Test Strategy

Test focuses on the overall functions of the software system on Oppenheimer Project. Manual Testing shall be conducted first to find all possible bugs in early stage, automation test shall be conducted on more stable system integrated software to make testing fast and reliable. Automation testing will be used on selective test cases by writing test scripts or using any automation testing tool. The scope of test coverage during test execution comprises the following 3 features according to requirement:

* Enable Clerks to populate a list of working class heroes to the system
* Enable Bookkeepers to retrieve the payable taxation relief for each working class
* Enable Governor to dispense the money to each working class hero at her discretion

Regression Test will be also performed during Integration Test and System Test. There are two types of Regression Test as below:

* Regressions for defects – After defect verification, execute the test cases related to the defect in the new build or modules affected by the fix. This is important to assess perceived quality risks.
* Regression for overall functions – In every development stage, Regression test is to execute previously-completed test case efficiently by selecting the appropriate minimum of test , to seek uncover new software bug in existing functional and non-functional areas of a system after changes, such as enhancements, patches or configuration changes in order to ensure product quality.

Both white box and black box test will be used to test the system Client, Server, Database and modules between each other. Following test types will be covered during test execution:

* Functional Test
* Database Test
* Capacity/Performance Test
* Supportability/ Compatibility Test
* Security and accessibility Test
* Exploratory Test

Test cases listed below are based on existing requirement and will be improved during testing. New test cases shall be added during exploratory testing.

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| **User Story** | **Testing type** | **Test Case** | **Automation** | **Tool** |
| 1 | Functional Testing | Check the page is displayed with all required input fields properly: 1.After accessing to the page, natid, Name Gender, Birthday, Salary and Tax paid fields shall be displayed properly. 2. Submit or Save buttons shall be available. | Yes | Selenium |
| Insert a valid record and save it. Note: verify the result by querying data from database | Yes | Selenium |
| Check each field limitation: 1.field length 2.allowed characters 3.copy/paste operation allowed or not 4.Case sensitive or not | No |  |
| Insert a invalid record and save it to check if error will be prompted: 1. Some empty fields 2. Exceed field length 3. Invalid character | Yes but partially | Selenium |
| Check if record can be inserted successfully after correcting invalid data |  |  |
| Insert a valid record with minimum and maximum input and save it to check if no crash happened. Note: verify the result by querying data from database | Yes | Selenium |
| Insert a duplicate record and save it to see if error will be prompted | Yes | Selenium |
| 2 | Functional Testing | Check if there is a list for inserting multiple records with all required fields | Yes | Selenium |
| Check if a single record can be inserted successfully without error | Yes | Selenium |
| Check if multiple records can be inserted successfully without error | Yes | Selenium |
| Check if invalid record can be inserted: 1. error shall be shown and invalid record is highlighted 2. other valid records can be saved or not | Yes but partially | Selenium |
| Check if records can be inserted successfully after correcting invalid data | No |  |
| Check if user can add or delete record | Yes | Selenium |
| Check UI display when adding multiple records in different length | No |  |
| 3 | Functional Testing | Upload a valid csv file with valid data: verify correctness by querying data from database to compare | Yes | Selenium |
| Upload a valid csv file with invalid data to see if error will be prompted: 1.No first row with natid, name, gender, salary, birthday, tax 2.missing fields in first row 3.Copy/paste operation is allowed for the data? 4.picture or other non-characters 5.invalid character 6.Case sensitive or not 7.Empty file | Yes but partially | Selenium |
| Upload non-csv file with valid data to see if error will be prompted. Note: check database if data is saved already | No |  |
| Upload duplicate csv file or with duplicate data to see if error will be prompted Note: check database if data is saved already | No |  |
| Check upload dialog window design | No |  |
| Check allowed maximum size of the file Note: query total records in database to see if maximum records are saved successfully | No |  |
| Check each button on the page can work without issue: 1. single/multiple click 2. slow/fast click 3. tooltip rendering properly 4. drag | No |  |
| 4 | Functional Testing | Check the page is displayed with all required fields properly: 1.a list consist of natid, tax relief amount, name 2.Page/table navigation shall be available to see next list of datas. | Yes | Selenium |
| Check if natid field is masked from the 5th character onwards with dollar sign '$': 1.natid length < 5 2.natid length = 5 3.natid length > 5 | Yes | Selenium |
| Check if tax relief table is working without issue | Yes | Selenium |
| Check if tax relief table is refreshed and displayed successfully when new record is inserted by Clerk | Yes | Selenium |
| Check if tax relief table is refreshed and displayed successfully when new record is deleted from database | Yes | Selenium |
| Check each button on the page can work without issue: 1. single/multiple click 2. slow/fast click 3. tooltip rendering properly 4. drag | No |  |
| Verify tax relief amount correctness: 1.Use python to query data from database and calculate to see if it's correct 2.Select some boundary value and middle value | No |  |
| 5 | Functional Testing | Check "Dispense Now" button design: 1.must be red-color 2.Size 3.Name 4.Tooltip 5.Enabled | Yes but partially | Selenium |
| what will be shown after clicking "Dispense Now" button successfully: 1.new page with text will says "Cash dispensed" 2.Tax relief shall be dispensed immediately, database shall reflect this data correctly in some table | Yes | Selenium |
| Check data integrity after "Dispense Now" by comparing the value between TaxRelief in US4 and dispensed money in US5 | No |  |
| Dispense to one working class hero | Yes | Selenium |
| Dispense to multiple working class heroes | Yes | Selenium |
| what will be shown after dispensing again on same records: 1. Error will be shown 2. Money won't be dispensed | No |  |
| Dispense now after inserting a new record | Yes | Selenium |
| what will be shown if fail to dispense: 1. Appropriate error will be shown 2. no crash happen |  |  |
| Check what's maximum records can be dispensed at one time | No |  |
| Check new page design: 1.display:color, size, font 2.new tab? 3.go back? 4.Refresh page? | No |  |
| Check each button on the page can work without issue: 1. single/multiple click 2. slow/fast click 3. tooltip rendering properly 4. drag | No |  |
| All | Compatibility Testing | Check all above functions can work on different devices like PC, mobile, tablet etc. | No | Selenium |
| Check all above functions can work on different operating system: ios, Android, windows etc. | No |
| Check all above functions can work on different browsers: Chrome, IE, Edge, Safari etc. | No |
| Performance Testing | Check browser, page, server response time in typical hour and peak hour when inserting/uploading single records | No | User experience, Stopwatch,Jmeter |
| Check browser, page, server response time in typical hour and peak hour when inserting/uploading multiple records | No |
| Check browser, page, server response time in typical hour and peak hour when inserting/uploading maximum limited records | No |
| Check Memory and CPU consumption | No |
| Check system response time after dispensing on maximum records | No |
| Does system work when many concurrent clerks are accessing and operating on the page | No | LoadRunner(Simulate multiple users), User experience |
| Security Testing | Check if access privileges are implemented correctly: 1,Only clerk/bookkeeper/governor is able to see respective page 2,Clerk/bookkeeper/governor is not able to see other page with different permission | No |  |
| Check if page is still alive when refreshing | No |  |
| Check if page crash reveals any application or server information. | No |  |