Front end:
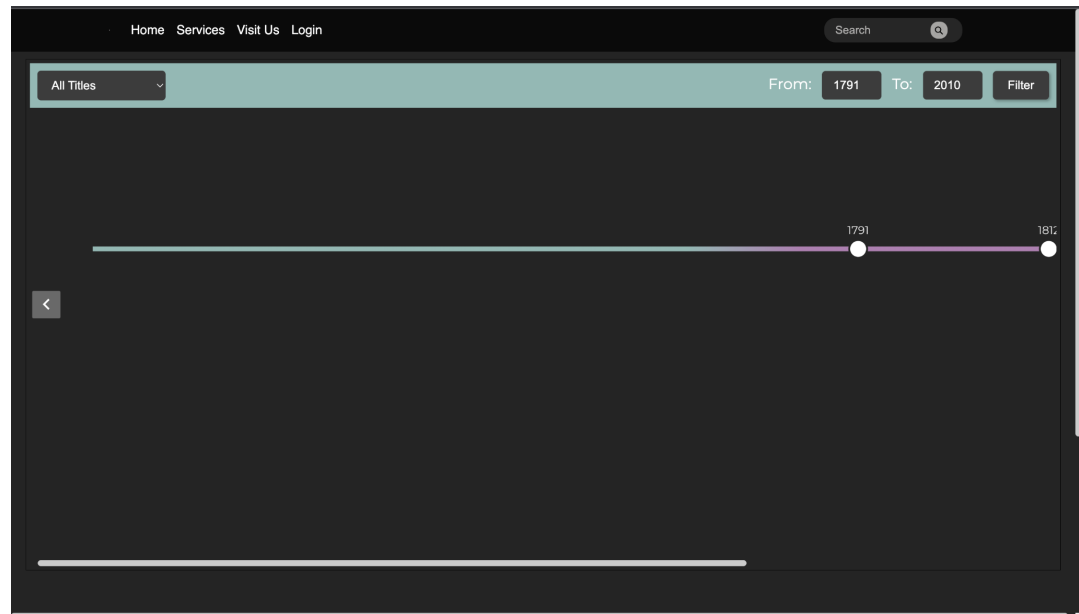- Home page
- Log in page
- Register page
- Buttons
- Window sizing
- Mobile support

Backend:
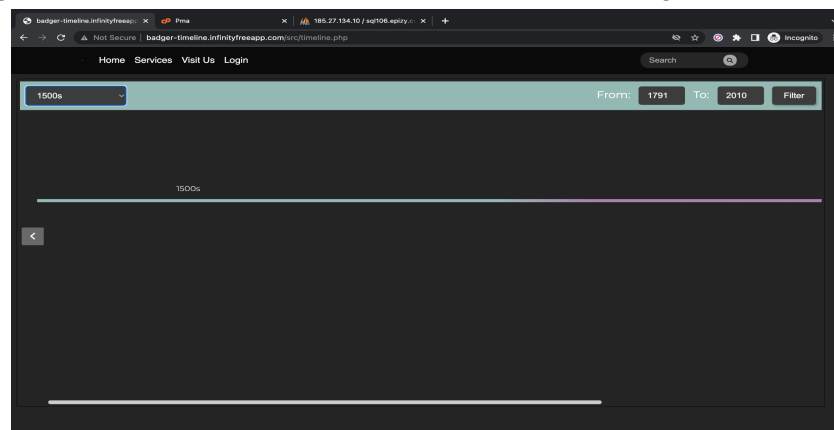- Scrolling
- Information display
- Mobile support

