Requirements Specification, 3.1.47: “The system shall have pagination for cybersecurity tool display”

(View Tools Page) System Requirements Specification, 3.1.48: “The system shall provide left arrow button”

(View Tools Page) System Requirements Specification, 3.1.49: “The system shall provide right arrow button”

(View Tools Page) System Requirements Specification, 3.1.50: “The system shall move to next page when right arrow is pressed”

(View Tools Page) System Requirements Specification, 3.1.51: “The system shall move to previous page when left arrow is pressed”

(View Tools Page) System Requirements Specification, 3.1.52: “The system shall provide a filter drop down menu”

(View Tools Page) System Requirements Specification, 3.1.53: “The system shall provide a drop-down menu with different filter options”

(View Tools Page) System Requirements Specification, 3.1.54: “The system shall filter cybersecurity tools based on filter user choice (see appendix item TBD for filter choices)”

(View Tools Page) System Requirements Specification, 3.1.55: “The system shall provide ‘Download as PDF button’”

(View Tools Page) System Requirements Specification, 3.1.56: “The system shall provide a link to retrieve old reports”

(View Tools Page) System Requirements Specification, 3.1.57: “The system shall allow user to be directed to reports page”

(View Tools Page) System Requirements Specification, 3.1.58: “The system shall allow user to download comparative report”

(View Document Page) System Requirements Specification, 3.1.59: “The system shall display all documents previously made”

(View Document Page) System Requirements Specification, 3.1.60: “The system shall provide ‘View Report’ link

(View Document Page) System Requirements Specification, 3.1.61: “The system shall allow user to view report”

(View Document Page) System Requirements Specification, 3.1.62: “The system shall display checkboxes for filtering”

(View Document Page) System Requirements Specification, 3.1.63: “The system shall display a dropdown filter”

(View Document Page) System Requirements Specification, 3.1.64: “The system shall process user checkbox inputs if clicked”

(View Document Page) System Requirements Specification, 3.1.65: “The system shall process user dropdown inputs if clicked”

(View Document Page) System Requirements Specification, 3.1.66: “The system shall update a JSON object based on user checkbox interactions”

(View Document Page) System Requirements Specification, 3.1.67: “The system shall update a JSON object based on user dropdown interactions”

(Forgot Password Page) System Requirements Specification, 3.1.68: “The system shall provide an input field for the user’s email associated with their account.”

(Forgot Password Page) System Requirements Specification, 3.1.69: “The system shall provide a ‘Send Code’ button under the input field.”

(Forgot Password Page) System Requirements Specification, 3.1.70: “The system shall provide an alert if the user inputs an invalid email.”

(Forgot Password Page) System Requirements Specification, 3.1.71: “The system shall only redirect to the Reset Password Page if the user provides a valid email.”

(Account Information Page) System Requirements Specification, 3.1.72: “The system shall display the current user’s email in a text box once directed to this page.”

3.7 Functional Testing

The objective of this test is to ensure that each element of the component meets the functional requirements of the business as outlined in the:

- Business / Functional Requirements
- Business rules or conditions
- Other functional documents produced during the course of the project i.e. resolution to issues/change requests/feedback

3.7.2 Comparative Report Requirements

System Requirements Specification, 4.2.3.1: The system shall develop a report in a PDF format.
System Requirements Specification, 4.2.3.2: The system shall develop a report in a wasm format.

System Requirements Specification, 4.2.3.4: The system shall create a presigned URL for the report that is valid for 7 days.

System Requirements Specification, 4.2.3.5: The system shall store the source URL as a String of the report in DynamoDB.

System Requirements Specification, 4.2.3.6: The system shall store fonts in an S3 Bucket.

System Requirements Specification, 4.2.3.7: The system shall use AWS Lambda to run its code.

System Requirements Specification, 4.2.3.8: The system shall use the Rust Bootstrap for Lambda Runtime.

System Requirements Specification, 4.2.3.9: The system shall create error logs via CloudWatch.

System Requirements Specification, 4.2.3.10: The system shall create user usage logs via CloudWatch.

System Requirements Specification, 4.2.3.11: The system shall notify the user if an error occurs during report creation error via AWS SNS email.

System Requirements Specification, 4.2.3.12: The system shall notify website administrators of any report creation errors via AWS sns email.

System Requirements Specification, 4.2.3.13: The system shall query from DynamoDB for tool data.

System Requirements Specification, 4.2.3.14: The system shall deserialize Json from DynamoDB Tool Database.

System Requirements Specification, 4.2.3.15: The system shall derive Json output from recommendation algorithm.

System Requirements Specification, 4.2.3.16: The system shall use the programming language Rust for creation of the report.

System Requirements Specification, 4.2.3.17: The report shall display the tools selected as a table.

System Requirements Specification, 4.2.3.18: The report table shall display the technology’s name.

System Requirements Specification, 4.2.3.19: The report shall contain the user’s username.

System Requirements Specification, 4.2.3.20: The report table shall contain tools already used by the user.
System Requirements Specification, 4.2.3.21: The report table shall contain links to each technology's homepage.

