SEPR Assessment 4 Test Plan - Team BHD

Approaches Taken

The main approaches taken with the software testing were to verify and to validate the software. The verification of the software was done through regression testing and unit tests, while the validation of the software was done through requirements validation, manual requirements testing and acceptance testing.

Our main software engineering approach was loosely based upon a waterfall model, where we did the bulk of the testing after we had done the implementation. However, within our waterfall model we had multiple iterations of processes such as regression testing and manual requirements testing which allowed us to make small improvements where needed and then test the software again to ensure that it worked and met all of our requirements.

Testing responsibilities

Initial Regression Testing - Tim Waterson
Requirements Validation - whole team
Manual Requirements Testing - written by Katie Onyett, carried out by Katie Onyett and Chris Harrison
Regression Testing - Tim Waterson
New unit tests - Radostin Nanov
Acceptance Testing - written and carried out by Katie Onyett

Pre-extension testing

Initial Regression Testing

Initially, we received 107 tests with the code from Team PSA. The initial testing had a 23.21% pass rate on 56 tests, but 51 tests were disabled due to infinite loops: There were 29 errors and 14 failures. Due to the poor pass rate on the tests, we contacted Team PSA and found out that most of the 29 errors were due to the tests needing a graphics context (OpenGL) which was not there in the testing environment.

Several tests were removed due to needing the openGL, while some were also removed since they required a radial menu implemented by team PSA which we intended to remove in our implementation.

After this, 65 tests remained. 9 of these had been disabled and 56 were enabled. In order to enable the 9 disabled tests, a function within the game code for building flight plans had to be refactored to take out an infinite loop (replacing a while loop with a for loop). Once this change had been made the disabled tests were re-enabled.

The final success rate for regression tests was 93.85% on 65 tests with 4 failures.

Requirements Validation

For the requirements validation, we used our own original and extension requirements from assessments 1-3 to validate since these were what we would base our future tests on. However, some of the requirements are either not essential or have been relaxed for assessment 4. These have been indicated in the requirements validation table and in the further tests which may involve those requirements. Not all of the requirements were met, but this was expected considering that we had not carried out our extension of the software yet.

Requirement	Is it implemented?	Notes
SR1 - main menu	yes	
SR2 - help screen	yes	
SR3 - start button	yes	
SR4 - generate airspace	yes	
SR5 - display airspace	yes	
SR6 - create flights	yes	
SR7 - GUI, including a score and a timer	yes	
SR8 - varied flight characteristics	yes	in this case it is the speed of the flight
SR9 - display score	yes	
SR10 - save score	no	
SR11 - upload score to master repository	no	
SR12 - monitor separation rules	yes	
SR13 - generate and remove flights via entry and exit points	yes	
SR14 - preset flight plan	yes	

SR15 - alter flight plan	yes	
SR16 - change course	yes	
SR17 - change altitude	yes	
SR18 - land	yes	
SR19 - take off	yes	
SR20 - turn left/right	yes	
SR21 - update GUI regularly	yes	
SR22 - have waypoints	yes	
SR23 - set flights on crash course occasionally	no	not done deliberately
SR24 - simulate bad weather	no	not an essential requirement
SR25 - simulate equipment failures	no	not an essential requirement
SR26 - quit button	yes	through pause menu
SR27 - progressively increase difficulty	yes	
SR28 - pause/resume	yes	
SR29 (additional requirement 1) - highlight next waypoint on flight plan	yes	highlighted in a different shade of grey
SR30 (additional requirement 2) - fuel gauge and associated game over state	no	not an essential requirement
NFR efficiency	yes	
NFR documentation	no	
NFR testability	no	in our initial regression testing, many of the tests did not work (see “Initial Regression Testing” above)
NFR stability	yes	
NFR reliability	yes	

NFR maintainability	no	
NFR extensibility	no	extension difficulties such as difficulties with airports and changing controls system etc. - see extension report
NFR accessibility	no	there were no options to change the accessibility of the game for visually impaired users, but due to time constraints this is not an essential requirement
NFR open source	yes	
NFR time-to-market	N/A	fixed deadline
NFR immersivity	no	
ER1 - landing at an airport	yes	
ER2 - taking off from an airport	yes	
ER3 - airports exist	yes	
ER4 - constraints on takeoffs and landings	no	only constraint was not spawning one plane on top of another - not a vital requirement
ER5 - enter and land or take off and exit	yes	
ER6 - score is displayed	yes	
ER7 - score is added to a list of high scores at the end of a game	no	
ER8 - list of high scores is visible to the user	no	achievements visible but these do not mean anything and are not recorded
ER9 - at least ten flights can be in the airspace at once	yes	

Post-extension testing

Manual requirements testing

The manual requirements tests were based directly on the new further requirements (more details in the extension report [1]). We also decided to repeat some of the manual requirements tests from the previous two assessments ([2],[3]) in order to ensure that all our requirements were thoroughly tested but changed some of them in order to reflect the changes in implementation from the past assessments.

Due to the requirements for two players and two airports, in these tests player 1 is referred to as the red player and player 2 is referred to as the blue player. In a similar way, airport 1 is airport DHB in the game and airport 2 is airport BHD in the game.

test #	action performed	expected successful result	expected error result	actual result	requirements tested
1	Play the game and observe the airspace	There are two airports in the airspace	one airport in the airspace	Pass	FR1
2	land a flight at airport 1	successful landing	flight continues	Pass	FR1
3	land a flight at airport 2	successful landing	flight continues	Pass	FR1
4	take off from airport 1	successful takeoff	flight remains in airport	Pass	FR1
5	take off from airport 2	successful takeoff	flight remains in airport	Pass	FR1
6	Play in multiplayer mode	There are two separate scores visible	only one score visible	Pass	FR2.1 and SR9
7	player 1 causes a plane to pass through a waypoint	player 1 score increments by 100	no change / change in score of player 2 / change by	Pass	FR2.1 and SR9

