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| **Test Number** | **Description** | **Test Data** | **Expected Result** | **Actual Result** | **Screen Shot** | **Pass/Fail** |
| 1 | Testing the main menu and functionality. | Option 1 will be used when the menu prompts the user to input a selection. | Main menu should appear upon launching program and allow users input. | Main menu appears on start-up and user input is allowed and processed. |  | Pass |
| 2 | The main menu should not accept any number not between 1 and 6. | Test number:  7 | Program should not accept a value not between 1 and 6 and instead display “Please enter a valid selection”, followed by prompting the user for another input. | Program counters an invalid number selection and outputs an error message followed by the main menu loading again. |  | Pass |
| 3 | The main menu should only allow for a numeric entry to be added. | Test value:  Test | Program should catch the exception and output “Please enter a valid selection” before reloading the main menu. | Program counters an invalid entry with the appropriate error message instead of crashing. Main menu is loaded again. |  | Pass |
| 4 | The “Create a loan” option should not allow an invalid user ID. | Test user ID will be: 12345 | Program should output “No user found with that ID” and not create a loan, followed by the returning to the main menu. | Program outputs an error message and stops the create a loan process before returning to the main menu. |  | Pass |
| 5 | The “Create a loan” option should not accept an invalid item barcode. | Test barcode will be: 12345 | Program should output “No item found with that Id” and return the main menu. | Program accepts entry of a valid user ID and proceeds to item ID before being stopped and an appropriate error message output and the user sent to the main menu. |  | Pass |
| 6 | The “Create a loan” option should create a new loan object if both the item barcode and user ID are valid. This should allow loan of a multimedia item. | Test User ID: B00447489  Test item barcode:  382471060 | Program should successfully create a new loan object and automatically assign todays date as the issue date and a due date of one week as it is a multimedia item. | Program accepts the User ID and the item ID before creating a new loan with a date of one week in the future for due date and todays date as the issue date as well as 0 for renews. |  | Pass |
| 7 | The “Create a loan” option should create a new loan object if both barcode and user ID are valid. This should allow loan of a book. | Test User ID:  B00986808  Test item barcode:  813844363 | Program should successfully create a new loan object and automatically assign todays date as the issue date and a due date of four weeks as it is a book item. | Program accepts the User ID and the item ID before creating a new loan with a date of four weeks in the future for due date and todays date as the issue date as well as 0 for renews. |  | Pass |
| 8 | The “Renew an existing loan” option should not accept an invalid loan barcode. | Test barcode will be:  12345 | Program should output “No match found” and return the main menu. | Program outputs appropriate error message and returns user to main menu. |  | Pass |
| 9 | The “Renew an existing loan” should update “Due\_Date” and “numRenews” if the loan barcode is valid. | Test barcode will be:  240453126 | Program should display “Match Found”, with a summary of the loan. Then display “Renewing” and the new due date.  The “View all loans” option should also display the number of renews each loan now has. | Program prints out match found followed by the loans details and then renews the due date for additional two weeks. The renews figure was updated to 1. |  | Pass |
| 10 | The “Renew an existing loan” option should not accept a renew if it has been renewed 3 times. | Test barcode will be:  340096334  (Renewed 3 times already) | Program should display a summary of the loan, and then print “Too many renews! Books can have no more than 3 renews. Please return by due date: 2022-05-31", and then return to the menu. | Program stops the renewal of the loan and outputs the appropriate error message followed by returning the user to the main menu. | Inserting image... | Pass |
| 11 | The “Process a return” option should not accept an invalid item barcode. | Test barcode:  12345 | Program should output “No barcode found”, no loan should be removed from the loan list and the user should be returned to the main menu. | The program stops the return process and outputs the appropriate error message before returning the main menu. |  | Pass |
| 12 | The “Process a return” option should remove an overdue loan but notify the librarian that it was returned past its due date. | Test barcode:  240453126 | Program should output “Match Found.  Loan was returned past due date. Consult overdue policy!” and remove the loan from the loans list. | Program returns the loan and outputs the correct message before returning the used back to the main menu. |  | Pass |
| 13 | The “Process a return” option should remove a loan that is before or equal to its due date. | Test barcode:  340096334 | Program should output “Match found  Loan returned.”, remove the loan object from the list of loans and the program and return the user to the main menu. | The program returns the loan and outputs the correct message before returning the user to the main menu. |  | Pass |
| 14 | The “View all items” option should display all the items present in the ITEMS(1).csv file. | None | Program should display each item organised into columns under the appropriate headings, then return the main menu. | The program displays all items organised into columns and returns the user to the main menu. |  | Pass |
| 15 | The “View all loans” option should display all the loans present in the LOANS(1).csv file. | None | Program should display each loan organised into columns under the appropriate headings and return the user to the main menu. | The program displays all the loans organised by columns and returns the user to the main menu. |  | Pass |
| 16 | The “Exit” option should close the program and save any changes to the loans into the LOANS.csv file. | Test item barcode:  530038220  Test USER ID:  B00359213 | Program should output “Saving to file...  Thank you for using this library application!” and should then stop operation. The loans objects should then be saved and overwrite the contents of the LOANS(1).csv file. | The program saves the updated list of loans back into the .csv file and terminates the program. |  | Pass |