System Requirements Specification, 4.2.3.22: The report table shall contain what type of technology each row contains.

3.7.3 Recommendation Algorithm Requirements

System Requirements Specification, TBD (TROY & JW)

3.7.4 Cognito Authentication Requirements

System Requirements Specification, 4.4.3.1: The system shall enforce Cognito data protection standards.

System Requirements Specification, 4.4.3.2: The system shall authenticate users through Cognito.

System Requirements Specification, 4.4.3.3: The system shall use user groups for user management.

System Requirements Specification, 4.4.3.4: The system shall sync front-end validations with Cognito.

System Requirements Specification, 4.4.3.5: The system shall monitor login attempts via Cognito.

System Requirements Specification, 4.4.3.6: The system shall direct authenticated users with Cognito.

System Requirements Specification, 4.4.3.7: The system shall confirm user email through Cognito.

System Requirements Specification, 4.4.3.8: The system shall use user group assignments in Cognito.

System Requirements Specification, 4.4.3.9: The system shall permit role-based access with Cognito

System Requirements Specification, 4.4.3.10: The system shall support temporary guest credentials.

System Requirements Specification, 4.4.3.11: The system shall suspend user accounts with Cognito.

System Requirements Specification, 4.4.3.12: The system shall support password policies with Cognito.

System Requirements Specification, 4.4.3.13: The system shall scale based on user pool.

System Requirements Specification, 4.4.3.14: The system shall suspend user pools with Cognito.

3.7.5 Database Requirements

System Requirements Specification, 4.5.3.1: The system shall store tables that each contain a unique string-type partition key that is associated with the function you want the tool to serve. (See Appendix 9.1 for partition keys)

System Requirements Specification, 4.5.3.2 The system shall store tables that contain string-type global

secondary indexes (GSI) that will contain a list of attributes. (See Appendix 9.1 for GSIs)

System Requirements Specification, 4.5.3.3: The system shall perform queries based on desired partition keys and GSIs designated by the user.

System Requirements Specification, 4.5.3.4: The system shall allow the user to form complex queries equivalent to AND, OR, or NOT operations.

System Requirements Specification, 4.5.3.5: The system shall provide the user with information about a tool based on queries to the database.

System Requirements Specification, 4.5.3.6: If the user enters a query and no tool matches the input given, the system shall display an error message that there are no tools available with the given criteria.

3.7.6 API Requirements

System Requirements Specification, 4.5.3.1: The system shall utilize Amazon API Gateway

System Requirements Specification, 4.5.3.2: The system shall seamlessly integrate with other AWS services, including AWS Lambda, AWS Amplify, and DynamoDB.

System Requirements Specification, 4.5.3.3: The system shall provide logging and monitoring capabilities for API usage via AWS CloudWatch

System Requirements Specification, 4.5.3.4: The system shall expose API endpoints with a clear and consistent URL structure

System Requirements Specification, 4.5.3.5: The system shall define and expose endpoints for main resources, such as /tools, /users, etc.

System Requirements Specification, 4.5.3.6: The system shall implement API authentication using Cognito User Pools

System Requirements Specification, 4.5.3.7: The system shall support JSON as the standard format for request and response bodies

System Requirements Specification, 4.5.3.8: Each API request shall require appropriate headers, including Content-Type, Authorization, and Accept.

System Requirements Specification, 4.5.3.9: The system shall use JSON for data serialization in API communication

System Requirements Specification, 4.5.3.10: The system shall support the HTTP methods GET, POST, PUT, and DELETE

System Requirements Specification, 4.5.3.11: The system shall follow RESTful principles for a consistent and predictable API

System Requirements Specification, 4.5.3.12: HTTP status codes shall be used appropriately to indicate the result of API requests

System Requirements Specification, 4.5.3.13: The system shall provide clear error messages in the API response, including error codes and descriptions.

System Requirements Specification, 4.5.3.14: Additional error details and a trace ID shall be included for debugging purposes.

System Requirements Specification, 4.5.3.15: The system shall maintain comprehensive API documentation that includes details on endpoints, request/response formats, authentication, and examples.

System Requirements Specification, 4.5.3.16: Documentation shall be easily accessible to developers.

System Requirements Specification, 4.5.3.17: The system shall implement thorough testing.

System Requirements Specification, 4.5.3.18: The system shall utilize AWS Lambda with a Python 3.10 runtime to run code through API Gateway

3.7.7 Data and Documentation Testing

Data and documentation cover all the user guides, installation guides, README files, and set up a manual that is provided with the software to ensure that the user understands the CyberTool system. The objectives of this type of testing: check if what is stated in the documents is available in the software and check if the explanation of the system is correctly explained in the documentation.

System Requirements Specification, 2.6.1: The website shall be hosted via a GitHub repository.

System Requirements Specification, 2.6.2: The complete code of the AWS backend shall be hosted via a GitHub repository.

System Requirements Specification, 2.6.3: A user setup manual of the AWS backend will be provided via a GitHub repository.

System Requirements Specification, 2.6.4: A system architecture diagram will be provided via a GitHub repository.

System Requirements Specification, 2.6.5: The website shall provide links to documentation to GitHub repository.