			wrong amount		
8	player 1 causes a plane to exit or land without passing through all of its waypoints	player 1 score decrements by 50	no change/ change in score of player 2 / change by wrong amount	Pass	FR2.1 and SR9
9	player 2 causes a plane to pass through a waypoint	player 2 score increments by 100	no change / change in score of player 1 / change by wrong amount	Pass	FR2.1 and SR9
10	player 2 causes a plane to exit or land without passing through all of its waypoints	player 2 score decrements by 50	no change/ change in score of player 1 / change by wrong amount	Pass	FR2.1 and SR9
11	player 1 uses v to land a plane	plane lands successfully	plane continues flying	Pass	FR2.2, SR18 and ER1
12	player 1 uses v to take off a plane	plane takes off successfully	plane remains at airport	Pass	FR2.2, SR19 and ER2
13	player 1 uses e to accelerate a flight	flight speed increases	flight continues at same speed	Pass	FR2.2
14	player 1 uses q to decelerate a flight	flight speed decreases	flight continues at same speed	Pass	FR2.2
15	player 1 uses a to turn plane left	flight heading changes anticlockwise	flight continues at same heading	Pass	FR2.2, SR16 and SR20

16	player 1 uses d to turn plane right	flight heading changes clockwise	flight continues at same heading	Pass	FR2.2, SR16 and SR20
17	player 1 uses w to increase plane altitude	flight altitude increases	flight continues at same altitude	Pass	FR2.2 and SR17
18	player 1 uses s to decrease plane altitude	flight altitude decreases	flight continues at same altitude	Pass	FR2.2 and SR17
19	player 1 uses key x/c to select a flight	newly selected flight is highlighted and old flight is no longer highlighted	old flight is still highlighted	Pass	FR2.2 and 2.3
20	player 2 uses key l to land a plane	plane lands successfully	plane continues flying	Pass	FR2.2, SR18 and ER1
21	player 2 uses key l to take off a plane	plane takes off successfully	plane remains at airport	Pass	FR2.2, SR19 and ER2
22	player 2 uses [to decrease plane speed	flight speed is adjusted	flight continues at same speed	Pass	FR2.2
23	player 2 uses] to increase plane speed	flight speed decreases	flight continues at same speed	Pass	FR2.2
24	player 2 uses left to turn plane left	flight heading changes anticlockwise	flight continues at same heading	Pass	FR2.2, SR16 and SR20
25	player 2 uses right to turn plane right	flight heading changes clockwise	flight continues at same heading	Pass	FR2.2, SR16 and SR20
26	player 2 uses up to increase altitude	flight altitude increases	flight continues at	Pass	FR2.2 and SR17

			same altitude		
27	player 2 uses down to decrease altitude	flight altitude decreases	flight continues at same altitude	Pass	FR2.2 and SR17
28	player 2 uses key . or , to select a flight	newly selected flight is highlighted and old flight is no longer highlighted	old flight is still highlighted	Pass	FR2.2 and 2.3
29	Play the game in multiplayer mode	the flights are coloured either red or blue	no coloured flights or only flights of one colour	Pass	FR2.4
30	initiate handover process from player 1 to player 2 for flight x (b button)	flight x handed over from player 1 to player 2	flight remains in control of player 1	Pass	FR3
31	initiate handover process from player 2 to player 1 for flight x (; button)	flight x handed over from player 2 to player 1	flight remains in control of player 2	Pass	FR3
32	player 1 hands over a plane then tries to handover within 5 seconds	second handover does not work due to cooldown	second plane is handed over	Pass	FR3
33	player 2 hands over a plane then tries to handover within 5 seconds	second handover does not work due to cooldown	second plane is handed over	Pass	FR3

Assessment 2 requirements tests

When referring to requirements tests from past assessment, assessment number.test number is used to refer to a specific test.

These are the assessment 2 tests which have not been used for manual requirements testing:

- 2.7 - This is not feasible with keyboard controls. However, flights can be selected through the keyboard controls.

- 2.12 - The requirement for crashing has been relaxed for this assessment
- 2.13 - The requirement for two flights only applied to assessment 2 and contradicts the assessment 3 requirement of being able to have 10 flights
- 2.17-2.26 - These are no longer feasible with keyboard controls
- 2.28 - The waypoint separation distance is not an essential requirement, especially considering that the airspace is no longer randomly generated (also difficult to measure)
- 2.30 - Quitting to the menu and starting a new game fulfils the same function as a restart button
- 2.32 - Having a back button is not a vital requirement
- 2.33 - The crash requirement has been relaxed and the fuel gauge is not a vital requirement either

Below are the manual requirements tests from assessment 2, stating whether they have been used for this assessment (justification for not using them is given above) and the result of running them on the latest implementation of the game.

test #	Action taken	expected result	still used?	actual result	what is tested
1	Start using the game	the main menu is present	yes	Pass	SR1
2	Click the quit button while in the airspace	the menu is displayed	yes	Pass	SR1, SR28 and immersivity
3	Click the user manual button in the menu	instructions are displayed	yes	Pass	SR2
4.	Click the Play button in the menu	the game screen loads and the game begins	yes	Pass	SR3
5	Click the Play button in the menu	the new airspace created has at least 10 waypoints	yes	Pass	SR3 and SR22
6	Click the Play button in the menu	a new airspace is generated and displayed	yes	The new airspace is generated, however the waypoints are no longer random.	SR3, SR4 and SR5
7	Click on a flight	the flight properties are displayed to	no	n/a	SR5 and SR21

		the user and the flight is highlighted (only one flight should be highlighted)			
8	Start playing the game	there is at least one flight in the airspace	yes	Pass	SR6
9	click play button in the menu	the new airspace has a timer	yes	Pass	SR7
10	play the game and look at the characteristics of two different flights	the flights can have a different speed and amount of fuel	partial	Speed Pass, but fuel has been removed from gameplay	SR8
11	Send two flights on a collision course	When they are within the separation distance, both flights should be highlighted.	yes	Pass	SR12
12	Crash two planes together	Game over screen is displayed and timers stop	no	n/a	SR12
13	click play button in the menu	the number of flights in the airspace at any time is greater than or equal to 0 and less than or equal to 2	no	n/a	SR13
14	send a flight over the edge of the airspace	plane icon should disappear and shortly a new plane should enter the airspace	yes	Pass	SR13
15	Look at the properties of a flight	the flight has a list of waypoints to travel to and the next waypoint is highlighted	yes	Pass, but flight path shown directly on the game space	SR14 and AR1

