**Seed Project with 100 defects for ZORK**

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| Defect  Number | Defect | Resultant Output |  | Suggested  Corrections | How can  the defect  be caught | Severity |
|  |  | Before  Seeding | After  Seeding |  | white box or black box | S1 – critical;  S2 –  important; S3 – workaround |
| 1 | By keep clicking on “register/login”, UI creates multiple instances | UI creates multiple instances | UI creates only one login/register instance | Instead of creating additional instances, embed the windows in to main screen as only instance | Black Box | S1 |
| 2 | Trying to login when the internet is disconnected, the UI will freeze | UI freezes when click on login | A message should show up tell user he/she needs Internet connection | Throw an exception when the Internet is not connected and caught it in UI | Black Box | S3 |
| 3 | User is able to select ‘Create Game’ before login | User is able to select ‘Create Game’ before login | User cannot select ‘Create Game’ before login | createGame.setenable(False)  before login | Black Box | S2 |
| 4 | User is able to select ‘Save Game’ before login | User is able to select ‘Save Game’ before login | User cannot select ‘Save Game’ before login | saveGame.setenable(False)  before login | Black Box | S1 |
| 5 | User is able to select ‘Load Game’ before login | User is able to select ‘Load Game’ before login | User cannot select ‘Load Game’ before login | loadGame.setenable(False)  before login | Black Box | S1 |
| 6 | User is able to select ‘New Game’ before login | User is able to select ‘New Game’ before login | User cannot select ‘New Game’ before login | newGame.setenable(False)  before login | Black Box | S1 |
| 7 | If you disconnected the internet after login, the UI will not show anything on save/load | The UI shows nothing when the Internet is disconnected | A message should show up tell user he/she needs Internet connection | Throw an exception when the Internet is not connected and caught it in UI | White Box | S2 |
| 8 | Content is delayed updating after new action | Content is delayed updating after new action | Content is not delayed updating | We need to remove things in the content first then add and refresh instead of only a repaint | Black Box | S3 |
| 9 | The UI will stuck if the server return false on an action | The UI will freeze if the server return false | A pop up will notice that the server returns false | Catch the error and show the pop up window | White Box | S2 |
| 10 | After login if user choose another login could lead to potential leak of current status loss | After login if user choose another login could lead to leak of current game status | User will not leak anything since login/register was locked | set login to be setEnable(False) | White Box | S2 |
| 11 | After login if user choose another register could lead to potential leak of current status loss | After login if user choose another register could lead to leak of current game status | User will not leak anything since login/register was locked | set register to be setEnable(False) | White Box | S2 |
| 12 | If user click reset button while register screen username typed wrong nothing changed | If user click reset button while register screen username typed wrong nothing changed | Reset works properly | User have a reset method give “ ”value to all text field | Black Box | S2 |
| 13 | If user click reset button while register screen username typed wrong nothing changed | If user click reset button while register screen username typed wrong nothing changed | Reset works properly | User have a reset method give “ ”value to all text field | Black Box | S2 |
| 14 | Upon reset the text field is full like”\*\*\*\*\*\*\*\*\*\*” | text field we want to type things is filled after reset | text field is reset properly | inputField.setText(“ ”) is better instead of clean | Black Box | S3 |
| 15 | When adding a component panel to register the panel in login was redundant we switch to login again | the component panel in login was redundant if we switch to login | no redundant stuff show up | new instance of panel only for once | White Box | S1 |
| 16 | User password include special character can be stored | User password include special character can be stored | User password include special character cannot be stored | add a checker for user password to be valid | Black Box | S2 |
| 17 | User name and password  too short could be also stored | User name and password  too short could be also stored | User name and password  too short could not be  stored | Add a check for length of the user  name and password to ensure safety | Black Box | S2 |
| 18 | Using border layout inside border layout is not good looking | Using border layout inside border layout is not good looking | Using Grid layout is more sorted and ordered | Use Grid Layout instead of Border Layout when add panel to borderlayout.center | White Box | S3 |
| 19 | Keep track of static variable needs additional work | Additional work is needed to  keep track of static variable needs | We do not concern about additional thread or static variable | Move everything related to zorkGUI.java | White Box | S2 |
