

Defect Number	Defect	Resultant Output (Before Seeding)	Resultant Output (After Seeding)	Suggested Corrections	How Can The Defect Be Caught	Severity
1	Personal scores include other users, Because after one user played, the temp score has not been cleared.	Personal score list display only the current user score	The personal score list displays scores of more than one user.	When game ends, the score should be set to 0.	Black box	S1
2	Scores are ordered incorrectly.	Score should be ordered displayed on scoreboard	Some higher scores are positioned lower than some lower scores.	Sort the scores whenever a new score is obtained.	Black box	S2
3	Score is not updated if a user quits the game before finishing a level.	The users score should be uploaded when he exits out of the game	The score remains the same when the user quits the game in middle of the game.	In close button action listener, save the current score.	Black box	S1
4	Account is created even if the password entered the second time is not the same as the first time (there should be a first field for password, and a second to make sure they are both the same when creating an account)	If the password in the first field is different from the password in the second field, it should not let you create an account	The password verification feature does not work.	Add a check that both password fields are the same.	Black box	S1
5	The menu bar does not close after the user clicks on "Exit" button.	Menu bar should close when user clicks on close	The "close" button does not turn off the menu bar.	Add a dispose call to the listener for the close button.	Black box	S2
6	The size of frame is not being set such that the map can be shown fully.	Size of frame should not be readjustable	Only partial portion of the map is shown.	Reset the frame size so that it matches the map size.	Black box	S3
7	The treasure cannot be picked up.	All treasure should be able to get picked up	The character model walks past the treasure without picking it up. The treasure does not disappear.	Check the condition of the treasure pick up function and set the treasure to be disappeared after the user collides with the treasure. Max health will increase and also the scores will increase.	Black box	S1
8	One enemy walks past walls, treasures and/or doors in level 6.	Enemy should not be able to walk past walls, treasure, and/or doors.	The enemy units walk through the walls, treasure, and doors without any collision checked.	Change the parameters for the enemy movement logic so that enemy walks in the correct path.	Black box	S1
9	Score doesn't change when pass through the doors.	Score should go down when you walk through a door	The score remains intact after opening the door.	Add location of doors to collision check, and if a collision occurs, update score.	Black box	S1
10	Nothing happens when the character model reaches exit of a particular level.	When you reach a end of a level, you should move on to the next level or when you reach a final level it should end game	The character model remains at the same level forever.	Add the location of the end of the level to the list of locations that the collision method checks.	Black box	S1
11	The character model walks past the enemy units without teleporting back to entrance.	When character model walks into an enemy you should engage in combat	The combat system is not triggered.	This occurs because the user has run out of lives and the check no longer occurs, the game should end before this happens.	Black box	S1
12	If you pick up a treasure, then die, the treasure reappears. It should not reappear to prevent users from dying and regathering the same treasure to add to their score. This should not reset after a death so the user cannot abuse it.	When you pick up a treasure and die, it should not reappear	The treasure reappears. Yes, score farming is enabled.	Remove function that redraws treasure after user's death.	Black box	S2

13	Doors do not reset when the character model dies.	When character dies, door should reappear	The doors do not reappear when resetting the game after the model dies.	Add method to redraw doors when a user dies and restarts level.	Black box	S1
14	The treasure cannot be accessed because it is blocked by walls on level 2.	All treasure should be accesable and not be stuck in walls	The treasure is unreachable due to the walls.	Change location of walls to make sure all treasure is accessable	Black box	S2
15	The game does not end when the character model loses all its lives.	Game should end when user lives reach 0	The game continues even after the life of the model is zero.	After each time the user loses a life, a check should be implimented to see if the amount of lives is ≤ 0 , if so, then the game hould end and the score should be saved	Black box	S1
16	Score multiplier is not properly applied for all difficulties.	The higher the difficulty the more score you should recieve for treasure and completion of level	All difficulty levels have a same score multiplier.	Add global variable for each multiplier, and apply it to every score update.	Black box	S1
17	Movement speed of enemies does not change between all difficulties.	Enemies should move faster for each increasing difficulty	The enemy units move at the same speed in all difficulty levels.	Movement speed should be a variable instead of hard coded, a the variable should change based on the selected difficulty.	Black box	S1