16	plane reaches its next target waypoint	next target waypoint in list should be highlighted and old target waypoint should not	yes	Pass	SR14 and AR1
17	Click the set altitude button for a flight and enter 3000	altitude changes gradually towards entered value	no	n/a	SR15 and SR17
18	Click the set altitude button for a flight and enter 3,000,000	error should be displayed and prompt for a different value	no	n/a	SR15 and SR17
19	Click the set altitude button for a flight and enter -1	error should be displayed and prompt for a different value	no	n/a	SR15 and SR17
20	Click the set heading button for a flight and enter -1	error should be displayed and prompt for a different value	no	n/a	SR15 and SR16
21	Click the set heading button for a flight and enter 0	plane changes direction to head due north	no	n/a	SR15 and SR16
22	Click the set heading button for a flight and enter 180	plane changes direction to head due south	no	n/a	SR15 and SR16
23	Click the set heading button for a flight and enter 359	plane changes direction to head nearly due north	no	n/a	SR15 and SR16
24	Click the set heading button for a flight and enter 360	error should be displayed and prompt for a different value	no	n/a	SR15 and SR16
25	Click the turn left button for flight x	target heading is changed by -15	no	n/a	SR15 and SR20

		degrees and plane starts to rotate to its left			
26	Click the turn right button for flight x	target heading is changed by 15 degrees and plane starts to rotate to its right	no	n/a	SR15 and SR20
27	Play the game	flights appear to move smoothly across the airspace	yes	Pass	SR21 and efficiency
28	Play the game and look at the airspace waypoint positions in debug mode	the waypoints in the airspace are at least 3000m apart	no	n/a	SR22
29	Click the Pause button	the timer is paused and all movement stops	yes	Pass	SR28
30	Click the Restart button	a new airspace is generated and the game restarts	no	n/a	SR28
31	Click the Resume button when the game is paused	the game carries on from where it paused	yes	Pass	SR28
32	Click the back button	if another page is displayed, the main menu is displayed again	no	n/a	back() method in conceptual proposal
33	Fly plane until it runs out of fuel	game over message is displayed and game ends	no	n/a	AR2

Assessment 3 requirements tests

These are the assessment 3 tests which have not been used for manual requirements testing:

- 3.1-3.5 - the minimum speed and altitude requirements for landing have changed since assessment 3 and are now tested by a new unit test so this test is no longer needed.

- 3.7-3.8 - the airport obstructions requirement has been relaxed
- 3.13 - The scoring system has been changed from a decrement of 200 for leaving without completing a flight plan to decrement of 50 but the test is still included with the altered value.
- 3.14-3.16 - The high scores list is no longer a vital requirement
- 3.17 - The requirement on the number of flights has been relaxed for assessment 4

Below are the manual requirements tests from assessment 3, stating whether they have been used for this assessment (justification for not using them is given above) and the result of running them on the latest implementation of the game.

test	action taken	expected result	still used?	actual result	requirement tested
1	A flight in the airspace tries to land at the airport at altitude 2000 and speed 75 mph - no obstructions to landing	error or failure since plane is too far away to land	no	n/a	ER1
2	A flight in the airspace tries to land at the airport at altitude 1000 and speed 500 mph - no obstructions to landing	error or failure since plane is travelling too fast to land	no	n/a	ER1
3	A flight in the airspace tries to land at the airport at altitude 2000 and speed 500 mph - no obstructions to landing	error or failure since plane is too far away and travelling too fast to land	no	n/a	ER1
4	A flight in the airspace tries to land at the airport at altitude 1000 and speed 75 mph - no obstructions to landing	flight lands successfully and is removed from the airspace	no	n/a	ER1
5	A flight attempts to take off from the airport with no	Flight takes off successfully and enters the airspace	no	n/a	ER2

	obstructions to it doing so				
6	Play the game	there is at least one airport in the airspace which can be seen and interacted with	yes	Pass	ER3
7	Attempt to land a plane while another is taking off	error or failure due to obstruction to landing i.e. the other plane	no	n/a	ER4
8	Attempt to make a plane take off while another is landing	error or failure due to obstruction to takeoff i.e. the other plane	no	n/a	ER4
9	flight enters the airspace via an entry point and attempts to land at an airport	flight lands successfully	yes	Pass	ER5
10	flight takes off from an airport and attempts to exit the airspace via an exit point	flight leaves airspace successfully	yes	Pass	ER5
11	Play the game	the current score of the game is visible to the player	yes	Pass	ER6
12	make a flight pass through one of the waypoints on its flight plan	score is incremented by 100 points	yes	Pass	ER6
13	make a flight land or exit without passing through all of its waypoints	score is decremented by 200 points	yes, with change of score to 50	Pass	ER6
14	finish playing the game	score is added (and can be seen) on the high scores list	no	n/a	ER7
15	Click “High scores”	the user can see	no	n/a	ER8

	button on the menu	the list of high scores			
16	view high scores list, play the game and then view the high scores list again	new score from game played has been added to the high scores list	no	n/a	ER7 and ER8
17	Play the game	at least 10 flights are in the airspace at any one time	no	n/a	ER9

Regression testing and New unit tests

Once we had finished making changes to the software as detailed in the extension report [1], we re-ran the old unit tests, with the changes to those tests mentioned earlier still in place. This allowed us to check that the basic functionality of the game was still working and had not been affected by the changes made.

However, we also added several new unit tests to the testing environment. These new unit tests mainly consist of method tests of the new functionality of the system, since most of the logic of the game was tested in the regression tests inherited from the previous system.