System Requirements Specification, 2.6.6: The website shall provide a web page to explain physical website usage of the website.

3.8 Suspension Criteria and Resumption Requirements

This section will specify the criteria that will be used to suspend all or a portion of the testing activities on the items associated with this test plan.

3.8.1 Suspension Criteria

Testing will be halted if any of the following conditions are met:

- Failure to obtain a proper response based on user selections, stemming from issues such as faulty API interactions.
- Incorrect query results retrieved from the NoSQL database.
- Inaccuracy in the performance of the recommendation algorithm.
- If the tester cannot log into the website, stemming from wrong user credentials/issues with AWS Cognito.

3.8.2 Resumption Requirements

Testing can resume upon meeting the following prerequisites:

- The website is successfully rehosted.
- Resolution of errors in the AWS backend has been completed.
- Tester can locally run the React website, as downloaded from GitHub.

4. Execution Plan

4.1 Execution Plan

The execution plan will detail the test cases to be executed. The Execution plan will be put together to ensure that all the requirements are covered. The execution plan will be designed to accommodate some changes if necessary if testing is incomplete on any day. All the test cases of the projects under test in this release are arranged in a logical order depending upon their interdependency.

The test plan for the CyberTool system is as follows:

4.1.1 Database Testing (See 3.1.2)

4.1.2 Function Testing (See 3.1.1)

4.1.3 Performance Testing (See 3.1.3)

4.2 User Interface Performance Testing

Requirement (From SRS)	Test Case Identifier	Input	Expected Behavior	Pass / Fail
3.1.1 Login Page: The system shall provide input fields for the username.	1.1	User opens login page	Input field for username is displayed.	PASS
3.1.3 Login Page: The system shall accept a string between 6 and 20 characters for the username field.	1.1	User enters a username of varying lengths.	The system accepts usernames between 6 and 20 characters, rejecting others.	NOT IMPLEMENTED/FAIL
3.1.4 Login Page: The system shall accept a string between 6 and 20 characters for the password field.	1.1	User enters a password of varying lengths.	The system accepts passwords between 6 and 20 characters, rejecting others.	NOT IMPLEMENTED/FAIL
3.1.5 Login Page: The system shall provide a ‘forgot password’ link beneath the password field.	1.1	User opens login page	‘Forgot password' link is visible beneath the password input field.	NOT IMPLEMENTED/FAIL
3.1.6 Login Page: The system shall provide a ‘Login’ button.	1.1	User opens login page	'Login' button is visible and prompts user authentication	PASS

			upon click.	
3.1.7 Login Page: The systems shall provide a ‘Sign Up’ button underneath the ‘Login’ button.	1.1	User opens login page	'Sign Up' button is visible underneath the 'Login' button and leads to the registration process.	PASS
3.1.8 Login Page: The systems shall provide a ‘Continue as guest’ link next to the Signup button.	1.1	User opens login page	'Continue as guest' link is visible next to the 'Sign Up' button and allows access to limited features.	NOT IMPLEMENTED/FAIL
3.1.9 Login Page: The system shall allow authenticated users to take the survey.	2.1	User logs in and attempts to access the survey.	Authenticated users can access and take the survey.	PASS
3.1.10 Login Page: The system shall allow unauthenticated users to view CyberTool page.	3.1	User opens the CyberTool page without logging in.	The CyberTool page is accessible to unauthenticated users.	NOT IMPLEMENTED/FAIL
3.1.11 Login Page: The system shall allow authenticated users to be directed to survey page.	2.1	User logs in and is taken to survey page.	If the user is a registered user, the system will redirect them to the survey page	NOT IMPLEMENTED/FAIL
3.1.12 Login Page: The system shall allow authenticated users to view the main page.	4.1	User logs in and attempts to access the main page.	Authenticated users can view the main page.	PASS
3.1.13 Login Page: The system shall detect if an input field has not been filled out.	5.1	User does not input field	Login Page will not authenticate the user, it will popular an error stating the field has to be filled	NOT IMPLEMENTED/FAIL
3.1.14 Login Page: The system shall detect if a username is incorrect.	6.1	User inputs a username that is not found in database	Login Page will not authenticate the user, it will populate an error stating the incorrect username	PASS
3.1.15 Login Page: The system shall detect if a password is incorrect.	7.1	User inputs a password that is not found in	Login Page will not authenticate the user, it will populate	PASS