18	Penalty for opening a door is the same for easy and medium.	Penalty for opening doors on higher difficulties should be more than on lower ones	Same penalty applies for the easy and medium difficulty.	There should be a global variable for a difficulty multiplier, and it should be applied to the base door penalty.	Black box	S2
19	Amount of lives is the same for all three levels, should be one less life for the hardest level.	For the hardest difficulty you should start out with 2 lives not 3	The hardest level has the same amount of lives as the easier levels.	A life should be added or subtracted if easy or hard difficulty is selected.	Black box	S3
20	Character model's movement is buggy around tight corners.	Character model should move smoothly and not jerk around corners	The character model cannot move smoothly in the corners.	Reduce slightly size of the character model. This will make the movement smoother.	Black box	S3
21	Character model will create an exception when it moves left by the entrance.	There should not be an exception when the character model moves left by the entrance.	There is an exception when the character model moves left by the entrance	Check the character model position and make sure it is always positive and handle the exception.	White box	S3
22	Character model might be fighting with an invisible enemy on level 9.	There should not be any invisible enemies.	The combat system is triggered out of no where.	Call draw enemy function whenever you set a new enemy movement function.	Black box	S1
23	The file of the start point picture path is not correct. So entrance picture cannot be seen	There should have a picture at the entrance to indicate the starting point.	There is no picture at the entrance to indicate the starting point.	correct the path of the entrance picture at the coding part.	White box	S3
24	No way to keep track of the levels.	Should be a display on what current level you are at	The user is not able to know which level he or she is currently playing.	Display current level in a spot that can be easily seen.	Black box	S2
25	When a user dies, or restarts level, all enemies should be revived, but not all are.	When a user dies, all enemies should reappear	Some enemy units are not revived.	Reset a particular level after the user dies. All enemies are revived and positioned on their respective starting place.	Black box	S1

26	When a character model runs out of health, he loses a life, but health does not reset.	When a character loses a life his health should go back to full	The amount of health does not reset accordingly after the character model loses a life.	Check the condition of the health and reset the health when the user loses a life and restart.	Black box	S1
27	There is no function to make sure enemy position is always positive at vertical direction	Keep check the movement of enemy to make sure the position is always positive	If an enemy has a way to go up to out the map, there is an exception thrown.	When the y position of enemy is negative, the enemy should go in the opposite direction	White box	S2
28	Current Health is incorrectly displayed in the battle window.	Current Health should be displayed correctly. Lose 200 for running, Lose 100 for losing a fight	The value of Current Health and Max Health does not change accordingly as the game proceeds.	Track how the two variables change. Focus on amount of health reduced for two cases: run away and lose in the battle.	Black box	S1
29	When user played game and then switch user, the difficulties didn't be reset	All global variable should be initialized again for the new user.	The global variable were not reset when switch user.	In switch user function, initialize global variable of the user	White box	S1
30	When a character model picks up a treasure, his max health increases, his current health should increase by the same amount.	When a user gets a treasure the current health should also increase by 100	The current health does not increase when the model picks up the treasure.	Set a global variable that stores amount of health to be incremented after picking up the treasure. Trigger it for both max health and current health.	Black box	S1
31	The character model should not be able to move during battle.	When a character is engaged in battle. The user should not be able to move, only click on the battle menu	The character model moves around during a battle.	Disable movement of character model during the battle in such a way that direction keystrokes are useless.	Black box	S1
32	If user click cross box on the right up corner at the playing page, the JFrame not be disposed	When a user click cross box on the right up corner at playing page. The frame should be disposed.	When a user click cross box on the right up corner at playing page. Application process is not killed.	Add f.setDefaultCloseOperation(JFrame.DISPOSE_ON_CLOSE); to kill the process.	White box	S3
33	If user exits the game, the menu comes up, but the gameboard does not close.	When the user exits the game, everything should close	The gameboard does not close when the user exits the game.	Close the gameboard before triggering the menu.	Black box	S2