The new tests added to the system included:

- handoverTest1 - tests that handover happens properly
- handoverTest2 - tests that handover does not happen while where is cooldown for the player
- handoverTest3 - tests that handover sets up a delay for the player who initiates it
- landTest1 - tests that flight lands properly when all landing conditions are fulfilled
- landTest2 - tests that a flight lands properly when heading in the inverse direction of a runway
- landTest3 - tests that a flight does not land when not at the right co-ordinates
- landTest4 - tests that a flight does not land when not with the right heading
- landTest5 - tests that a flight does not land when not with the right altitude
- landTest6 - tests that a flight does not land when not with the right velocity
- handoverTimerTest1 - tests that the handover delay flag is switched after a long enough wait
- handoverTimerTest2 - tests that the handover delay flag does not switch back without a handover intiated
- testUnavailableControls - tests if controls are unavailable while a flight is landing

The unit tests which were removed were:

- toString test for ScoreTracking - the game no longer uses a special toString method for score tracking

- two tests were removed after the ability to change flight plans was removed
- the test for functions for getting and setting a selected flight in the controls class were removed since this information no longer needs to be passed in this way to the flight class
- the test for the function to generate a random flight name was removed because the flights no longer have specific names
- the test for the function to change the airspace used by the play state was taken out because there is now only one airspace used by the game

The final success rate of the unit tests was 96.5 percent. This was run on 71 tests with 3 failures.A full list of the tests can be found in src/unitTests, and the associated test reports can be found in appendix B of this report.

Acceptance testing

In this assessment, we had one round of acceptance testing with our client, allowing us to check that the client was happy with our product. The majority of the acceptance tests passed without difficulty, although a small change was made as a result. This change was to add text to the flight statistics in order to indicate when a flight was ready to land, which happened because the client commented that the readiness of the flight to land needed to be more obvious to the player.

However, we also found that some of the requirements in the acceptance tests had been stated as implemented but had either not been implemented or had been relaxed since the previous assessment. These requirements were:
- SR8 - The implementation has a different speed for each flight but not a fuel gauge, and there are no particular unique characteristics for flights. This requirement has been relaxed somewhat since the previous assessment but unfortunately this was not stated in the acceptance tests.
- SR15 - The requirement to alter a flight plan was not feasible to implement with keyboard controls and difficult for multiplayer.
- SR27 - The requirement for increasing difficulty had actually been fulfilled but was put in the section of the acceptance testing where requirements were not tested and approved by the client as such. However, the fulfilment of this requirement is not something which can be immediately obvious to a player of the game.

Untested Areas

Several of the system and extension requirements were not tested because they were relaxed since the previous assessment. These relaxed requirements include SR10, SR11, SR15, SR24, SR25, SR30, ER4, ER7 and ER8. Further information about these relaxed requirements is in the extension report [1].

SR23, which is the requirement to occasionally set flights on a crash course or near miss, has not been explicitly tested. This is because it is difficult to test and is statistically likely to happen anyway with a sufficient number of flights in the airspace.

SR26 (the requirement to have a quit button), has been validated before the extension of the game but not included in the manual requirements testing. Since no changes were made to this functionality in the extension of the implementation and we were able to check that the requirement was fulfilled in the course of our other manual requirements tests, we felt that there was no need for a specific test for it.

SR27, which is the requirement for the game to become more difficult over time, is present in our implementation but not currently tested. This is mainly because the progression of difficulty is not a feature which would be immediately obvious to the player and is therefore hard to test.

The requirement for at least ten flights in the airspace at one time (ER9), has been validated but not tested as part of the manual requirements testing. Since it is hard mechanically for a player to keep ten flights in the airspace at one time (but possible), we decided not to include a test for this requirement.

We have tested the efficiency of the game in that it appears to run smoothly, but we have not made any specific tests of performance and space used due to time constraints.

We have not specifically tested documentation of our game because this is difficult to test, but we have detailed reports about the changes we have made to the game and made useful comments in the code.

The game is easily testable, as proved by our extensive test reports and rigid test plan, but we have no specific criteria of testability at the moment to rigidly test this.

The stability and reliability of our game have been tested through our unit tests and there have been no crashes or bugs spotted in the game.

We cannot definitely test the maintainability and extensibility of our game but we believe that it has been made more maintainable than it previously was through the changes we made [1].

The accessibility of the game has not been specifically tested but we have tried to make our GUI accessible through the colours and fonts which we have chosen.

The game is currently open source since it is available on Bitbucket and GitHub.

In terms of the time to market, the deadline for the game (7th May 2014) has been kept.

Although the immersivity of the game has not been tested explicitly, we subjectively believe that immersivity has increased from the previous team's game build. Due to time constraints we have been unable to create specific tests for it.

