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CS743 Software Verification and Validation

**Assignment 2**

**Details**

* Rooms opened by key or card
* **Every lock opened by at least 1 key**
* **Every key must open at least 1 lock**
* Master keys may open 1+ locks and physical key
* Cards can’t be master keys, only open 1 lock
* Every lock has
  + Unique **[ int ]**  lock number
  + Room number where lock is located
  + Set of keys and cards that can open the lock
* Every key has
  + Unique **[ int ]** key number
  + Key type [ key / card ]
  + Set of locks it can open

**Expected functionalities**

* Add new key and lock combo to system [lock and key ID’s are generated]
* Add new key to system and map it to existing lock [key ID generated]
* Add existing key to existing lock
  + **Only physical keys can add new keys**
    - Become a master key if successfully added
* Delete existing to existing lock
  + **Must ensure at least one other available key to open the lock**
* Display information
  + Of key given ID → type, and master?
  + Of lock given ID → room number where lock located
  + All locks for given key ID
  + All locks for given lock ID

**What to expect**:

* Test the GUI
* The testing is split into two parts
  + Part 1: Testing all the Controls
    - Controls: buttons, drop down boxes, and etc
    - Statement if they are working.
    - Is appropriate for the task it was created for?
  + Part 2: Testing all the Functionalities
    - Test cases with at least 1 valid input and invalid input for every functionality
    - Some functionalities may not have the ability to input invalid information

**Initial Data**

|  |  |  |  |
| --- | --- | --- | --- |
| Key Number | Key Type | Master Key? | Associated Locks |
| 1 | Swipe Card | No | 1001 |
| 2 | Swipe Card | No | 1002 |
| 3 | Swipe Card | No | 1003 |
| 4 | Swipe Card | No | 1004 |
| 5 | Swipe Card | No | 1005 |
| 6 | Swipe Card | No | 1006 |
| 7 | Swipe Card | No | 1007 |
| 8 | Swipe Card | No | 1008 |
| 9 | Physical Key | Yes | 1009, 1003, 1007 |
| 10 | Physical Key | Yes | 1010, 1005 |
| 11 | Physical Key | Yes | 1011, 1007 |
| 12 | Physical Key | Yes | 1012, 1001, 1009, 1003 |
| 13 | Physical Key | Yes | 1013, 1001, 1010 |
| 14 | Physical Key | Yes | 1014, 1012 |
| 15 | Physical Key | Yes | 1015, 1013 |

|  |  |  |
| --- | --- | --- |
| Lock Number | Room Number | Associated Keys |
| 1001 | 101 | 1, 12, 13 |
| 1002 | 102 | 2 |
| 1003 | 103 | 3, 9, 12 |
| 1004 | 104 | 4 |
| 1005 | 105 | 5, 10 |
| 1006 | 201 | 6 |
| 1007 | 202 | 7, 9, 11 |
| 1008 | 203 | 8 |
| 1009 | 204 | 9, 12 |
| 1010 | 205 | 10, 13 |
| 1011 | 301 | 11 |
| 1012 | 302 | 12, 14 |
| 1013 | 303 | 13, 15 |
| 1014 | 304 | 14 |
| 1015 | 305 | 15 |

**Part 1)**  **Testing of all Controls**

**Controls**

* **Controls Working? Appropriate?**
* Question Mark Button Works Yes
* Detail Popup Box Ok Button Works Yes
* Detail Popup Close Button Works Yes

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* Minimize Button Works Yes
* Restore Down Button Works Yes
* Close Button Works Yes
* Exit Button Works Yes

Not well placed on

full screen mode

But can argue no

Since there is the close button

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* Select an Option Drop Down Menu Works Yes

All options work

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*[Show lock information selected]*

* Choose Lock: Drop Down Menu Works Yes

All options work

* Get Lock Information Button Works Yes
* Get Lock Information Button’s Works Yes

Input Error Box

* OK Button Works Yes
* Close Button Works Yes

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[*Show key information selected*]