34	Enemy in level 2 does not move.	Enemy should be moving	The enemy units stick to their respective position at level 2.	Pass the enemy in level 2 parameter into the enemy MoveLogic function.	Black box	S1
35	The penalty is the same for running away from a battle and losing a battle. If user exits battle, it should count as a runaway, and he should be penalized accordingly.	If the user clicks the "x" button on the window it should be treated as he ran away. He should lose 200 health and get reset back to the starting point of the level	Same penalty value is set for running away from battles and losing battles.	Define separate variables for running away and losing in a battle. Assign appropriate penalty value into the variable for running away.	Black box	S2
36	When the user runs away, health is subtracted from his max, not his current.	When using the run away button current health should be subtracted	Max health is subtracted rather than the current total health.	Correct the max health variable instead of the total health variable by subtracting the max health when the user runs away.	Black box	S2
37	The user creates an account with username and/or password of invalid length.	User can only create a username/password with length between 5-25	The user manages to create an account with credentials of invalid length.	Check the length of the username and/or password before storing the credentials into the database. If the length is invalid, prompt a warning message, asking for the user to insert valid credentials.	Black box	S1
38	The user creates an account with username and/or password consisting of special characters.	User should only be allowed to create a username/password with only letters and digits	The user manages to create an account with credentials consisting of special characters.	Check for input type of the username and/or password before storing the credentials into the database. If there is a special character, display a warning message, asking for the user to insert valid credentials.	Black box	S2

39	The user creates an account using an existing username.	The program will return an error if the user tried to register the same user name as someone else	A username is used for more than one account.	Set username as primary key of the database. Check whether any duplicate username has been inputted before completing the registration process.	Black box	S1
40	Password field shows the password as you type it.	The password id displayed with stars(****)	The user can see the exact password when typing in the password field.	Use JPasswordField.	Black box	S1
41	Password could include a space, not very good design.	The password does not allow spaces as characters	The user creates a password consisting of a space.	Scan the password whether if it contains spaces. If true, pops up an error message to prompt the user to input a password without space.	Black box	S3
42	If you resize the window, it gets distorted and you can see gray area	You are not able to resize the window beyond default size	Resizing the game window distorts the game display, showing the gray area.	Set correct pixels size for each level accordingly and disable the ability for the frame to resize.	Black box	S3
43	If you click the exit button of the battle GUI, the user becomes invisible to all enemy and will not collide with them.	If you click the exit button, the user should be penalized and restart from the starting point.	The character model can bypass every enemies	Define separate variables for running away ,losing in a battle and after clicked the "exit" button . Assign appropriate penalty value into those variables.	Black box	S1
44	No "Retype password" field. There should be another field "Retype password" in the sign up page.	There is a "Retype password" field below "Password" field for password verification.	The user cannot retype his or her password for verification purpose.	Add another field named "Retype password". It should be JPasswordField.	Black box	S3
45	At level 8, the position of the entrance is covered by wall.	The entrance shouldn't have any wall.	The character model floats at the wall at the entrance.	Find the coordinates of the specific wall and remove it.	Black box	S1
46	At level 8, the character model will get surrounded by the wall.	The character model shouldn't be surrounded by walls.	At near the entrance, when the character model can get stucked by the walls.	Find the coordinates of the specific wall and remove it.	Black box	S1
47	Some useless thing is drawn before the map such that the it is covered by map.	The dungeon map should not have unnecessary item being drawn.	There is an oval draw function that has been implemented before the drawMap function.	Remove the drawOval function.	White box	S3
48	The high scores menu leaves out the top score.	All 5 top scores are shown	The top score is not shown in the score list.	Add by starting score at array spot 1.	Black box	S1
49	The score change after picking up a treasure or opening a door is the same for all difficulties. It should be different for each difficulty.	Each difficulty has a separete score multiplier for treasure bonuses and door penalties	No score and penalty multipliers for the difficulty levels.	Add a different bonus and penalty multiplier for each difficulty. Trigger the correct multiplier according to the difficulty level.	Black box	S2