		database	an error stating the incorrect password	
3.1.16 Signup Page: The system shall provide a signup page	8.1	User clicks button on Login Page to “Sign Up”	Signup Page will display	PASS
3.1.17 Signup Page: The system shall provide input fields for the username.	8.1	User clicks button on Login Page to “Sign Up”	Signup Page will display with username field	PASS
3.1.18 Signup Page: The system shall provide input fields for the password.	8.1	User clicks button on Login Page to “Sign Up”	Signup Page will display with password field	PASS
3.1.19 Signup Page: The system shall provide input fields for the ‘retype password’ field.	8.1	User clicks button on Login Page to “Sign Up”	Signup Page will display with retype password field	PASS
3.1.20 Signup Page: The system shall provide input fields for the email	8.1	User clicks button on Login Page to “Sign Up”	Signup Page will display with email field	PASS
3.1.21 Signup Page: The system shall accept a string between 6 and 20 characters for the username field.	9.1	User input a valid username and clicks “Sign Up” button	Signup Page will display user username in text field	PASS
3.1.22 Signup Page: The system shall accept a string between 6 and 20 characters for the password field.	9.1	User input a valid password and clicks “Sign Up” button	Signup Page will display user password in text field	PASS
3.1.23 Signup Page: The system shall accept a valid email for the ‘email’ input	9.1	User input a valid email and clicks “Sign Up” button	Signup Page will display user email in text field	FAIL
3.1.24 Signup Page: The system shall ensure the ‘password’ and the ‘re-type password’ are the same	9.1	User input values for both Password and Retype Password fields	Signup Page will display user password and retype password in text fields	PASS

3.1.25 Signup Page: The system shall provide a 'Sign Up' button	8.1	User accesses the Signup Page	Signup Page is displayed with signup button	PASS
3.1.26 Signup Page: The system shall provide a check box for the user agreement	8.1	User accesses the Signup Page	Signup Page is displayed with checkbox	NOT IMPLEMENTED
3.1.27 Signup Page: The system shall detect if an input field has not been filled out	10.1	User fails to fill out one or more input fields	Signup Page displays error that one or more fields are empty	NOT IMPLEMENTED
3.1.28 Signup Page: The system shall detect if check box has been checked	11.1	User does not check User Agreement box	Signup Page displays error that box has not been checked	NOT IMPLEMENTED
3.1.29 Signup Page: The system shall detect if an email is already in use	12.1	User enters email that is already stored in the database	Signup Page displays error that email is already in use	FAIL
3.1.30 Signup Page: The system shall detect if password is UTF8 characters	2.1	User enters a valid UTF8 password	Survey Page will display	PASS
3.1.31 Signup Page: The system shall allow authenticated user to view main page	2.1	User enters valid credentials into the Login Page	Survey Page will display	PASS
3.1.32 Signup Page: The system shall allow authenticated users to be directed to survey page	2.1	User enters valid credentials into the Login Page and navigates to the Survey Page	Survey Page will display	PASS
3.1.33 Survey Page: The system shall provide check boxes	13.1	User access the survey page.	Checkboxes are displayed for user selection.	PASS
3.1.34 Survey Page: The system shall provide questions for user	13.1	User access the survey page.	Survey questions are presented to the user.	PASS

3.1.35 Survey Page: The system shall allow users to check off box	13.1	User clicks checkbox.	Checkboxes can be selected and deselected by the user.	PASS
3.1.36 Survey Page: The system shall detect if a box is not checked off	14.1	Proceed without clicking a required checkbox.	The system identifies and alerts the user to any required checkbox that has not been checked.	NOT IMPLEMENTED/FAIL
3.1.37 Survey Page: The system shall allow authenticated user to be directed to main page	2.1	User enters valid credentials on Login Page	Survey Page will display	PASS
3.1.38 Survey Page: The system shall provide a 'Continue' button	13.1	User comes to the end of the Survey Page	User can press the Continue button to access the Tools Page	PASS
3.1.39 Tools Page: The system shall provide a list of cybersecurity tools	15.1	User clicks Continue button on Survey Page	List of cybersecurity tools populates the Tools Page	NOT IMPLEMENTED/WIP
3.1.40 Tools Page: The system shall provide the name of the cybersecurity tools	15.1	User clicks Continue button on Survey Page	List of cybersecurity tools populates the Tools Page with the name	NOT IMPLEMENTED/WIP
3.1.41 Tools Page: The system shall provide the version of the cybersecurity tools	15.1	User clicks Continue button on Survey Page	List of cybersecurity tools populates the Tools Page with the version	NOT IMPLEMENTED/WIP
3.1.42 Tools Page: The system shall provide the status of the cybersecurity tools	15.1	User clicks Continue button on Survey Page	List of cybersecurity tools populates the Tools Page with the status	NOT IMPLEMENTED/WIP
3.1.43 Tools Page: The system shall provide the launch date of the cybersecurity tools	15.1	User clicks Continue button on Survey Page	List of cybersecurity tools populates the Tools Page with the launch date	NOT IMPLEMENTED/WIP
3.1.44 Tools Page: The system shall provide a search bar on top of the cybersecurity tools	15.1	User clicks Continue button on Survey Page	Search bar shall populate at the top of the Tools Page	NOT IMPLEMENTED