| 20 | Then click on next page or previous page from map selection panel, new page did not show correct number of maps | New page did not show correct number of maps | Number of maps showed correctly | Correct the code relating to showing list of maps | White Box | S2 |
| 21 | Missing map validness test | Map does not show up if invalid | Error handling for invalid map | Give additional try catch for invalid map | White Box | S2 |
| 22 | After showing JOptionPane ,UI was not updated | UI was not updated after showed up JOptionPane | UI was updated after JOptionPane pop up | After JOptionPane showed up UI was also updated | White Box | S3 |
| 23 | load will not resume the status of item | The status of the item will be back to default | The status of the item should also resume | Save the item status when saving the game | White Box | S1 |
| 24 | The map will not be added into the server if user choose to be private | The map will not upload into the private folder | The map will upload | Implement the server part to upload the map into different dirs | Black Box | S2 |
| 25 | User can’t move to right direction when using capital letter for direction. | User can’t move to the right direction | User can move to the right direction or “Can’t go that way” is printed on screen. | Check for capital letters, such as ‘N’, ‘W’, ‘S’, ‘E’ for move command. | Black box | S1 |
| 26 | User can’t move to the right direction when extra spaces existed. | User can’t move to the right direction. | User can move to the right direction or “Can’t go that way” is printed on screen. | Skip for white spaces when dealing with move direction command. | Black Box | S2 |
| 27 | The game play text area will not clear when a new game is created | User can still view the game process from last game | The text area should be cleared when creating a new game | Set the textArea when loading a new game | Black Box | S3 |
| 28 | Items in inventory can’t be showed up when using capital letter | Nothing printed out when using “show inventory” command. | User can see items listed in the inventory. | Check for capital letter, such as ‘I’ for show inventory command | Blackbox | S1 |
| 29 | Item in room can’t be taken | “Can’t take the item” is printed when user tries to take an available item | User can take the item | Skip all spaces when check take item command | Blackbox | S1 |
| 30 | Cannot open container | “Cannot open container” | User can open the container and take the item | Check for capital letters in the string. Any capital letter in the string will not execute the command | Blackbox | S1 |
| 31 | Cannot exit the game | “Cannot exit the game” | User can exit the game correctly | Check for capital letters in the command string. Any capital letter will cause user cannot exit the game | Blackbox | S1 |
| 32 | The user will be able to upload a xml file that is not valid | The user can upload an incorrect map to the server | The user cannot upload an invalid xml file | Do a file validation before the file uploads | Blackbox | S1 |
| 33 | The user can select a file that’s not xml to upload | The user can upload any file they want | The user can only upload an xml file | Use a filter to only allow uploading an xml file | Blackbox | S2 |
| 34 | The user can’t read the item if using extra spaces for command. | User is not able to read content of item if using extra spaces for command. | The user can read the content of the item. | Skip all white spaces when checking read item command. | BlackBox | S1 |
| 35 | User cannot read an item when capital letters are in the “read” command | User is unable to read the messages  on the item | The user can read the messages on the item. | Use a toLowerCase() to change all capital letters to lower case letters. | Blackbox | S1 |
| 36 | The game process will not resume after creating a map | The UI will show nothing after uploading the file | The game should resume after uploading the file | Add the game play panel back to UI after the upload | BlackBox | S2 |
| 37 | The game play text area will not clear when load a game process | User can still view the game process from last game | The text area should be cleared when creating a new game | Set the textArea when loading a new game | Black Box | S3 |
| 38 | If you disconnected the internet after logged in, the UI will not show anything on new game | The UI shows nothing when the Internet is disconnected | A message should show up tell user he/she needs Internet connection | Throw an exception when the Internet is not connected and caught it in UI | White Box | S2 |
| 39 | If you want to load the game multiple times, a set of button will be added to the UI each time | You will have more and more buttons in the UI | The number of buttons should not change | create the buttons when the class is created | Black Box | S1 |
| 40 | The map will be overridden on the server if a file of the same name is uploaded | A new file with the same name overrides the old one | We should not allow the file to be overridden | Before overriding the files, check if it exists on the server | Black Box | S3 |
| 41 | User is able to save the game when creating a new game. | The save game should not be functioning unless the user is in game process | The save button should be disabled when user is creating a game | Disable user to save the game when create is called | Black Box | S1 |