50	The Menu page should be invisible when game starts	The game window is the only window displayed	The menu page shows up when the game starts.	Close the menu page before the game starts. If needed, add this as a requirement for the game to start.	Black box	S3
51	The Menu page should be invisible when switch user.	When switch user is clicked, the menus creen goes away and is replaced by the log in / sign up page	The menu page shows up when switching user.	Close the menu page when switching the user.	Black box	S3

52	Health does not reset when restart a new game	Health is reset whenever a life is lost or the game / level is restarted	The health remains intact from the last game after restarting a new game.	Implement an if-statement to correct the health in the mouseClicked() function.	Black box	S1
53	Health becomes negative number.	When the health reaches 0, a life is lost, and the level is restarted	The character model will have a negative health in some circumstances.	Implement an if-statement to check if the health is less than 0, set the health to 0.	Black box	S1
54	If health and life is 0, the game does not end.	The game will end when the user has zero lives and loses the last of his/her health	The game never ends.	Check lives and health when losing life and health, if life and health is 0, then the game is over.	Black box	S1
55	If you still have health and 0 lives, you cannot die (an exception may be found).	You are vulnerable to enemies until you reach 0 health and lives, at which point the game ends	The character model becomes invincible when it reaches zero life but still has a portion of health amount remaining.	Check the life condition. If the life is 0, the game should end.	Black box	S1
56	The user can select more than one difficulty button.	the user can only select one button at a time	The difficulty button is not mutually exclusive.	Check the conditions of the enable of the radio button using if-else statement. For example, if "easy" level radio button is selected, the "medium" and "hard button" should be in setSelected(false)	Black box	S2
57	Sometimes, when you sign up for a username/password, it registers. However, it does not let you login.	If you successfully register an account, you are able to log in	Sometimes, the user cannot login into his or her account.	Check whether the registered credentials have been saved successfully into the database.	Black box	S1
58	There are multiple repaint() function that is not necessary.	At the coding part, the paintComponent function and actionPerformed function has overlapped repaint function.	There are multiple unnecessary repaint functions	Remove those unnecessary repaint function	White box	S3
59	Two JMenu item maxhealth and currentHealth shouldn't be declared a global variable.	At the coding part, there are two JMenu item that shouldn't be a global variable	They should be locally declared in case being modified by another class.	Move the two declaration into the MainFrame.java class.	White box	S3
60	You can't lose a battle. You always win	You can win or lose a battle, the odds are 2/3, if you win or tie the enemy, you win, if you lose, you lose	The character model never loses in battles.	Check the logic in the battle function.	Black box	S1
61	Current Health does not update properly.	Current health is properly displayed and updated as the game progresses	Current Health does not change accordingly as the game progresses.	Track changes of the "Current Health". Check for situation in which the model runs away or loses in a battle.	Black box	S1
62	You engage in battle even though the character model isn't fully touching the enemy (Proximity is off)	You only engage the enemy when contact is made	The battle system is triggered everytime when the model is near to an enemy unit without colliding it.	Change the amount of pixels the enemy can be away from the character model before it counts a collision	Black box	S2
63	When there are 4 or more floor tiles, the character model starts skipping frames.	The character moves smoothly along any number of floor tiles	The model skips frames when it reaches 4 or more floor tiles.	instead of moving a pixel at a time, have the character move 20 pixels at a time, so there is no way to have a not traversable area	Black box	S3
64	When playing the game, when the user clicked the back button the frame is not being disposed.	When clicked the back button the frame should be disposed.	The frame is not disposed when the user clicked the back button.	Implement the dispose() function to that frame.	White box	S3

65	Door doesn't disappear after opening.	Door disappears after it is opened	The door does not disappear after the character model walks past it.	Check the condition of the door pick up method. If the door is being collided, the door should disappear.	Black box	S1
66	There is invisible treasure on some levels.	All treasure is properly displayed with the treasure icon	The character model may get bonus score suddenly. In fact, it has just picked up the invisible treasure.	Find the coordinates at the level that causes the "treasure" effect and remove the code that causes the treasure effect.	Black box	S1
67	Score can be negative	Score stops at 0	The score is negative if the character model gets penalized without any score collected.	Check when the score is less than 0, the score should be remained at 0.	Black box	S1
