**Software Development:**

**Object Orientated Programming**

**DH3C 35**

**Assessment –**

**Outcome 4.**

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| **I.D.** | | 1013403 | | | | | | |
| **Date** | | 20/02/13 | | | | | | |
|  | **Pass** | |  | **Fail** |  | **Remediation** |  |  |
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#### INSTITUTE OF COMPUTING

**Glencaldy Learning Centre**

**Recording System**

**Testing Documentation**

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Version: V1  
Date: 20/02/2013

**Introduction**

The project is a library system to monitor and record users access and use of materials from the Glencaldy Learning Centre. The application has to maintain the state of users, staff and loan items of the centre. It is intended to develop in future, records of income from rental fees of multimedia items and fees charged from late return of items further test plans would be provided with these additional functions prior to their implementation. Each type of user ‘Staff’, ‘CentreMember’ and ‘HourlyUser’, are allowed to access only certain elements of the centre once login has been approved.

**Testing Strategy**

The aim of testing is to ensure the finished product for Glencaldy Learning Centre meets the required functionality required by the client. The initial stage of testing would be carried out before any code is written. This would be carried out with the client at various stages of the design discussing the progression of the design with use of ‘use case diagrams’, ‘structure charts’, mock-up gui’s and the early stages of the software itself to receive feedback from the client, this is the verification stage. On completion of verification you would have a comprehensive Design Document for the product, this would be finalised and agreed and signed by the client. This stage has been negated by the provision of the Project Brief and detailed structure chart, we are to design our product to match the requirements of these documents.

The other determining factor in construction is that the software is constructed to the design specification, this is carried out in the validation stage. In other words the product designed with the client is the product constructed by the development team. Otherwise the client will not be happy.

The following tests will be designed and carried out on the product as the construction progresses and on completion of the product prior to acceptance testing with the client. The main process of the testing will be using a bottom-up method. Starting with the unit testing and ensuring each class was tested and completed before moving to integration testing. Finalising the testing with System testing and client acceptance testing.

**Testing Plan**

**Unit Testing**

Each module or class will be tested to ensure it produces the desired results. Test data will be developed and the outcome from each set of data will be determined to ensure the required outcome from the ‘unit’ is produced during the test. Certain tests will be carried out as the ‘unit’ is constructed prior to integration with other units. The outcome from unit testing can usually be checked with ‘print’ statements in the code to check the state and output results from the test unit. The ‘unit’ test will involve some code checking, ‘white box testing’, of crucial elements of the code.

**Integration** **Testing**

Once modules have been built into a class or the class operatives are implemented, integration testing can be used to check communication of variables and state between units and interaction between units to ensure the desired outcome. In certain situations the integration testing will re-test the main modules steps tested at unit level providing further confidence in the product.

**System Testing**

This will test the completed system functions as required by the client. The testing at this stage should be thorough and use mainly ‘black box’ techniques. Test will be carried out with fictional data and real world data to ensure the final package will function. The initial documentation for the project brief and the requirement specification will be read over again and checked against the final product to ensure there are no missing features required by the client.

**Acceptance Testing**

This is carried out with the client to ensure they are involved in the process of trying to ‘break’ the product prior to handover. There are techniques required by the development team, in training in the use of the product but also to allow the clients personnel to operate the product while being observed to check if they have a specific way of working which could potentially produce an error in results. This joint testing also gives the client some confidence in the use of the final product and gives them an insight into the workings of the process during discussions with the development team. The systems should be intuitive to use with help screens to provide users with information and for training using tutorials built into the system.

**Summary**

The results of the Integration Testing and the further changes made to improve the functionality of the package, have indicated a lack of knowledge of the ‘Model View Controller’ set-up of classes , however, quite a bit of time was lost trying to achieve a result with the tools I had to hand. Further personal development of the Java API and code patterns will be required. Further development of the code is generally going to be the case, however the product must be handed over at a specific point and the known issues noted, including bugs and items not implemented as yet, and handed over.