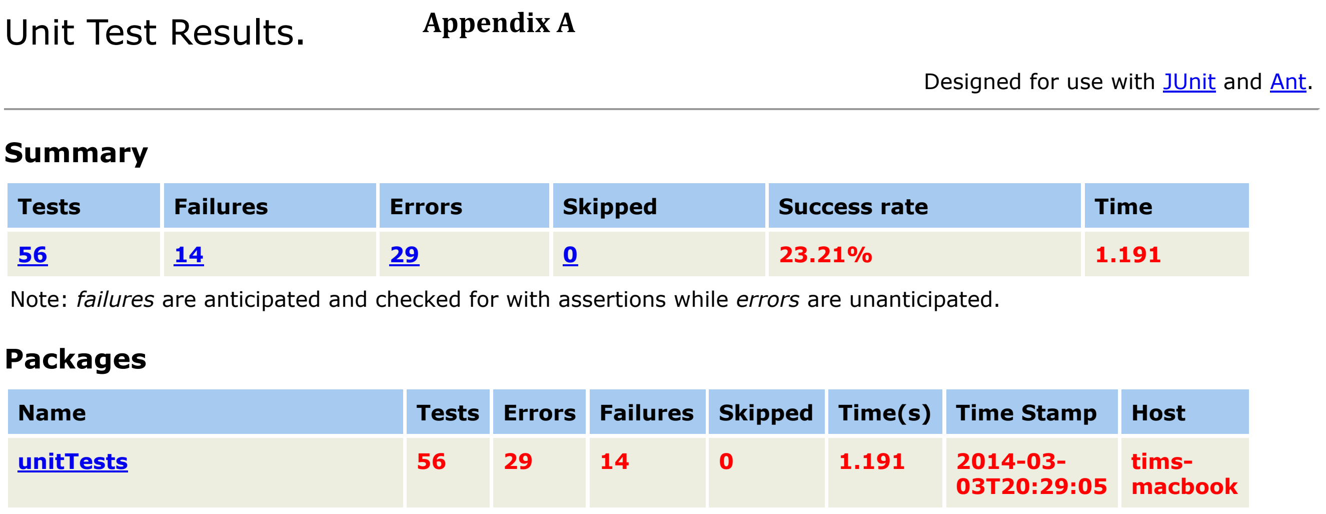
Sources

[1] Team BHD, "Extension Report", Department of Computer Science, University of York, May 2014
[2] Team BHD, "Test Plan Report", Department of Computer Science, University of York, Jan. 2014
[3] Team BHD, "SEPR Assessment 3 Test Plan", Department of Computer Science, University of York, Feb. 2014

Appendices

A - Initial regression test report
B - Post-extension regression tests and new unit tests report
C - Completed acceptance testing form from our session with the customer

Appendix A



Unit Test Results.

Designed for use with JUnit and Ant.

Summary

Tests	Failures	Errors	Skipped	Success rate	Time
56	14	29	0	23.21%	1.191

Note: *failures* are anticipated and checked for with assertions while *errors* are unanticipated.

Packages

Name	Tests	Errors	Failures	Skipped	Time(s)	Time Stamp	Host
unitTests	56	29	14	0	1.191	2014-03-03T20:29:05	tims-macbook

Unit Test Results.

Designed for use with JUnit and Ant.

All Tests

Class	Name	Status	Type	Time(s)
Controls_Tests	**testUpdateTurnLeftTextBox**	**Failure**	**Not yet implemented** junit.framework.AssertionFailedError: Not yet implemented at unitTests.Controls_Tests.testUpdateTurnLeftTextBox(Controls_Tests.java:65)	**0.007**
Controls_Tests	**testUpdateTurnRightTextBox**	**Failure**	**Not yet implemented** junit.framework.AssertionFailedError: Not yet implemented at unitTests.Controls_Tests.testUpdateTurnRightTextBox(Controls_Tests.java:70)	**0.001**
Controls_Tests	**testHandleAndUpdateAltitudeButtons**	**Failure**	**Not yet implemented** junit.framework.AssertionFailedError: Not yet implemented at unitTests.Controls_Tests.testHandleAndUpdateAltitudeButtons(Controls_Tests.java:40)	**0.003**
Controls_Tests	**testInit**	**Failure**	**Not yet implemented** junit.framework.AssertionFailedError: Not yet implemented at unitTests.Controls_Tests.testInit(Controls_Tests.java:35)	**0.001**
Controls_Tests	**testGetSelectedFlight**	**Error**	**N/A** java.lang.NullPointerException at logicClasses.Controls.setSelectedFlight(Controls.java:242) at unitTests.Controls_Tests.testGetSelectedFlight(Controls_Tests.java:93)	**0.011**
Controls_Tests	**testChangeModeByClickingOnFlight**	**Failure**	**Not yet implemented** junit.framework.AssertionFailedError: Not yet implemented at unitTests.Controls_Tests.testChangeModeByClickingOnFlight(Controls_Tests.java:45)	**0.002**
Controls_Tests	**testUpdateHeadingTextBox**	**Failure**	**Not yet implemented** junit.framework.AssertionFailedError: Not yet implemented at unitTests.Controls_Tests.testUpdateHeadingTextBox(Controls_Tests.java:60)	**0.001**
Controls_Tests	**testCheckSelected**	**Failure**	**Not yet implemented** junit.framework.AssertionFailedError: Not yet implemented at unitTests.Controls_Tests.testCheckSelected(Controls_Tests.java:50)	**0.001**
Controls_Tests	**testGiveHeadingWithMouse**	**Failure**	**Not yet implemented** junit.framework.AssertionFailedError: Not yet implemented at unitTests.Controls_Tests.testGiveHeadingWithMouse(Controls_Tests.java:55)	**0.001**
Controls_Tests	**testRender**	**Failure**	**Not yet implemented** junit.framework.AssertionFailedError: Not yet implemented at unitTests.Controls_Tests.testRender(Controls_Tests.java:75)	**0.001**
Controls_Tests	**testUpdate**	**Failure**	**Not yet implemented** junit.framework.AssertionFailedError: Not yet implemented at unitTests.Controls_Tests.testUpdate(Controls_Tests.java:80)	**0.001**
Controls_Tests	testSetDifficultyValueOfGame	Success		0.001
DeferredFile_Test	testLoad	Success		0.002
DeferredFile_Test	testGetDescription	Success		0.001
FlightMenu_Tests	**testGetSliderWidth**	**Error**	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	**0.306**
FlightMenu_Tests	**testSetButtonHeight**	**Error**	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	**0.002**
FlightMenu_Tests	**testSetSpacingSize**	**Error**	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	**0.002**
FlightMenu_Tests	**testSetButtonColor**	**Error**	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	**0.003**
FlightMenu_Tests	**testSetButtonWidth**	**Error**	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92)	**0.004**

			at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	
FlightMenu_Tests	**testGetBearingSize**	**Error**	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	**0.003**
FlightMenu_Tests	**testGetSpeedSize**	**Error**	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	**0.001**
FlightMenu_Tests	**testGetAltSize**	**Error**	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	**0.001**
FlightMenu_Tests	**testGetLabelColor**	**Error**	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	**0.001**
FlightMenu_Tests	**testSetIndicatorSize**	**Error**	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	**0.001**
FlightMenu_Tests	**testIsAcceptingInput**	**Error**	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	**0.001**
FlightMenu_Tests	**testMouseMoved**	**Error**	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	**0.001**
FlightMenu_Tests	**testGetSpacingSize**	**Error**	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	**0.001**
FlightMenu_Tests	**testSetSliderWidth**	**Error**	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	**0.003**
FlightMenu_Tests	**testGetButtonColor**	**Error**	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	**0.001**
FlightMenu_Tests	**testGetButtonWidth**	**Error**	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289)	**0.002**