68	Character model does not reset at Level 9.	Character model resets on every level, including 9	The character model does not reset accordingly (the top left corner) when Level 9 starts.	Add the reset function in level 9.	Black box	S1
69	Can't fight with enemy at Level 8.	All enemies on all levels can be engaged	The combat system is not triggered at Level 8.	Add the battle function for the enemy in level 8.	Black box	S1
70	If you maximize battle menu, it becomes huge and distorted.	You are not able to resize battle menu	The battle menu distorts after maximizing it.	Set correct pixels size for each level accordingly and disable the ability for the frame to resize.	Black box	S3
71	When you die, your score does not get uploaded.	Your score is uploaded when you die for the last time, or complete a level	The score is not stored into the database when game over.	Check the condition of the life. When the life is less than 0, the score should be updated into the database.	Black box	S1
72	When you finish a level, your score does not get uploaded.	Upon completing a level, your score is uploaded, when you complete the final level, or run out of lives, the score is finalized	The score is not stored into the database when the user completes a particular level.	Check the condition when a level is finished, the score should be updated in the database.	Black box	S1
73	Invisible wall in level 3	All walls in all levels are visible	The character model cannot walk through a path at an area. It is where the invisible wall locates.	Find the coordinates at the level that contains the invisible wall and remove the setWall function in that level.	Black box	S1
74	If you manually minimize the game window and then expand it again. The screen gets all distorted and unplayable.	You are able to minimize and un-minimize the window, and the game does not distort	Minimizing the game window distorts the game screen, and makes the game unplayable.	Set correct pixels size for each level accordingly and disable the ability for the frame to resize.	Black box	S3
75	If you minimize and then maximize, some enemies stop moving.	All enemies continue moving regardless of whether the game is minimized or maximized	Some enemy units do not move after the game window is maximized.	Set correct pixels size for each level accordingly and disable the ability for the frame to resize.	Black box	S2
76	While playing a game if you click play again, a second window opens, however it is missing character and enemies	When you click play again, a new window opens with properly moving enemies and character icon	The character model and enemy units disappear after the second window opens.	Check the condition when there is already a game being played, the play button should not be enabled.	Black box	S2
77	You have to click the menu buttons multiple times for them to work (Restart, Back, Exit)	Each menu button only has to be clicked once	Clicking the menu button once will not make them working.	Instead of having them as menu buttons, have them as regular buttons	Black box	S3

78	If you exit game, and then start a new one it will leave off from last game, instead of starting a new game	Once the game is exited, the next game opened will be new	The game does not start accordingly.	Have it so every time the user closes a game it resets everything	Black box	S1
79	If you click cancel on the sign up/in screen it will allow you to play the game without signing in.	if you click cancel on the login screen, the game is closed	The user can play the game without signing up or in successfully by pressing the cancel button.	Add correct listener to the cancel button. It should direct the user to a sign up/in screen.	Black box	S1
80	Restart button doesn't work in level 9.	Restart button works in every level	The restart button does nothing in level 9.	Check the condition of the restart button in the onClicked() function. Implement an if statement to check the restart button.	Black box	S2
81	When going into level 9, the character starts at a random place.	The character model correctly starts at the beginning of every level	The character model does not start from the top left corner.	Have the character reset when starting a new level	Black box	S1
82	Enemies in some levels cannot get passed without getting into a battle because they are moving too fast.	All enemies path and speed is slow enough so that you may pass without fighting them if you time it right	The character model has no choice but to initiate a battle with some fast-moving enemy units.	Reassign the enemies in that particular level.	Black box	S1
83	Enemy is stuck between the walls in level 2.	All enemies are placed properly on paths	The enemy unit is trapped inside the wall.	Remove those walls that causes the blockage of the enemy.	Black box	S1
84	Invisible door in level one	All doors are visibly displayed with door icons	The character model will get penalized for nothing. It occurs when it opens the invisible door.	Find the coordinates at the level that causes the "door" effect and remove the code that causes the door effect.	Black box	S1