| 42. | The buttons in the save and load are not the same size | The load game button is bigger than save game | They should be the same size | Change the layout to uniform the formats | Black Box | S3 |
| 43 | Once the user saved the game, he will not be able to go back to the game process | The game play window will not resume when the game is saved | The game play window should resume | Add the game play panel back to UI after the game saves | Black Box | S2 |
| 44 | User unable to put down item | The user is not able to put the item back to container | The user should be able to put the item to container. | Add a toLowerCase() method to convert any capital letters in the command | Black Box | S1 |
| 45 | User unable to put down item | The user is not able to put the item back to container | The user should be able to put the item to container. | Add a conditional statement to avoid multiple space been typed by user in the command | Black Box | S1 |
| 46 | User can’t turn on item when using extra white spaces for turnon command. | User can’t turn on item properly. | Item should be turned on as expected. | Skip all white spaces when checking turn on command. | BlackBox | S2 |
| 47 | User can’t turn on item when using capital letter for command | User can’t turn on item properly. | Item should be turned on as expected. | Consider capital letter case when checking turn on command. | BlackBox | S1 |
| 48 | The process text area will not auto go to the bottom | If text is longer than the screen, the text area will not auto go to the bottom | It should go to the bottom | DefaultCaret caret = (DefaultCaret) gameProcessField.getCaret();  caret.setUpdatePolicy(DefaultCaret.ALWAYS\_UPDATE); | BlackBox | S3 |
| 49 | User cannot attack the creature | User unable to attack creature | User should attack the creature with item | Add a conditional statement to check extra spaces in command | BlackBox | S1 |
| 50 | User cannot attack the creature | User unable to attack creature | User should attack the creature with item | Add a toLowerCase() method to get rid of the capital letters in the command | BlackBox | S1 |
| 51 | User can’t save games under certain circumstances | Save game sometimes will fail | Save game will never fail | Extend limitation of game data field in database | White Box | S1 |
| 52 | The same user name can be register again | The same user name can be registered multiple times | The same user name can only be register once | Add UNIQUE KEY attribute to the user name field in database | Black Box | S1 |
| 53 | User can’t register under certain circumstances | Even the user name passes the checker in client, server return fails | As long as the checker in client allows the user name to register, server should return success | Extend limitation of user name field in database | White Box | S2 |
| 54 | Variable name for UI component is hard to distinguish | Variable name for UI component is hard to distinguish | Variable name for UI component is clear | Rename ambivalent variable names | White Box | S3 |
| 55 | The submit button of create game cross the whole window | The submit button is too wide | The submit button should be no more than 50px | Change the size of submit button | Black Box | S3 |
| 56 | The text of the game process will be cut in the middle of a word when changing a line | The words are cut into pieces when changes line | It should print out the whole word in the second line | Format the text before printing it | Black Box | S2 |
| 57 | When click on an empty cell in the new game view, the UI freezes | The UI freeze when a click happen to a empty cell | Nothing should happen | Detect if the button points to nothing and just skip it | Black Box | S2 |
| 58 | If new game option is clicked twice, the view will not change and the user will not be above to go to another page | The UI will not show the previous/next page | The UI should show all the pages | Reload the map list every time new game is called | Black  Box | S1 |
| 59 | If you hit cancel on the file chooser of create game, the old create game will show up | The previous create game section will show up | Nothing should show up, the game should resume | Create game should throw an exception and add the previous panel back to UI | Black Box | S1 |
| 60 | When hit one of the empty slot when loading the game, the message will show up saying the game is resumed | The UI will return to game process and print “Game continuing...” | It should do nothing | The load should just skip empty slots | Black Box | S2 |
| 61 | The order of map listing will change every time new game is called | The order of the map changes | It should remain the same | Sort the maps before displaying | Black Box | S2 |
| 62 | After loading an invalid file, the UI freezes | The UI will freeze if an invalid file is loaded | The UI should not change and let the user know the file is not valid | Write a validator for the files from server | Black Box | S1 |
| 63 | It does not get feedback when user typed “take” | The system will not return feedback when blank is left after command | It should prompt messages to user that command must followed by items | The UI should caught the error if there are any error in game play and display the error | Black Box | S1 |