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| **Test Data Set** | **Test Data Name** | **Test Data Values** | **Reference Number** |
| User 1 | login | martin | Td1.1 |
| Staff | pword | charlie4 | Td1.2 |
| [martin] | login | Martin | Td2.1 |
| [charlie4] | pword | charlie4 | Td2.2 |
|  | login | 13456 | Td3.1 |
|  | pword | 12345678 | Td3.2 |
|  | login | (&%$2 | Td4.1 |
|  | pword | \*&^%) | Td4.2 |
| User 2 | login | mickey | Td5.1 |
| Centre Member | pword | mickmouse | Td5.2 |
| [mickey] | login | martin | Td6.1 |
| [mickmouse] | pword | mickmouse | Td6.2 |
|  | login | [nothing inserted] | Td7.1 |
|  | pword | [nothing inserted] | Td7.2 |
|  | login | [space] | Td8.1 |
|  | pword | [space] | Td8.2 |
|  | login | [multiple key presses at once] | Td9.1 |
|  | pword | [multiple key presses at once] | Td9.2 |
| User 3 | login | goofey | Td10.1 |
| Hourly User | pword | goofeydaug | Td10.2 |
| [goofey] | login | gooFey | Td11.1 |
| [goofeydaug] | pword | goofeyDaug | Td11.2 |
|  | login | goofeY | Td12.1 |
|  | pword | goofeydauG | Td12.2 |
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**Test Data**

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| **Test Data Set** | **Test Data Name** | **Test Data Values** | **Reference Number** |
| User 1 | menuitem | 1 [enter] 0 [enter] | Td13.1 |
| Staff Menu | menuitem | 2 [enter] 0 [enter] | Td13.2 |
| [martin] | menuitem | 7 [enter] 0 [enter] | Td13.3 |
| [charlie4] | menuitem | 13456 [enter] | Td13.4 |
|  | menuitem | (&%$2 [enter] | Td13.5 |
|  | menuitem | 0 [enter] | Td13.6 |
| User 2 | menuitem | 1 | Td14.1 |
| Member Menu | menuitem | 2 | Td14.2 |
| [mickey] | menuitem | 6 | Td14.3 |
| [mickmouse] | menuitem | 0 | Td14.4 |
|  | menuitem | 13456 | Td14.5 |
|  | menuitem | (&%$2 | Td14.6 |
|  | menuitem | [nothing inserted] | Td14.7 |
|  | menuitem | [nothing inserted] | Td14.8 |
|  | menuitem | [space] | Td14.9 |
|  | menuitem | [space] | Td14.10 |
|  | menuitem | [multiple key presses at once] | Td14.11 |
|  | menuitem | [multiple key presses at once] | Td14.12 |
| User 3 | menuitem | 1 | Td15.1 |
| Hourly User Menu | menuitem | 2 | Td15.2 |
| [goofey] | menuitem | 6 | Td15.3 |
| [goofeydaug] | menuitem | (&%$2 | Td15.4 |
|  | menuitem | 13456 | Td15.5 |
|  | menuitem | 0 | Td15.6 |
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| **Test Data Set** | **Test Data Name** | **Test Data Values** | **Reference Number** |
| User 1 | menuitem (Create Centre Member) | 1 | Td16.1 |
| Staff Users Menu | login | tommy | Td16.2 |
| [martin] | pword | trout | Td16.3 |
| [charlie4] | fname | Tommy | Td16.4 |
|  | sname | Trout | Td16.5 |
|  | dob | 01/10/2001 | Td16.6 |
|  | homeaddress | Burn Cottage. | Td16.7 |
|  | teleno | 01234 456789 | Td16.8 |
| User 1 | menuitem (List Users) | 4 | Td17.1 |
| Staff Users Menu | menuitem (Remove User ID) | 105 | Td17.2 |
| [martin] | menuitem (List Users) | 4 | Td17.3 |
| [charlie4] | menuitem (List Users Removed) | 7 | Td17.4 |
|  | menuitem (Edit Member ID) | 105 | Td17.5 |
|  | menuitem (Reinsate Member) | Y | Td17.6 |
|  | menuitem (List Users) | 4 | Td17.7 |
|  | menuitem (Remove User ID) | 107 | Td17.8 |
|  | menuitem (List Users) | 4 | Td17.9 |
| User 3 | menuitem (Edit Personal Details) | 3 | Td18.1 |
| Hourly User Menu | menuitem (Not Active) | 2 | Td18.2 |
| [goofey] | menuitem (Search Menu) | 1 | Td18.3 |
| [goofeydaug] | menuitem (Search Library - All) | 1 | Td18.4 |
|  | Searchlibrary (All) | a | Td18.5 |
|  | menuitem (Search Library - All) | 1 | Td18.6 |
|  | Searchlibrary (All) | A | Td18.7 |
|  | menuitem (Opening Times) | 4 | Td18.8 |