			at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	
FlightMenu_Tests	testSetLabelColor	Error	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	0.001
FlightMenu_Tests	testSetFlight	Error	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	0.001
FlightMenu_Tests	testSetSpeedSize	Error	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	0.002
FlightMenu_Tests	testSetHeadingSize	Error	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	0.002
FlightMenu_Tests	testSetAltSize	Error	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	0.001
FlightMenu_Tests	testGetIndicatorSize	Error	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	0.000
FlightMenu_Tests	testGetButtonHeight	Error	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	0.001
FlightMenu_Tests	testSetInput	Error	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.GLUtils.checkGLContext(GLUtils.java:17) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:92) at org.newdawn.slick.TrueTypeFont.<init>(TrueTypeFont.java:112) at logicClasses.FlightMenu.<init>(FlightMenu.java:32) at unitTests.FlightMenu_Tests.setUp(FlightMenu_Tests.java:28)	0.000
HoverImage_Test	testGetX	Error	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.InternalTextureLoader.getTexture(InternalTextureLoader.java:249) at org.newdawn.slick.opengl.InternalTextureLoader.getTexture(InternalTextureLoader.java:187) at org.newdawn.slick.Image.<init>(Image.java:192) at org.newdawn.slick.Image.<init>(Image.java:166) at org.newdawn.slick.Image.<init>(Image.java:154) at org.newdawn.slick.Image.<init>(Image.java:132) at unitTests.HoverImage_Test.setUp(HoverImage_Test.java:23)	0.065
HoverImage_Test	testGetY	Error	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.InternalTextureLoader.getTexture(InternalTextureLoader.java:249) at org.newdawn.slick.opengl.InternalTextureLoader.getTexture(InternalTextureLoader.java:187) at org.newdawn.slick.Image.<init>(Image.java:192) at org.newdawn.slick.Image.<init>(Image.java:166) at org.newdawn.slick.Image.<init>(Image.java:154) at org.newdawn.slick.Image.<init>(Image.java:132) at unitTests.HoverImage_Test.setUp(HoverImage_Test.java:23)	0.001

HoverImage_Test	**testSetX**	**Error**	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.InternalTextureLoader.getTexture(InternalTextureLoader.java:249) at org.newdawn.slick.opengl.InternalTextureLoader.getTexture(InternalTextureLoader.java:187) at org.newdawn.slick.Image.<init>(Image.java:192) at org.newdawn.slick.Image.<init>(Image.java:166) at org.newdawn.slick.Image.<init>(Image.java:154) at org.newdawn.slick.Image.<init>(Image.java:132) at unitTests.HoverImage_Test.setUp(HoverImage_Test.java:23)	**0.002**
HoverImage_Test	**testSetY**	**Error**	**No OpenGL context found in the current thread.** java.lang.RuntimeException: No OpenGL context found in the current thread. at org.lwjgl.opengl.GLContext.getCapabilities(GLContext.java:124) at org.lwjgl.opengl.GL11.glGetError(GL11.java:1289) at org.newdawn.slick.opengl.renderer.ImmediateModeOGLRenderer.glGetError(ImmediateModeOGLRenderer.java:384) at org.newdawn.slick.opengl.InternalTextureLoader.getTexture(InternalTextureLoader.java:249) at org.newdawn.slick.opengl.InternalTextureLoader.getTexture(InternalTextureLoader.java:187) at org.newdawn.slick.Image.<init>(Image.java:192) at org.newdawn.slick.Image.<init>(Image.java:166) at org.newdawn.slick.Image.<init>(Image.java:154) at org.newdawn.slick.Image.<init>(Image.java:132) at unitTests.HoverImage_Test.setUp(HoverImage_Test.java:23)	**0.003**
PlayState_Test	**testPlayState**	**Failure**	**Not yet implemented** junit.framework.AssertionFailedError: Not yet implemented at unitTests.PlayState_Test.testPlayState(PlayState_Test.java:30)	**0.012**
PlayState_Test	testGetID	Success		0.001
PlayState_Test	**testInit**	**Failure**	**Not yet implemented** junit.framework.AssertionFailedError: Not yet implemented at unitTests.PlayState_Test.testInit(PlayState_Test.java:35)	**0.001**
PlayState_Test	testSetAirspace	Success		0.000
PlayState_Test	**testRender**	**Failure**	**Not yet implemented** junit.framework.AssertionFailedError: Not yet implemented at unitTests.PlayState_Test.testRender(PlayState_Test.java:40)	**0.001**
PlayState_Test	**testUpdate**	**Failure**	**Not yet implemented** junit.framework.AssertionFailedError: Not yet implemented at unitTests.PlayState_Test.testUpdate(PlayState_Test.java:45)	**0.001**
ScoreTracking_Test	testGetScore	Success		0.002
ScoreTracking_Test	testUpdateScore	Success		0.000
ScoreTracking_Test	testToString	Success		0.001
ScoreTracking_Test	testUpdateWaypointScore	Success		0.001
ScoreTracking_Test	testUpdateTimeScore	Success		0.001
ScoreTracking_Test	testReduceScoreOnFlightLost	Success		0.000
ScoreTracking_Test	testReduceScoreOnFlightplanChange	Success		0.000
ScoreTracking_Test	testResetScore	Success		0.000

Unit Test Results.

Appendix B

Designed for use with JUnit and Ant.

Summary

Tests	Failures	Errors	Skipped	Success rate	Time
71	**2**	**0**	**0**	**97.18%**	**0.772**

Note: *failures* are anticipated and checked for with assertions while *errors* are unanticipated.

Packages

Note: package statistics are not computed recursively, they only sum up all of its testsuites numbers.