3.1.45 Tools Page: The system shall accept a string between 1 to 20 characters in search bar	16.1	User enters a valid string in the search bar	Tools Page shall display tools based on search string	NOT IMPLEMENTED
3.1.46 Tools Page: The system shall show numbers of cybersecurity tools shown on page.	17.1	User views the Tools Page	The total number of tools that match the user preferences is displayed on the Tools Page	PASS
3.1.47 Tools Page: The system shall have pagination for cybersecurity tool display	15.1	User views the Tools Page	Page numbers shall display in the Tools Page	PASS
3.1.48 Tools Page: The system shall provide left arrow button	15.1	User views the Tools Page	Left arrow shall display on Tools Page	PASS
3.1.49 Tools Page: The system shall provide right arrow button	15.1	User views the Tools Page	Right arrow shall display on Tools Page	PASS
3.1.50 Tools Page: The system shall move to next page when right arrow is pressed	18.1	User presses the right arrow	Tools Page shall display the tool page incremented by one	PASS
3.1.51 Tools Page: The system shall move to previous page when left arrow is pressed	18.1	User presses the left arrow	Tools Page shall display the tool page decremented by one	PASS
3.1.52 Tools Page: The system shall provide a filter drop down menu	15.1	User views the Tools Page	Tools Page shall display a filter drop down menu at the top	NOT IMPLEMENTED/WIP
3.1.53 Tools Page: The system shall provide a drop-down menu with different filter options	19.1	User selects the drop-down filter menu	Drop down menu shall display the different filter options once pressed	NOT IMPLEMENTED/WIP
3.1.54 Tools Page: The system shall filter cybersecurity tools based on filter user choice (see appendix	19.1	User selects filters from the drop-down menu	Tools Page shall display the filtered list of tools	NOT IMPLEMENTED/WIP

item ---- for filter choices)				
3.1.55 Tools Page: The system shall provide 'Download as PDF button	20.1	User applies filter to tools and views the filtered report	Tools Page displays a Download as PDF button	PASS
3.1.56 Tools Page: The system shall provide a link to retrieve old reports	21.1	User accesses the Tools Page	Tools Page displays a Retrieve Old Reports button at the bottom	PASS
3.1.57 Tools Page: The system shall allow user to be directed to reports page	21.1	User clicks the Retrieve Old Reports button	Document Page is displayed	PASS
3.1.58 Tools Page: The system shall allow user to download comparative report	21.1	User clicks the Retrieve Old Reports button	Document Page is displayed	PASS
3.1.59 Document Page: The system shall display all documents previously made	22.1	User accesses the Document Page	Document Page is displayed	PASS
3.1.60 Document Page: The system shall provide 'View Report' link	22.1	User accesses the Document Page	Document Page is displayed with View Report link for each stored report	PASS
3.1.61 Document Page: The system shall allow user to view report	23.1	User selects View Report link on Document Page	Stored report displays on screen	NOT IMPLEMENTED/WIP
3.1.62 Document Page: The system shall display checkboxes for filtering	23.1	User accesses dashboard	Checkboxes are displayed	PASS
3.1.63 Document Page: The system shall display a dropdown filter	23.1	User accesses dashboard	Dropdown menu is displayed	PASS
3.1.64 Document Page: The system shall process user checkbox inputs if clicked	23.1	User clicks on checkbox	System processes checkbox input	PASS

3.1.65 Document Page: The system shall process dropdown inputs if clicked	23.1	User clicks on dropdown menu	System processes dropdown menu input	PASS
3.1.66 Document Page: The system shall update a JSON object based on user checkbox interactions.	24.1	User clicks checkbox	System updates JSON object	PASS
3.1.67 Document Page: The system shall update a JSON object based on user dropdown menu interactions.	24.1	User clicks dropdown menu option	System updates JSON object	PASS
3.1.68 Forgot Password Page: The system shall provide an input field for the user's email associated with their account.	24.1	User accesses the Forgot Password Page	Forgot Password Page is displayed with all specified elements	PASS
3.1.69 Forgot Password Page: The system shall provide a "Send Code" button under the input field.	24.1	User accesses the Forgot Password Page	Forgot Password Page is displayed with all specified elements	PASS
3.1.70 Forgot Password Page: The system shall provide an alert if the user inputs an invalid email.	25.1	User inputs an invalid email and presses "Send Code" button	Alert displaying an error message appears on screen	PASS
3.1.71 Forgot Password Page: The system shall only redirect to the Reset Password Page if the user provides a valid email.	26.1	User inputs a valid email and presses "Send Code" button	User is redirected to the Reset Password Page	PASS
3.1.72 Account Information Page: The system shall display the current user's email in a text box once directed to the page.	27.1	User accesses the Account Information Page	Account Information page displays the current user's correct email address	PASS

Table 4.1. This table goes into detail about how to test each specific requirement from the System Requirements Specification document and includes what the expected result of the test should return.