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| **Test Data Set** | **Test Data Name** | **Test Data Values** | **Reference Number** |
| User 1 | menuitem (Loan Menu) | 3 | Td19.1 |
| Staff Users Menu | menuitem (Create Loan) | 1 | Td19.2 |
| [martin] | createLoan (User ID) | 104 | Td19.3 |
| [charlie4] | searchStock (Stock Type) | a | Td19.4 |
|  | stockLoanItem (Stock Item) | 1005 | Td19.5 |
|  | stockLoanItem (Date Borrowed) | 14/01/2013 | Td19.6 |
|  | menuitem (List All Loans) | 3 | Td19.7 |
|  | menuitem (List Loans by User ID) | 4 | Td19.8 |
|  | menuitem (List Loans by User ID) | 104 | Td19.9 |
| User 1 | menuitem (Create Centre Member) | 1 | Td20.1 |
| Staff Users Menu | login | %$)JBU$. | Td20.2 |
| [martin] | pword | %$)JBU$. | Td20.3 |
| [charlie4] | fname | 78(&%$\*. | Td20.4 |
|  | sname | Loi;&\*%. | Td20.5 |
|  | dob | mxfgn | Td20.6 |
|  | homeaddress | 7(&^$%;m. | Td20.74 |
|  | teleno | Djxn.,&£ | Td20.8 |
| User 1 | menuitem (List Centre Members) | 4 | Td21.1 |
| Staff Users Menu | menuitem (Edit Member by User ID) | 5 | Td21.2 |
| [martin] | Edit User (UserID) | 105 | Td21.3 |
| [charlie4] | fname | 1111 | Td21.4 |
|  | sname | 2222 | Td21.5 |
|  | login | 3333 | Td21.6 |
|  | pword | 4444 | Td21.7 |
|  | dob | 5555 | Td21.8 |

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| **Test Data Set** | **Test Data Name** | **Test Data Values** | **Reference Number** |
|  | homeaddress | 6666 | Td21.9 |
|  | teleno | 7777 | Td21.10 |
|  | Account Status | 123 | Td21.11 |
|  | menuitem (List Centre Members) | 4 | Td21.12 |
| User 1 | menuitem (Stock Menu – Register Book) | 1 | Td22.1 |
| Staff Users Menu | Author | Edward Kit | Td22.2 |
| [martin] | Title | Software Testing in the Real World | Td22.3 |
| [charlie4] | ISBN | 0-201-87756-2 | Td22.4 |
|  | Publisher | Addison-Wesley | Td22.5 |
|  | Subject Area | Computing Software Testing | Td22.6 |
|  | No. Pages | 252 | Td22.7 |
|  | Cost | 15.00 | Td22.8 |
|  | menuitem (Search Menu) | 5 | Td22.9 |
|  | menuitem (Search All (Books) ) | 1 [enter] b[enter] | Td22.10 |
|  | menuitem (Stock Menu – Edit Item Details by Item ID | 0 [enter] 6 [enter] 1024 [enter] y [enter] | Td22.11 |
|  | New Author Name – No.Pages | [enter] [enter] [enter] [enter] [enter] [enter] | Td22.12 |
|  | New Cost Price | 17 [enter] | Td22.13 |
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| **Test Case Number** | **Required Tested** | **Test Plan** | **Test Procedure Description** | **Expected Result** |
| Tc1 | Test users login is robust | Functionality | Enter data Td1.1 & Td1.2 as login & password | Access to Application Granted with Staff Rights |
| Tc2 | Test users login is robust | Functionality | Enter data Td2.1 & Td2.2 as login & password | Access to Application Not Granted |
| Tc3 | Test users login is robust | Functionality | Enter data Td3.1 & Td3.2 as login & password | Access to Application Not Granted |
| Tc4 | Test users login is robust | Functionality | Enter data Td4.1 & Td4.2 as login & password | Access to Application Not Granted |
| Tc5 | Test users login is robust | Functionality | Enter data Td5.1 & Td5.2 as login & password | Access to Application Granted with Centre Member Rights |
| Tc6 | Test users login is robust | Functionality | Enter data Td6.1 & Td6.2 as login & password | Access to Application Not Granted |
| Tc7 | Test users login is robust | Functionality | Enter data Td7.1 & Td7.2 as login & password | Access to Application Not Granted |
| Tc8 | Test users login is robust | Functionality | Enter data Td8.1 & Td8.2 as login & password | Access to Application Not Granted |
| Tc9 | Test users login is robust | Functionality | Enter data Td9.1 & Td9.2 as login & password | Access to Application Not Granted |
| Tc10 | Test users login is robust | Functionality | Enter data Td10.1 & Td10.2 as login & password | Access to Application Granted with Hourly User Rights |
| Tc11 | Test users login is robust | Functionality | Enter data Td11.1 & Td11.2 as login & password | Access to Application Not Granted |
| Tc12 | Test users login is robust | Functionality | Enter data Td12.1 & Td12.2 as login & password | Access to Application Not Granted |