*******Bugs that are found by the development team*******
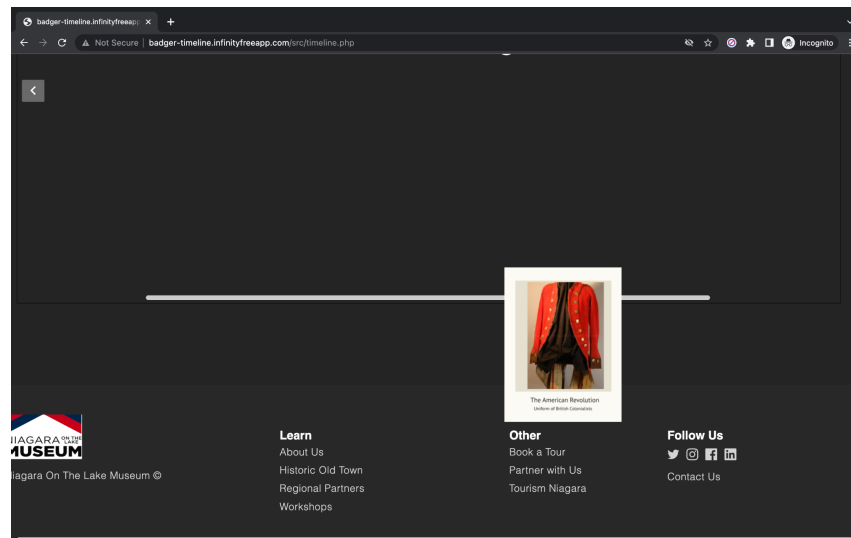- Overshot timeline points
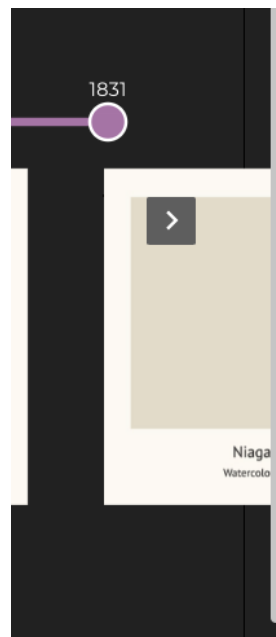 -
- Missing clickable point on the 1500 time period when using filter
  -

- American revolution photocard at the bottom of the webpage

  -
- 1812 time point extends past webpage

    -

The testing process
1. Test plans
2. Test scenarios
3. Test cases
4. Test data
5. Test results
6. Test report

(Black box testing - functionality and requirements testing)
Test plans

Front end:
- Homepage
  - Buttons as clickable(doesn't necessarily need to lead anywhere)
  - Header links as clickable
  - Footer links as clickable
  - Logo as clickable
  - Photos as clickable
  - Content displayed consistently as window is resized
  - Navigation is visibly understandable
  - Page modified for mobile support(if necessary)
- Login page
  - Text fields is editable by user
  - Login field
  - Password field
  - Remember me button
  - Button that leads to register page
  - Login button
  - Content displayed consistently as window is resized
  - Response on entering invalid username or password
  - Page modified for mobile support(if necessary)
  - reCaptcha pops up(if necessary)

- Register page
  - Is easily distinguishable from the login page
  - Text fields is editable by user
  - Name field (first + last)
  - Email field ()
  - Password field
  - Age field (if necessary)
  - Terms & conditions button
  - Button that leads to login page
  - Sign up button
  - Content displayed consistently as window is resized
  - Page modified for mobile support(if necessary)

- Timeline page
  - Timeline points are clickable
  - Photo cards are clickable
  - Points on the timeline display correct information
  - Horizontal scrolling support
  - Vertical scrolling support
  - Search bar is visible and accessible
  - Button to change between vertical and horizontal scrolling
  - Button to advance page(if necessary)

- ○ Sub-timeline is accessible
- ○ Sub-timeline points lie in between main timeline points
- ○ Visuals is consistent across timeline and subtimelines
- ○ Content displayed consistently as window is resized
- ○ Pages modified for mobile support(if necessary)
- ○ Space between points is non-clickable
- ○ Navigate with mouse and keyboard
- ○ Text-to-speech button is visible and clickable

Backend:
- ● Homepage
  - ○ Links direct to correct page
  - ○ Clickable features display correct information
  - ○ Buttons result in correct action
  - ○ Logo leads to the homepage.
  - ○ Flow for navigation must be implemented

- ● Login
  - ○ Check -> if users username/password is stored in database (correctly)
  - ○ Check -> No 2 users can have the same username.
  - ○ 2 or more users can have same password
  - ○ Check -> Username/password is removed from the database (correctly) when user deletes their account
  - ○ Making sure accounts are accessed properly -> references the correct user
  - ○ Response on entering invalid username or password
  - ○ If were doing Uppercase + # (requirement) for a password, have a check for it.
  - ○ Two-factor authentication(if necessary)
  - ○ recaptcha(if necessary)

- ● Register Page
  - Links direct to correct page
  - ○ Clickable features display correct information
  - ○ Check -> if users username/password is stored in database (correctly)
  - ○ Check -> No 2 users can have the same username.
  - ○ Making sure accounts are stored properly in the database
  - ○ If were doing Uppercase + # (requirement) for a password, have a check for it.