| 64 | User can login when password is incorrect | As long as user name exists, user can login | Password must match the record with exist user name. | Add check password algorithm in isValidLogin() | Black Box | S1 |
| 65 | No message printed out when user choosing an invalid map. | After user chooses a invalid map, no error message printed out. | Error message like “Error opening file. Exiting..” will be printed out when checking invalid map file | Add algorithm to check the validity of map file, if invalid, error message will be printed out. | Black Box | S1 |
| 66 | User can’t save game at the beginning of this game. | At the beginning of the game, user is not able to save game. | User is able to save game at the beginning of the game. | Initialize current Room string at first. | WhiteBox | S2 |
| 67 | If you hit cancel in the file chooser for create game, a null pointer exception will be thrown | A null pointer exception error will be thrown | No error should happen | Do a check it the file chooser returns null | White Box | S2 |
| 68 | Counter for the map loading accidentally starts with ‘1’ instead of ‘0’ | When click the first map actually the second one loaded | When first map icon clicked the first was loaded | Check the index again make sure it starts with 0. | White Box | S2 |
| 69 | If the user only input “take”  without an argument, the game play will throw an error | An error is thrown | No error should be there | The length of the command should be checked before parsing it | White Box | S1 |
| 70 | After enter command in the game scene the text filed for taking command was not set clear for taking next command | After enter command in the game scene the text filed for taking command was not set clear for taking next command | The text field for taking command was empty for next command | Reset the text field with ” ” | Black  Box | S3 |
| 71 | If there are more arguments than expected, the gameplay will not throw an error | The command parses normally | An error should be thrown | Check the length of the command before parsing it | Black Box | S2 |
| 72 | When user typed wrong input during login/register if we switch to register/login and switch the warning message remains there | When user typed wrong input during login/register if we switch to register/login and switch the warning message remains there | When user typed wrong input during login/register if we switch to register/login and switch the warning message was refreshed | Refresh the warning message on the top of the register/login after each related actionPerformed for login and register | Black Box | S3 |
| 73 | After first successful register we still need to login | After first successful register we still need to login | After first successful register it will be automatically logged in | Set it to be auto-logged in upon successful login | Black Box | S3 |
| 74 | If an empty cell is clicked in new game, an error will be thrown | An error occurs | There should be no errors | Check the valid of the button before requesting the server for the file | White Box | S1 |
| 75 | After attempted login fail and found user name do not exist, we register and switch to login panel warning message was still there which is misleading | After attempted login fail and found user name do not exist, we register and switch to login panel warning message was still there which is misleading | Warning message was gone and not misleading | Clear the warning message and refresh | Black Box | S3 |
| 76 | After login or register the console will leak information | After login or register the console will leak information | Console leaks nothing about user | Stop printing the message throw to console used to help testing | Black Box | S2 |
| 77 | The game loading method will throw a java.lang.ArrayIndexOutOfBoundsException and UI cannot caught it | An error occur in gameplay when loading the game but the UI cannot caught the error | The UI should catch the error and display error message | Use a try catch to catch the exception and display an error message | White Box | S1 |
| 78 | When you reach the exit, you win the game but the game will not end | The game does not end | The game should be ended and you can no longer enter new instructions | Stop taking any commands after the user reaches the end of the game | Black Box | S2 |
| 79 | After login successful we can still try to login with another account | After login successful we can still try to login with another account | After login successful we cannot still try to login with another account | Lock the login panel upon successful login | Black Box | S2 |
| 80 | Throwing error message even you did not select any valid item form ‘create game’ but just cancel the selection | Throwing error message even you did not select any valid item form ‘create game’ but just cancel the selection | Do not throw error message even you did not select any valid item form ‘create game’ but just cancel the selection | If file chooser did not receive anything no error message was thrown | White Box | S3 |
| 81 | If the map name is not valid and the user still click the submit button, a message will still show that the uploading was successful while it is not | A success message still should when the map did not upload | It should show that the map was not uploaded | Add an if condition to check the return valid from server | Black Box | S1 |