* Choose key: Drop Down Menu Works Yes

All options work

* Get key information Button’s Works Yes

Input Error Box

* OK Button Works Yes
* Close Button Works Yes

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[*Show locks for a key selected*]

* Choose key: Drop Down Menu Works Yes

All options work

* Show Lock Button Works Yes
* Show Lock Button’s Works No

Unhandled Exception Details Window should be handled

* Details Button Works No, gives

implementation details

* Continue Button Works Yes
* Exit Button Works Yes
* Close Button Works Yes

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[*Show keys for a lock selected*]

* Choose Lock: Drop Down Menu Works Yes

All options work

* Show keys button Works Yes
* Show keys button’s

Unhandled Exception Detail Window Works No

should be handled

* Details Button Works No, gives

implementation details

* Continue Button Works Yes
* Exit Button Works Yes
* Close Button Works Yes

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[*Add a new combination selected*]

* Choose new room number drop down menu Works Yes

All options work

* Add new combination button Works Yes
* Add new combination button’s Works Yes

Error Box

* OK button Works Yes
* Close button Works Yes

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[*Add a new key to lock selected*]

* Choose lock drop down menu Works Yes

All options work

* Choose key type drop down menu Works Yes

All options work It fits the theme.

No

Only 2 options, why use drop down menu?

* Add a new key to button Works Yes
* Add a ney key to button’s Works Yes

Error box

* OK button Works Yes
* Close Button Works Yes

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[Assign key to lock]

* Choose key drop down menu Works Yes

All options work

* Choose lock drop down menu Works Yes

All options work

* Choose Key type drop down menu Works Yes

All options work Fits the theme.

No

Only 2 options, why use drop down menu?

* Assign key button Works Yes
* Assign key button’s Works Yes

Error box

* OK button Works Yes
* Close button Works Yes

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[*Delete a combination selected]*

* Choose combination drop down menu Works Yes

All options work

* Delete a combination button Works Yes
* Delete a combination button’s Works Yes

Error box

* OK button Works Yes
* Close button Works Yes

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[Show all keys selected]

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[Show all locks selected]

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[Show all combinations selected]

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**Evaluation:**

* Everything works
  + **I counted errors for no input / incorrect input as working**
  + But there are some unhandled issues that display information that should not be displayed.
* Placement on the exit button could be better in fullscreen mode
* The text’s for “Show all …” does not properly display well
  + Needs a scroller or format the text better
* Questionable decision to use a drop down menu when there are only 2 options to choose from.
  + **This is why i have yes and no**
    - Yes because of consistent UI design
    - No because drop down menus should usually have more options than 2 as good practice in industry

**Part 2)** **All Functionalities**

* Notation: 22 … 1 means 22, 21, 20, all the way to 1. There was just a lot information that didn’t change.

**Evaluation:**

* + As mentioned before, certain input boxes that were blank were not handled correctly.
  + Newly added keys can be deleted when they should be kept since a key must open a lock.
  + Completely deleted keys with no locks to open still appeared on the list for “show locks for keys”. Keys shouldn’t even be completely deleted in the first place.
  + Weirdly, there was an operation that was handled, but then a few different operations, then coming back resulting in “unhandled exception”. After more operations it became “handled” again. So, not sure how that bug occurred.
  + List output if it’s too long will not properly display to be seen.
    - A scroll or format the data in a different way would be the best way to handle it.
  + There was a bug where I tried to delete a key that shouldn’t be deleted but the key said it was “successfully deleted” but then it remained on the list.
    - After some operations and after deleting the same buggy key, the key finally went away but it should still be there since a key needs to open one lock at a minimum.
  + When a key is a physical key, then is assigned a swipe key for another lock that seems contradicting as a swipe key and physical key would result in a master key and a swipe key can not be a master key. Then deleting the physical key to that corresponding lock resulted in the key still remaining as a “physical key” when there should be a swipe key leftover. The key only had 1 lock it could open but it was still considered a master key.