4.3 Comparative Report Performance Testing

Requirement (From SRS)	Test Case Identifier	Input	Expected Behavior	Pass / Fail
4.1.3.1 The system shall develop a report in a PDF format.	1.1	The system provides JSON document of queried tool data	A pdf shall be stored in s3 with an entry with the key & location of the pdf file in DynamoDB	PASS
4.1.3.2 The system shall develop a report in an HTML format.	2.1	The system provides JSON document of queried tool data.	An html shall be stored in s3 with an entry with the key & location of the pdf file in DynamoDB	NOT IMPLEMENTED/ WIP
4.1.3.3 The system shall store the report in an S3 Bucket. The system shall create a presigned URL for the report that is valid for 7 days.	3.1	The system takes in a JSON document containing UUID of wanted report, and user credentials	A https link shall automatically be opened by browser (Tested this on Opera, Firefox, and Chrome browsers) on request	PASS
4.1.3.4 The system shall store the source URL of the report in DynamoDB. The system shall store the fonts needed for reports in an S3 Bucket.	4.1	Step function step takes in JSON document controlled by create report functionality	Key/Value pair of report location in s3 is stored on DynamoDB.	PASS
4.1.3.5 The system shall use AWS Lambda to run its code.	5.1	N/A	This is a system design choice; Cargo Lambda dictates most settings. (See test case #6.1)	PASS
4.1.3.6 The system shall use the Rust Bootstrap for Lambda Runtime.	6.1	Cargo Lambda takes cli input from the programmer's computer.	Lambda functions uploaded with rust bootstrap, viewable on the AWS dashboard.	PASS
4.1.3.7 The system shall create error logs via CloudWatch.	7.1	IAM roles are provisioned to each Lambda function.	CloudWatch logs can be viewed on dashboard via AWS dashboard lookup.	PASS
4.1.3.8 The system shall create user usage logs via CloudWatch.	8.1	IAM Roles was provisioned to enable automatic user logging, all inputs are via JSON objects.	User logs are stored in set S3 bucket.	PASS

4.1.3.9 The system shall notify the user if an error occurs during report creation error via AWS SNS email.	9.1	Lambda outputs a JSON document labeled with ERROR, inputted into SNS queue	An email of the user who requested the report will be told the report generation failed.	NOT IMPLEMENTED/WIP
4.1.3.10 The system shall notify website administrators of any report creation errors via AWS SNS email.	10.1	Cloudwatch JSON alerts into SNS.	An email to developer's set IAM email will be received.	NOT IMPLEMENTED/WIP
4.1.3.11 The report shall query from DynamoDB for tool data via Amazon API Gateway. The system shall deserialize JSON from DynamoDB Tool Database.	11.1	Lambda Request into AWS SDK, done via AWS DynamoDB Query Input	Lambda function will have a JSON object containing row(s) of tool data (see Database attributes in appendix)	PASS
4.1.3.12 The system shall derive JSON output from recommendation algorithm.	12.1	Lambda function will take user information, questionnaire data, (JSON document) from API Gateway	(Currently, not fully fleshed out yet) Output queried tools based on questionnaire input via prepared statements	PASS
4.1.3.13 The system shall use the programming language Rust for creation of the report.	13.1	System Configuration design choice via cargo lambda cli tool	Lambda functions deployed to AWS using bootstrapped Rust	PASS
4.1.3.14 The report shall display the tools selected as a table.	14.1	Lambda function input has JSON object containing tool data.	PDF containing data in table (STILL WORK IN PROGRESS)	PASS
4.1.3.15 The report table shall display the technology's name.	15.1	JSON Object within Lambda function (See test requirement #14.1)	In Row (See test requirement #14.1) cell, technology name will be present, in pdf.	PASS
4.1.3.16 The report shall contain the user's username.	16.1	JSON Object within Lambda function passed from previous step function (See test requirement #14.1)	On first row of the report pdf, user's username will be printed.	PASS
4.1.3.17 The report table shall contain tools already used by the user.	17.1	Within the questionnaire the user will select tools used, passed as JSON to Lambda.	DynamoDB row containing Json document of user contained tools within "Report	PASS

			Database”	
4.1.3.18 The report table shall contain links to each technology’s homepage.	18.1	Links attached as pdf/html links within lambda function	Hyperlink of tool link will be placed on url near the name of the tool.	PASS
4.1.3.19 The report table shall contain what type of technology each row contains.	19.1	JSON Object within Lambda function (See test requirement #14.1)	In a cell within the table of the report, there shall be a print of text on the pdf.	NOT IMPLEMENTED/WIP

Table 4.2. Test case testing for requirements for the Comparative Report functionality.

5. Traceability Matrix & Defect Tracking

5.1 Traceability Matrix – Website

Req.	Req. Depend	Test Case	Test Case Depend.	Tester	Result	Comment
3.1.1	3.1.9	1.1	2.1	OM	PASS	
3.1.3	3.1.9	1.1	2.1	OM	PASS	
3.1.4	3.1.9	1.1	2.1	OM	PASS	
3.1.5	3.1.9	1.1	2.1	OM	FAIL	NOT ADDED
3.1.6	3.1.9	1.1	2.1	OM	PASS	
3.1.7	3.1.9	1.1	2.1	OM	PASS	
3.1.8	3.1.6	1.1	2.1	OM	FAIL	NOT ADDED
3.1.9	3.1.6	2.1	2.1	OM	PASS	
3.1.10	3.1.8	3.1	1.1	OM	FAIL	NOT ADDED
3.1.11	3.1.9	2.1	1.1	OM	PASS	
3.1.12	2.3.6	4.1	1.1	OM	PASS	
3.1.13	3.1.1/3.1.2	5.1	1.1	OM	PASS	
3.1.14	3.1.1	6.1	1.1	OM	PASS	
3.1.15	3.1.2	7.1	1.1	OM	PASS	
3.1.16	3.1.8	8.1	1.1	OM	PASS	