- ● Timeline
  - Dots work as intended
  - Search bar gathers information from database
  - Sub timeline and main timeline cause no interference with each other
  - Line in between dots works as intended

Horizontal Scroll feature does not break during any instances
Vertical Scroll feature does not break during any instances
Correct information is compiled/displayed
Feature work as intended on mobile devices
Space between timeline points lead no where.
Support and semantics is
Text-to-speech button works as intended

Test Scenarios
- check homepage buttons
- Verify login feature
    - Login page and database linked (information access)
    - Check remember me feature
    - Check that login matches the credentials in the database
    - Check reCaptcha feature (if necessary)
    - Check two-factor authentication (if necessary)
- Verify register feature
    - Register page and database linked (information access and storage)
    - Check registered user is stored correctly in database
    - Check reCaptcha feature (if necessary)
    - Verify two factor authentication (if necessary)
- Verify header links
    - Check that each link lead to their respective places
- Verify footer links
    - Check that each link lead to their respective places
- Check search bars
    - Search bar displays relevant information and suggestions
- Check photo feature
    - Photos can be expanded for bigger view once clicked upon
- Check support for multiple window resolutions.
- Verify timeline functionality
    - Check subtimeline accessibility
    - Check that main timeline points break into clickable dots
    - Check photocards are accessible
    - Check information is accessible and can be easily displayed
    - Check horizontal scrolling feature
    - Check vertical scrolling feature
    - Check that scrolling can be toggled between horizontal and vertical scrolling.
    - Check the search bar feature on the timeline page.
    - Check mouse and keyboard navigation
    - Check entire main timeline functionality once merged with main timeline
    - Check text-to-speech feature
- Verify subtimeline functionality

- ○ Check main timeline accessibility
- ○ Check photocards are accessible
- ○ Check information is accessible and can be easily displayed
- ○ Check horizontal scrolling feature
- ○ Check vertical scrolling feature
- ○ Check that scrolling can be toggled between horizontal and vertical scrolling.
- ○ Check the search bar feature on the sub-timeline page.
- ○ Check mouse and keyboard navigation
- ○ Check entire sub-timeline functionality once merged with main timeline
- ○ Check text-to-speech feature
- ○ Check sub-timeline image slider
- ● Check that visuals are consistent across all pages.

Test cases

ID	Scenario	Test Steps	Test Data	Expected Results	Actual Results	Pass /Fail
test_case1	Login user with correct data	Go to login site Enter Username Enter Password Click Login		User should log into the site	As expected	Pass
test_case2	Login user with incorrect data	Go to login site Enter Username Enter Password Click Login		User should not log into the site	As expected	Pass
test_case3	Register with correct data	Go to register site Enter name		User is successfully registered and is redirected	As expected	Pass

		Enter email		back to the homepage.		
		Enter password				
		Verify age				
		Accept terms and conditions				
test_case4	Register with incorrect data	Go to register site		User is unable to successfully register and errors are visually displayed and prompting them to look where it went wrong.	As expected	Pass
		Enter name				
		Enter already used email				
		Enter password				
		Verify incorrect age				
		Do not accept terms and conditions				
test_case5	Check homepage buttons	Go to homepage		User is successfully redirected to desired site/feature	As expected	Pass
		Click on all clickable buttons				
test_case6	Check footer links	Go to homepage		User is successfully redirected to desired site/feature	As expected	Pass
		Click on all clickable links				
test_case7	Check photo feature	Go to homepage		A larger image is displayed as a hover and/or user gets redirected somewhere	As expected	Pass
		Click on any photo from carousal/slideshow				
test_case8	Check search functionality	Go to Search feature		All intended and relevant data comes up	As expected	Pass
		And test all possibilities				
test_case9	Check multiple window	Go to homepage		Content should be proportioned	As expected	Pass
		Go to Log in page				