| 82 | The UI will let the user to set the name of the map to be empty when submitting the map | The UI lets the user to set the map name to be null | The UI should show a message when the map name is null | Check if the map name is valid before uploading | Black Box | S1 |
| 83 | When there is no ‘prev’ and ‘next’ page of maps sometimes if you click prev and next error message will show up | When there is no ‘prev’ and ‘next’ page of maps sometimes if you click prev and next error message will show up | When there is no ‘prev’ and ‘next’ page of maps sometimes if you click prev and next no error message will show up | check if the map listing already reached end | Black Box | S2 |
| 84 | Show inventory can’t show all items in inventory. | After using show inventory command, only the first item is shown. | All items are shown after show inventory command. | By using for loop, get all items existing in user  ‘s inventory. | WhiteBox | S2 |
| 85 | Wrong message shows up when using ‘i’ command | If user’s inventory is empty, no wrong message shows up. | If the inventory is empty, shows “inventory: empty”. | In function “show inventory”, check if the inventory is empty. | BlackBox | S1 |
| 86 | When user wants to check what items exist in the container, not all items are shown. | Only the first item in container is shown up. | All items existing in container will be shown. | Iterate all items in container. | Blackbox | S2 |
| 87 | GUI was not exit on close | GUI was not exit on close | If you click the close icon on upper right corner it exits | Set the exit on close | White Box | S3 |
| 88 | The GUI window size was fixed and not adjustable | The GUI window size was fixed and not adjustable | User can change the size of GUI window | Change the GUI window to be resizable | White box | S3 |
| 89 | When  user going to save a game status, the current saver will not check if previously there is a save archive | When  user going to save a game status, the current saver will not check if previously there is a save archive | The current saver will check if previously there is a saved archive | Set a check for previously saved game status | White Box | S2 |
| 90 | If container is empty when user want to check what items are in the container, no appropriate message is popped out. | No error message is printed out if the container is empty. | “The container is empty” is printed out. | Check if the container is empty. | BlackBox | S1 |
| 91 | Invalid input can’t be caught. | If user inputs invalid input, like “use”, “purdue”, we can’t catch them. | Errors can be caught when user inputs meaningless command. | Add check for meaningless command. | BlackBox | S2 |
| 92 | The create game will show the dirname of the S3 bucket | The create name shows the dir as a map | It should not show it | Do not show the dir name | Black Box | S1 |
| 93 | After user drops item, the item can’t be removed from inventory properly. | After dropping one item, we can still see this item in the inventory. | Item is removed properly from the inventory. | add inventory.remove() to drop item function. | BlackBox | S1 |
| 94 | User can put an item in a container which is not open yet. | When a container is not open, user can put an item into it. | When the container is not open, we should be unable to do “put item” action. | Add if (container is open) to open item function. | BlackBox | S2 |
| 95 | After using put item command, the item is not added to the container properly. | When a user uses “put item” command, item is not shown up in the container. | Item is added to the container properly. | Add put(item, container) to put item function. | WhiteBox | S3 |
| 96 | The content of map cannot contain special character | The content of map cannot contain special character | The content of map can contain special character | Before read the map, we convert everything into UTF-8 | White Box | S2 |
| 97 | When hold the ‘Enter’ during the main game scene, it will send the request to gameplay constantly | When hold the ‘Enter’ during the main game scene, it will send the request to gameplay constantly | When hold the ‘Enter’ during the main game scene, it will not send the request to gameplay constantly | choose proper actionPerformed method only when user released the key | White Box | S2 |
| 98 | User is still able to read item which is not in the inventory. | When user wants to read content of an item which is not in the inventory. | Wrong message will be popped out if user wants to read the content of an item which is not in the inventory. | Add check if(item is in the inventory). | BlackBox | S2 |
| 99 | An additional clear mechanism not performed as expected to clear the game process | An additional clear mechanism not performed as expected to clear the game process | The clear mechanism will clear the whole game process | Add a proper clear mechanism for game process | White Box | S2 |
| 100 | When you are not actually in the main game scene you may still be able to call the clear mechanism. | You may call the clear mechanism when you are not in the main game scene. | The clear mechanism can only be called in main game scene. | Restrict the use of clear mechanism to only within game scene. | White Box | S2 |