3.1.17	3.1.16	8.1	1.1	OM	PASS	
3.1.18	3.1.16	8.1	1.1	OM	PASS	
3.1.19	3.1.16	8.1	1.1	OM	PASS	
3.1.20	3.1.16	8.1	1.1	OM	PASS	
3.1.21	3.1.17	9.1	8.1	OM	PASS	
3.1.22	3.1.18	9.1	8.1	OM	PASS	
3.1.23	3.1.20	9.1	8.1	OM	PASS	
3.1.24	3.1.18/ 3.1.19	9.1	8.1	OM	PASS	
3.1.25	3.1.16	8.1	1.1	OM	PASS	
3.1.26	3.1.16	8.1	1.1	OM	FAIL	NOT ADDED
3.1.27	3.1.17/ 3.1.18/ 3.1.19/ 3.1.20	10.1	8.1	OM	PASS	
3.1.28	3.1.16	11.1	8.1	OM	FAIL	NOT ADDED
3.1.29	3.1.23	12.1	9.1	OM	PASS	
3.1.30	3.1.22	2.1	1.1	OM	PASS	
3.1.31	3.1.14/ 3.1.15	2.1	1.1	OM	PASS	
3.1.32	3.1.14/ 3.1.15	2.1	1.1	OM	PASS	
3.1.33	3.1.32	13.1	2.1	OM	PASS	
3.1.34	3.1.32	13.1	2.1	OM	PASS	
3.1.35	3.1.33	13.1	2.1	OM	PASS	
3.1.36	3.1.33	14.1	2.1	OM	FAIL	NOT ADDED
3.1.37	3.1.31	2.1	1.1	SG	PASS	
3.1.38	3.1.37	13.1	2.1	SG	PASS	
3.1.39	3.1.38	15.1	13.1	SG	PASS	
3.1.40	3.1.39	15.1	13.1	SG	PASS	

3.1.41	3.1.39	15.1	13.1	SG	PASS	
3.1.42	3.1.39	15.1	13.1	SG	PASS	
3.1.43	3.1.39	15.1	13.1	SG	PASS	
3.1.44	3.1.39	15.1	13.1	SG	FAIL	NOT ADDED
3.1.45	3.1.44	16.1	15.1	SG	FAIL	NOT ADDED
3.1.46	3.1.39	17.1	15.1	SG	PASS	
3.1.47	3.1.46	15.1	13.1	SG	PASS	
3.1.48	3.1.47	15.1	13.1	SG	PASS	
3.1.49	3.1.47	15.1	13.1	SG	PASS	
3.1.50	3.1.49	18.1	15.1	SG	PASS	
3.1.51	3.1.48	18.1	15.1	SG	PASS	
3.1.52	3.1.39	18.1	15.1	SG	FAIL	NOT ADDED
3.1.53	3.1.52	15.1	13.1	SG	FAIL	NOT ADDED
3.1.54	3.1.53	19.1	15.1	SG	FAIL	NOT ADDED
3.1.55	3.1.39	20.1	19.1	SG	PASS	
3.1.56	3.1.55	21.1	20.1	SG	PASS	
3.1.57	3.1.56	21.1	20.1	SG	PASS	
3.1.58	3.1.55	21.1	20.1	SG	FAIL	NOT ADDED
3.1.59	3.1.57	22.1	20.1	SG	PASS	
3.1.60	3.1.59	22.1	20.1	SG	PASS	
3.1.61	3.1.60	23.1	22.1	SG	FAIL	NOT ADDED
3.1.62	3.1.5	24.1	1.1	OM	PASS	
3.1.63	3.1.5	24.1	1.1	OM	PASS	
3.1.64	3.1.63	25.1	24.1	OM	PASS	
3.1.65	3.1.63	26.1	24.1	OM	PASS	
3.1.66	3.1.31	27.1	2.1	OM	PASS	

5.2 Traceability Matrix – Comparison Report

Req.	Req. Depend	Test Case	Test Case Depend.	Responsible	Result	Comment
4.1.3.1,4.1.3.2	4.1.3.5	1.1,2.1	5.1	JW	PASS	
4.1.3.4	4.1.3.3	4.1	3.1	JW	PASS	
4.1.3.5		5.1		JW	PASS	
4.1.3.6	4.13.13, 4.3.1.5 (Circular dependency)	6.1	13.1	JW	PASS	
4.1.3.10	4.1.3.7,4.1.3.8,4.1.3.9	10.1	7.1,8.1,9.1	JW	PASS	
4.1.3.14	4.1.3.11	14.1	11.1	JW	PASS	
4.1.3.15	4.1.3.14	15.1	14.1	JW	PASS	
4.1.3.16	4.1.3.14	16.1	14.1	JW	PASS	
4.1.3.17	4.1.3.14	17.1	14.1	JW	PASS	
4.1.3.18	4.1.3.14	18.1	14.1	JW	PASS	
4.1.3.19	4.1.3.14	19.1	14.1	JW	PASS	