	resolution support for homepage/login page/register page	Go to register page Manually resize window		appropriately.		
test_case10	Check mobile support for homepage/ login page/ register page	Go to homepage on mobile device Go to log in page on mobile device Go to register page on mobile device		Modified versions of each page should be displayed on mobile device	As expected	Pass
test_case11	Check multiple window resolution support for timeline	Go to timeline page Manually resize window		Features should be proportioned for cellular device and still work	As expected	Pass
test_case12	Check horizontal/vertical resolution support for timeline	Go to timeline page Manually resize window		Features should be proportioned for cellular device and still work	As expected	Pass
test_case13	Check remember me feature for login	Go to login page Enter username Enter password Click on the remember me checkbox Click login button Close window Go to homepage		User should be automatically logged in as the website "remembers" them.	As expected	Pass
test_case14	Check text to speech	Enter text Click Enter		User should hear words entered in the text box	As expected	Pass

| test_case15 | Check timeline hover feature | Go to timeline

Hover over photocard with mouse | | User should visually see the photocard change and display information | As expected | Pass |
|---|---|---|---|---|---|---|
| test_case16 | Check toggle for horizontal and vertical scrolling | Go to timeline

Click on toggle button | | Content should be displayed horizontally or vertically depending on setting | As expected | Pass |
| test_case17 | Check horizontal scrolling | Go to timeline

Scroll using mouse | | Page should scroll in a horizontal direction | As expected | Pass |
| test_case18 | Check vertical scrolling | Go to timeline

Scroll using mouse | | Scroll should be working as intended pc/mobile from top to bottom | As expected | Pass |
| test_case19 | Mouse and keyboard functionality | Go to horizontal/vertical scroll

Click

Use arrow keys to the move direction | | Scroller should work as if you were using the mouse. | As Expected | Pass |
| test_case20 | Check main timeline points can break into clickable points | Go to timeline

Select on of the points | | Points should break into smaller clickable dots spanning from one era to another | As expected | Pass |
| test_case21 | Check sub-timeline image slider | Go to timeline

Go to sub-timeline

Use image slider | | Slider should shuffle through images corresponding to an event. | As expected | Pass |

Test data
- ***TBD(next sprint)***

Test results
- ***TBD(need test data)***

Test report
- ***TBD(need test data and results)***

(White box testing - system design and non-functional testing)
Test plans
Front end:
- Code coverage
  - Function
  - Statement
  - Branch
  - condition
  - Basic block

Back end:
- Code coverage
  - Function
  - Statement
  - Branch
  - condition

Test scenarios

Test results
- **TBD**

Test report
- **TBD**

Nonfunctional requirements we should probably implement and test for
- Product requirements
  - Efficiency requirements
    - Performance requirements
  - Usability requirements
  - Security requirements
    - Specifically for the login feature
- Organizational requirements
  - Developmental requirements
  - Environmental requirements
- External requirements

    ○ Regulatory requirements
    ○ Ethical requirements
    ○ Legislative requirements
      ■ safety/security requirements

Some APIs/frameworks we can use to help in the testing process
- Open telemetry - statistical debugging
- Monkeybox - mobile debugging
- Libfuzzer -statement testing
- JUnit - automated testing
- JMH (java microbenchmarking harness) - benchmark/harness testing

Extra:
Test Examples:
   1. The div box registration is limited from top of screen to the bottom of the screen of the 'characters'. No mouse or keyboard registration
 underneath the words.
   -> This negatively impacts horizontal scrolling

   2. The sub-timeline breaking main timeline clickable dots.
 Dots become unclickable when the sub-timeline is parallel with the main timeline points.
   -> (check into this for fixes)

   3. Timeline functionality testing when merged with the website to make sure all functionalities still work (UNIT TESTING)
   -> Done once the timeline is incorporated onto the main website
   - Unit Test - done during development to test each application of program works as intended
   - NUnit and xUnit?

   4. Seeing how a website handles being used on a cellular device. Is it mobile friendly?
   -> no bugs when scaled to phone
   -> all features still work as intended

Test
- focusing on 1 specific module to be tested thoroughly for positive and negative scenarios such as:
   Example: Our websites 'Subscriber' feature. no bug where you go below 0 subs as people unsub/sub expires. sub count stored correctly. etc...

- (star) Security Testing - threat check from external threats

- Usability Testing - make sure there is flow throughout the website for the user. Navigation should be simple and user-friendly for
      first time users.
      -> Does the user clearly understand the website from a first glance (initial page)?