Name	Tests	Errors	Failures	Skipped	Time(s)	Time Stamp	Host
unitTests	**71**	**0**	**2**	**0**	**0.772**	**2014-05-06T10:17:11**	**tims-macbook**

Package unitTests

Name	Tests	Errors	Failures	Skipped	Time(s)	Time Stamp	Host
Airspace_Tests	7	0	0	0	0.151	2014-05-06T10:17:11	tims-macbook
Controls_Tests	1	0	0	0	0.082	2014-05-06T10:17:12	tims-macbook
DeferredFile_Test	2	0	0	0	0.069	2014-05-06T10:17:12	tims-macbook
FlightPlan_Tests	**8**	**0**	**1**	**0**	**0.106**	**2014-05-06T10:17:13**	**tims-macbook**
Flight_Tests	**41**	**0**	**1**	**0**	**0.136**	**2014-05-06T10:17:14**	**tims-macbook**
PlayState_Test	1	0	0	0	0.069	2014-05-06T10:17:14	tims-macbook
ScoreTracking_Test	6	0	0	0	0.077	2014-05-06T10:17:15	tims-macbook
SeparationRules_Tests	5	0	0	0	0.082	2014-05-06T10:17:15	tims-macbook

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TestCase Airspace_Tests

Name	Status	Type	Time(s)
handoverTimerTest1	Success		0.015
handoverTimerTest2	Success		0.006
newExitPointTest	Success		0.000
checkIfFlightHasLeftAirspaceTest	Success		0.001
newEntryPointTest	Success		0.001
resetAirspaceTest	Success		0.000
newWaypointTest	Success		0.000

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TestCase Controls_Tests

Name	Status	Type	Time(s)
testUnavailableControls	Success		0.013

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TestCase DeferredFile_Test

Name	Status	Type	Time(s)
testLoad	Success		0.002
testGetDescription	Success		0.000

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TestCase Flight_Tests

Name	Status	Type	Time(s)
turnFlightLeftTest1	Success		0.012
turnFlightLeftTest2	Success		0.000
turnFlightLeftTest3	Success		0.000
checkIfFlightAtWaypointTest1	Success		0.001

checkIfFlightAtWaypointTest2	**Failure**	**N/A**
		`junit.framework.AssertionFailedError`
		`at`
		`unitTests.Flight_Tests.checkIfFlightAtWaypointTest2(Flight_Tests.java:198)`
			0.006

checkIfFlightAtWaypointTest3	Success		0.000
checkIfFlightAtWaypointTest4	Success		0.001
checkIfFlightAtWaypointTest5	Success		0.001
updateCurrentHeadingTest1	Success		0.001
updateCurrentHeadingTest2	Success		0.000
updateCurrentHeadingTest3	Success		0.000
updateCurrentHeadingTest4	Success		0.001
updateCurrentHeadingTest5	Success		0.000
updateCurrentHeadingTest6	Success		0.000
updateCurrentHeadingTest7	Success		0.000
updateCurrentHeadingTest8	Success		0.002
calculateHeadingToFirstWaypointTest1	Success		0.000
calculateHeadingToFirstWaypointTest2	Success		0.000
handoverTest1	Success		0.000
handoverTest2	Success		0.001
handoverTest3	Success		0.000
turnFlightRightTest1	Success		0.000
turnFlightRightTest2	Success		0.001
turnFlightRightTest3	Success		0.001
generateAltitudeTest1	Success		0.001
giveHeadingTest1	Success		0.000
giveHeadingTest2	Success		0.000
giveHeadingTest3	Success		0.001
giveHeadingTest4	Success		0.000
updateAltitudeTest1	Success		0.000
updateAltitudeTest2	Success		0.001
updateAltitudeTest3	Success		0.000

updateAltitudeTest4	Success		0.000
updateAltitudeTest5	Success		0.001
updateXYCoordinates	Success		0.000
landTest1	Success		0.000
landTest2	Success		0.001
landTest3	Success		0.001
landTest4	Success		0.001
landTest5	Success		0.000
landTest6	Success		0.000

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TestCase FlightPlan_Tests

Name	Status	Type	Time(s)
buildRouteTest1	Success		0.018
buildRouteTest2	Success		0.006
buildRouteTest3	Success		0.000
buildRouteTest4	Success		0.001
generateVelocityTest	Success		0.001

updateFlightPlanTest	**Failure**	**expected:<2> but was:<3>**
		`junit.framework.AssertionFailedError: expected:<2> but was:<3>`
		`at unitTests.FlightPlan_Tests.updateFlightPlanTest(FlightPlan_Tests.java:146)`
			0.008

generateEntryPointTest1	Success		0.001
updateFlightPlanTest2	Success		0.001

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TestCase PlayState_Test

Name	Status	Type	Time(s)
testGetID	Success		0.003

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TestCase ScoreTracking_Test

Name	Status	Type	Time(s)
testGetScore	Success		0.002
testUpdateScore	Success		0.000
testUpdateWaypointScore	Success		0.000
testUpdateTimeScore	Success		0.000
testReduceScoreOnFlightLost	Success		0.000
testResetScore	Success		0.000

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TestCase SeparationRules_Tests

Name	Status	Type	Time(s)
checkViolationFalseVerticalTest	Success		0.011
verticalDistanceBetweenFlightsTest	Success		0.000

checkViolationFalseLateralTest	Success		0.000
lateralDistanceBetweenFLightsTest	Success		0.001
checkViolationTrueTest	Success		0.001

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Appendix C

User acceptance testing

This test plan will reference requirements stated in another document. The document with these requirements will be provided to the client before acceptance testing begins. Requirements not tested will be stated alongside the acknowledgement from the client that these requirements should not be tested.

Requirements tested:	Actions taken:	This requirement has been met:		Comments:
		Agree	Disagree	
FR1, SR18 and ER1	1. Guide a plane to the DHB airport 2. Ensure that the plane is at its minimum altitude and speed. 3. Land the plane. 4. Verify that the plane lands successfully.	✓		
FR1, SR18 and ER1	1. Guide a plane to the BHD airport. 2. Ensure that the plane is at its minimum altitude and speed. 3. Land the plane. 4. Verify that the plane lands successfully	✓		
FR1, SR19 and ER2	1. Wait for a plane to appear at the DHB airport.			