5.3 Traceability Matrix – Cognito

Req.	Req. Depend	Test Case	Test Case Depend.	Responsible	Result	Comment
4.4.3.1		1.1		NR	TBD	
4.4.3.2	4.4.3.1	2.1		NR	PASS	
4.4.3.4	4.4.3.2	3.1		NR	TBD	

4.4.3.5	4.4.3.2	4.1		NR	TBD	
4.4.3.6	4.4.3.2	5.1		NR	TBD	
4.4.3.7	4.4.3.2	6.1		NR	PASS	
4.4.3.7	4.4.3.3	7.1		NR	TBD	
4.4.3.9	4.4.3.3,4.4.3.8	8.1		NR	TBD	
4.4.3.10	4.4.3.2	9.1		NR	TBD	
4.4.3.11	4.4.3.2,4.4.3.5	10.1		NR	TBD	
4.4.3.12	4.4.3.2	11.1		NR	TBD	
4.4.3.13		12.1		NR	TBD	
4.4.3.14	4.4.3.3,4.4.3.8	13.1		NR	TBD	

5.4 Traceability Matrix – DynamoDB

Req.	Req. Depend	Test Case	Test Case Depend.	Responsible	Result	Comment
4.5.3.1		1.1		JA	PASS	
4.5.3.2		2.1		JA	PASS	
4.5.3.3	4.5.3.1 4.5.3.2	3.1		JA	FAIL	
4.5.3.4		4.1		JA	TBD	
4.5.3.5	4.5.3.1 4.5.3.2	5.1		JA	FAIL	
4.5.3.6		6.1		JA	TBD	Have not attempted yet

5.5 Traceability Matrix - API

Req.	Req. Depend	Test Case	Test Case Depend.	Responsible	Result	Comment
4.5.3.1				MM	TBD	
4.5.3.2				MM	TBD	
4.5.3.3				MM	TBD	
4.5.3.4				MM	TBD	
4.5.3.5				MM	TBD	
4.5.3.6				MM	TBD	
4.5.3.7				MM	TBD	
4.5.3.8				MM	TBD	
4.5.3.9				MM	TBD	
4.5.3.10				MM	TBD	
4.5.3.11				MM	TBD	
4.5.3.12				MM	TBD	
4.5.3.13				MM	TBD	
4.5.3.14				MM	TBD	
4.5.3.15				MM	TBD	
4.5.3.16				MM	TBD	
4.5.3.17				MM	TBD	
4.5.3.18				MM	TBD	

5.6 Defect Severity Definitions

Critical	The defect causes a catastrophic or severe error that results in major problems and the functionality rendered is unavailable to the user. A manual procedure cannot be either implemented or a high effort is required to remedy the defect. Examples of a critical defect are as follows: • System abends • Data cannot flow through a business function/lifecycle • Data is corrupted or cannot post to the database
Medium	The defect does not seriously impair system function and can be categorized as a medium Defect. A manual procedure requiring medium effort can be implemented to remedy the defect. Examples of a medium defect are as follows: • Form navigation is incorrect • Field labels are not consistent with global terminology • Wrong Technology labels
Low	The defect is cosmetic or has little to no impact on system functionality. A manual procedure requiring low effort can be implemented to remedy the defect. Examples of a low defect are as follows: • Repositioning of fields on screens • Text font on reports is incorrect

6. Environment

6.1 Environment

- The System Testing Environment will be used for System Testing.

To conduct the testing, the tester needs to have the following installed onto their computer:

- Version 118.0.2 (64-bit) Firefox Web Browser
- Version 118.0.5993.72 (Official Build) (64-bit) Google Chrome Web Browser
- Version 7.0.0 of npm
- Version 21.0.0 of nodejs
- Version 2.10.0 of aws-cli
- Administrative access via Access Keys to AWS.

7. Assumptions

This section lists assumptions that are made specific to this project.
For links of these technologies, check the GitHub repository documentation.

- The user must use Version 118.0.5993.72 (Official Build) (64-bit) Google Chrome Web Browser.
- The user may use Version 118.0.2 (64-bit) Firefox Web Browser.
- The user must have at least version 7.0.0 of npm.
- The user must have at least version 21.0.0 of nodejs.
- The user must have at least version 2.10.0 of aws-cli.
- The user must have internet access.
- The user must be on a computer running Windows 10.
- The user must have Administrative Access to AWS Dashboard

8. Risks and Contingencies

Risk #	Risk	Impact	Contingency Plan
1	Recommendations not accurate	High	Continuous tweaking of recommendation algorithm, use artificial intelligence for decision making.

2	Incompatible versions of software	High	Testing deployment can run smoothly with various IDEs including but not limited to VSCode, VIM, NEOVIM. Check AWS for versions of software, including nodejs, npm & aws-cli.

9. Appendix

9.1 Partition Keys

- Log Analysis
- Industrial Control Systems
- Operational Technology
- Identity and Access Management
- Indicators of Compromise

9.2 Global Secondary Indexes

- Name
- Company Name
- Company Website
- Company Phone Number
- Device
- Launch Year
- Active
- Requirements
- Features
- Drawbacks
- Accuracy
- Pricing
- Compliance