**Test Cases**

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| --- | --- | --- | --- | --- |
| **Test Case Number** | **Required Tested** | **Test Plan** | **Test Procedure Description** | **Expected Result** |
| Tc13 | Test Menu Structure and input selection verification | User Interface | Enter data Td13.1 - Td13.6 as menu selections | Only valid data will provide access to next menu in system, false data will be rejected. |
| Tc14 | Test Menu Structure and input selection verification | User Interface | Enter data Td14.1 - Td14.12 as menu selections | Only valid data will provide access to next menu in Centre Members Area of the system, false data will be rejected. |
| Tc15 | Test Menu Structure and input selection verification | User Interface | Enter data Td15.1 - Td15.6 as menu selections | Only valid data will provide access to next menu in Hourly User Area of the system, false data will be rejected. |
| Tc16 | Staff Admin to Add New Centre Member | Functionality | Enter data Td16.1 - Td16.8 to verify data and create new centre member | Centre Member 107 created successfully by User1 |
| Tc17 | Staff Admin of Centre Member | Functionality | Enter data Td17.1 - Td17.9 to manage user access rights | Centre Member 105 & 107 removed and 105 reinstated successfully. |
| Tc18 | Hourly User 106 available options & functions. | User Interface & Functionality | Enter data Td18.1 – Td18.8 to edit user details and search functions. | Edit & Search functions operate as expected results shown on selections made. |
| Tc19 | Staff Admin to create loan of item to user 104 | User Interface & Functionality | Enter data Td19.1 - Td19.9 to enter data & verify input for a loan of item 1005 | Loan created successfully. |
| Tc20 | Staff Admin to create User with false data | Functionality | Enter data Td20.1 - Td20.8 to enter data & verify input for a new user | Data is rejected – user not created. |
| Tc21 | Staff Admin to edit User with false data | Functionality | Enter data Td21.1 – Td21.12 to edit data & verify input for an existing user | Data is rejected – User details are not changed. |
| Tc22 | Staff Admin to enter & edit new book | User Interface & Functionality | Enter data Td22.1 – Td22.13 to enter & edit book data | Data is stored changed and stored again in proper format |