85	The confirm password textField does not work.	The password and confirm password field must match to create an account	The password textField is useless.	Check password when sign in to make sure confirm password textField and password field has same content	Black box	S1
86	Life is not reset if you restart level, only if you completely restart the game	life is reset if you restart the level or the game	The amount of life is not reset accordingly for restarting a level.	Under listener that restarts game, call methods that reset current and maximum health global variables	Black box	S1
87	The character model cannot go back to previous levels.	The character model can return to previous levels to fight enemies or pick up treasure if he/she chooses	The model will not be able to go back to previous levels through the top left corner.	Link the previous level to current level, and do this linkage to all related levels.	Black box	S3
88	If the health doesn't equal exactly 0, it is not reset.	the health is reset whenever it reaches 0 or below	Health only resets when it is equal to zero.	Change the check to be <= 0 instead of == 0.	Black box	S1
89	The character model cannot move diagonally.	The character model can move diagonally by pressing a combination of arrows	The model can only move up, down, left and right.	Add the direction keystrokes for diagonal movement.	Black box	S3
90	Enemies should stop moving when battle is happening.	Enemies are paused when battle menu appears	The enemy units move around during a battle.	Implement an if-statement to pause the movement of the enemies when a battle occurred.	Black box	S2

91	The newest score is not recorded after a blackout or sudden termination of the game program.	The newest score is uploaded after the completion of every level, so that if a blackout occurs, a score is still saved	The score is not recorded successfully after the blackout.	Save the newest score immediately after completion of each level so that the database has a copy of the newest score.	Black box	S1
92	The database code does not check for the validity of each field inserted to the database. Therefore the insert statement may fail if the length of hashed password exceeds the limit.	Program will not fail because of sql insert error.	The validity of each field is not checked. Program may fail if user chooses a weird password.	Check for the validity of each field before executing insert statement in sql.	White box	S1
93	The database file "dungeon.db" is exposed to the users.	Existing users and hashed password will not be exposed to users.	The program saves the database file "dungeon.db" to the current directory. Users will know the existing users and hashed password once (s)he opens the file.	Save the database file with a username and password.	White box	S2
94	If user opens two programs at the same time, the second program will crash because of database errors.	The second program should be closed automatically with an error message.	SQLite allows only a single access at a time. The second program will crash if it attempts to access the database when the first program is accessing the database.	Close the second program if it detects that another program is also running.	White box	S3
95	Current program does not handle exceptions caused by incorrect sql statements.	The program should be able to fail graceful when a sql exception occurs.	The program simply exits whenever an exception is caught.	Handle errors in the catch block.	White box	S2
96	The battle GUI pops up another time after the user finished a battle with the enemy.	The Battle GUI should ends after the battle instead of popping up again.	The battle GUI pops up again after the user won the rock, paper and scissors game.	Check the condition in the enemy encounter function to check whether the battle GUI function is called twice.	White box	S3
97	The battle algorithm is not well design -- if user chooses play rock, (s)he always wins.	The user should be able to fail if he chooses "rock".	If user chooses to play rock, (s) he always wins.	Use a random number generator that's seeded with the current time.	White box	S3
98	The program creates a new game screen whenever user clicks on "Play" button. This is bad as user may not intent to restart the game.	If user clicks on play button when a game window is open, the game should not be restarted.	The program restarts the game whenever user clicks on play.	Declare "game screen" as an instance variable. Check whether it's null whenever user clicks on play. If it is not null, do nothing.	White box	S3
99	The menu is not user friendly -- it pops up a JOptionPane whenever user enters a wrong format of password or username.	Information about why username or password is invalid in shown next to the field.	The porgram pops up a dialog box whenever user enters a wrong format of username or password.	Use JLabel to display error information.	White box	S3
100	The size of the buttons in main menu are not fixed. It can be changed to a larger size if username is longer because of the spring layout.	Size of buttons should be the same no matter how long the username is.	The program uses spring layout to layout all the buttons and lables, which means that the width of the buttons is dependent on the width of the labels.	Limit length of username and decide a fix size for JLabel. Add extra white spaces to JLabel if it does not have enough length.	White box	S3