**Testing Log Sheets**

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| --- | --- | --- | --- | --- | --- | --- |
| **Date Tested** | **19/02/2013** | **Tested By** | **Martin Naismith 1013403** | **Project Name** | **Glencaldy Learning Centre Recording System** | |
| **Test Case Number** | **Requirements Tested** | **Test Plan** | **Test Procedure Description** | **Expected Result** | **Actual Result** | **Action** |
| **TC1** | Test users login is robust | Functionality | Enter data Td1.1 & Td1.2 as login & password | Access to Application Granted with Staff Rights | As Expected |  |
| **TC2** | Test users login is robust | Functionality | Enter data Td2.1 & Td2.2 as login & password | Access to Application Not Granted | As Expected |  |
| **TC3** | Test users login is robust | Functionality | Enter data Td3.1 & Td3.2 as login & password | Access to Application Not Granted | As Expected |  |
| **TC4** | Test users login is robust | Functionality | Enter data Td4.1 & Td4.2 as login & password | Access to Application Not Granted | As Expected |  |
| **TC5** | Test users login is robust | Functionality | Enter data Td5.1 & Td5.2 as login & password | Access to Application Granted with Centre Member Rights | As Expected |  |
| **TC6** | Test users login is robust | Functionality | Enter data Td6.1 & Td6.2 as login & password | Access to Application Not Granted | As Expected |  |
| **TC7** | Test users login is robust | Functionality | Enter data Td7.1 & Td7.2 as login & password | Access to Application Not Granted | As Expected |  |
| **TC8** | Test users login is robust | Functionality | Enter data Td8.1 & Td8.2 as login & password | Access to Application Not Granted | As Expected |  |
| **TC9** | Test users login is robust | Functionality | Enter data Td9.1 & Td9.2 as login & password | Access to Application Not Granted | As Expected |  |
| **TC10** | Test users login is robust | Functionality | Enter data Td10.1 & Td10.2 as login & password | Access to Application Granted with Hourly User Rights | As Expected |  |
| **TC11** | Test users login is robust | Functionality | Enter data Td11.1 & Td11.2 as login & password | Access to Application Not Granted | As Expected |  |
| **TC12** | Test users login is robust | Functionality | Enter data Td12.1 & Td12.2 as login & password | Access to Application Not Granted | As Expected |  |
| **TC13** | Test Menu Structure and input selection verification | User Interface | Enter data Td13.1 - Td13.6 as menu selections | Only valid data will provide access to next menu in system, false data will be rejected. | As Expected |  |
| **TC14** | Test Menu Structure and input selection verification | User Interface | Enter data Td14.1 - Td14.12 as menu selections | Only valid data will provide access to next menu in Centre Members Area of the system, false data will be rejected. | Error with Address input and Tele no input | **Priority 1 Fix Required** |
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| **Test Case Number** | **Requirements Tested** | **Test Plan** | **Test Procedure Description** | **Expected Result** | **Actual Result** | **Action** |
| **TC15** | Test Menu Structure and input selection verification | User Interface | Enter data Td15.1 - Td15.6 as menu selections | Only valid data will provide access to next menu in Hourly User Area of the system, false data will be rejected. | Error with Address input and Tele no input | **Priority 1 Fix Required** |
| **TC16** | Staff Admin to Add New Centre Member | Functionality | Enter data Td16.1 - Td16.8 to verify data and create new centre member | Centre Member 107 created successfully by User1 | Error with Address input and Tele no input | **Priority 1 Fix Required** |
| **TC17** | Staff Admin of Centre Member | Functionality | Enter data Td17.1 - Td17.9 to manage user access rights | Centre Member 105 & 107 removed and 105 reinstated successfully. | Removed User still able to logon to application | Priority 2 Fix Required |
| **TC18** | Hourly User 106 available options & functions. | User Interface & Functionality | Enter data Td18.1 – Td18.8 to edit user details and search functions. | Edit & Search functions operate as expected results shown on selections made. | Error with Address input and Tele no input | **Priority 1 Fix Required** |
| **TC19** | Staff Admin to create loan of item to user 104 | User Interface & Functionality | Enter data Td19.1 - Td19.9 to enter data & verify input for a loan of item 1005 | Loan created successfully. | As Expected |  |
| **TC20** | Staff Admin to create User with false data | Functionality | Enter data Td20.1 - Td20.8 to enter data & verify input for a new user | Data is rejected – user not created. | Data is saved as valid user | Priority 3 Fix Required |
| **TC21** | Staff Admin to edit User with false data | Functionality | Enter data Td21.1 – Td21.12 to edit data & verify input for an existing user | Data is rejected – User details are not changed. |  |  |
| **TC22** | Staff Admin to enter & edit new book | User Interface & Functionality | Enter data Td22.1 – Td22.13 to enter & edit book data | Data is stored changed and stored again in proper format | As Expected |  |
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**Testing Summary**

It is noted that certain aspects of the functionality of the system are not implemented or are not functioning as requested in the requirements specification. These items are noted and will need immediate rectification. There are functions for staff to interrogate the items or record at present which produce listings, however the management listings would be more concise at easier to look through and print out.

1. The functionality to the Management Menu to ;-
   1. List Centre Members in short form
   2. List Members Removed in short form
   3. List Stock & Loaned Items in short form, Books
   4. List Stock & Loaned Items in short form, Journals
   5. List Stock & Loaned Items in short form, Videos
   6. List Stock & Loaned Items in short form, CDs
   7. List Stock & Loaned Items in short form, Removed Stock
   8. List Items on Loan

The following items are shown to be producing some erroneous results as the regular expression checking has not been implemented in the code, this will be added in the next release after the fixes above.

1. The inputs of data for editing the user, the address and telephone number are accepting invalid data. The address accepts only numbers and the phone number accepts only characters. There would appear to be a crossover of the checking of the input. It would appear to be the same method being used in TC14, TC15, TC16 & TC18.
2. The user accounts being disabled still allow that user to logon to the system. This will need an ‘if’ check in the login for the disabled account marker.
3. The validation of data would require to be tightened up. Possibly by use of regex or parsing of the data. This will need to be investigated further.

The planed date to fix the items of immediate urgency, Priority 1 and missing functionality to provide a patch for the system is by ;- Friday the 1st March 2013.

The planed date to fix the remaining error items noted above is by ;- Friday the 29th March 2013.