	2. Take off the plane. 3. Verify that the plane takes off successfully.	✓		
FR1, SR19 and ER2	1. Wait for a plane to appear at the BHD airport. 2. Take off the plane. 3. Verify that the plane takes off successfully.	✓		
FR2.1 and SR7	1. Verify that in versus mode, there are two separate score counters which can be seen and update appropriately.	✓		
FR2.2, SR18 and ER1	1. Verify that there is a control for the red player to land a plane.	✓		
FR2.2, SR18 and ER1	1. Verify that there is a control for the blue player to land a plane.	✓		Perhaps could be a bit more obvious when conditions to land are satisfied; shouldn't land off the runway.
FR2.2, SR19 and ER2	1. Verify that there is a control for the red player to take off a plane.	✓		
FR2.2, SR19 and ER2	1. Verify that there is a control for the blue player to take off a plane.	✓		

FR2.2 and SR17	1. Verify that there are controls for the red player to adjust the altitude of a flight.	✓		
FR2.2 and SR17	1. Verify that there are controls for the blue player to adjust the altitude of a flight.	✓		
FR2.2, SR16 and SR20	1. Verify that there are controls for the red player to adjust the bearing of a flight.	✓		
FR2.2, SR16 and SR20	1. Verify that there are controls for the blue player to adjust the bearing of a flight.	✓		
FR2.2	1. Verify that there are controls for the red player to adjust the speed of a flight	✓		
FR2.2	1. Verify that there are controls for the blue player to adjust the speed of a flight.	✓		
FR2.2	1. Verify that there are			

	controls for the red player to change which of their flights is currently selected.	✓		
FR2.2	1. Verify that there are controls for the blue player to change which of their flights is currently selected.	✓		
FR2.3	1. Verify that the planes in versus mode can appear in two different colours.	✓		
FR2.4	1. Verify that the red planes are controlled by the red player and the blue planes are controlled by the blue player.	✓		
FR3	1. Verify that there is a control to hand a plane from the red player to the blue player.	✓		
FR3	1. Verify that there is a control to hand a plane from the blue player to the red player.	✓		

Requirement not tested:	Reason for not testing:	The reason for not testing is valid:		Comments:
		Agree	Disagree	
SR1-9	These were already tested and implemented by the previous team.		✓	But same changes to implementation of SR8 [illegible]
SR10-11, ER7-8	These requirements were to create a list of high scores, but this is not required in assessment 4 and thus not essential so, due to time constraints, the team decided against implementing it.	✓		
SR12-15, SR21-23	These were already tested and implemented by the previous team.		✓	SR15 Not Met .
SR24-25, SR27	The "bad weather" and "equipment failure" constraints were not required for assessment 4 and thus non-essential so, due to time constraints, the team decided against implementing these features.	✓		
SR26, SR28-29	These were already tested and implemented by the previous team.	✓		
SR30	The fuel gauge was not required for assessment 4 and therefore non-essential so, due to time constraints, the team decided against implementing these features.	✓		

ER3, ER5-6, ER9	These were already tested and implemented by the previous team.	✓		
ER4	The constraints on numbers of flights taking off and landing at an airport have been relaxed (apart from ensuring that one plane does not spawn on top of another). It is not something which is specifically required for assessment 4 so the team decided against enforcing this constraint	✓		But shame that no track is kept of the planes when landed.

By signing below, you are verifying that the tests above took place and the results are valid.

Client's Signature: ____________________

Team member in charge of acceptance testing signature: ____________

Team BHD assessment 4 requirements list

From assessments 1 and 2 (system requirements and additional requirements):

SR1 - Have a main menu - the easiest and most common way for interfacing between the player and the game prior to the launch of a game session

SR2 - Have a help/instructions screen - in direct relation to UR1

SR3 - Have a "start" button for the user to start the game - in direct relation to UR2

SR4 Generate an airspace - without having the system create a random or predefined airspace, no gameplay can be conducted

SR5 - Simulate airspace graphically - the best and most engaging way to present the game to the players

SR6 - Populate the airspace with flights - without flights, the game will be exempt of gameplay

SR7 - Have a GUI with a score and a timer - a GUI allows for easy and engaging control of the game by the user

SR8 - Have varied characteristics for flights - variety is a great way to improve the player ? experience

SR9 - Display score - in direct relation to UR8

~~SR10 - Save score - in direct relation to UR9~~

~~SR11 - Upload score to a master repository - in direct relation to UR9~~

SR12 - Monitor separation rules - separation rules are an authentic way to provide a challenge for the players and challenge is very important, as previously stated

SR13 - Generate and remove flights from the airspace via entry and exit points - the game must persistently give the player flights to manipulate

SR14 - Pre-set a flight plan - when flights come into the airspace they should have a sensible flight plan

not feasible to implement w/ keyboard controls & difficult for multiplayer

SR15 - Alter a flight plan - players should be able to manipulate the flights in the airspace

SR16 - Change course - in direct relation to UR4

SR17 - Change altitude - in direct relation to UR4

SR18 - Land at airport - in direct relation to UR6

SR19 - Take off from airport - in direct relation to UR6

SR20 - Turn left or right by particular degree - in direct relation to UR4

SR21 - Display updates regularly - if updates are not regular enough, the game will feel unresponsive and "stutter"-y, which will decrease player immersion and enjoyment

SR22 - Have waypoints - in direct relation to UR5

SR23 - Occasionally set flights on crash course/near miss - without this feature, the game will mostly lack challenge

~~SR24 - Simulate bad weather - a feature that will provide greater challenge to players~~

~~SR25 - Simulate equipment failures~~ - a feature providing ~~greater challenge to players~~

SR26 - Have a quit button - the player must be able to exit the game seamlessly

? ~~SR27 - Game becomes harder as the timer goes up - to provide an incre~~asing challenge arc and keep the player engaged

SR28 - Have a pause /resume functionality

SR29 (or AR1) - The next waypoint on the flight plan should be highlighted
SR30 (or AR2) - planes should have a fuel amount and the game shall end if the fuel for a plane runs out

From assessment 3 (extension requirements):

ER1 - An aircraft can land at an airport
ER2 - An aircraft can take off from an airport
ER3 - Airports must exist and be visible to the user
ER4 - There must be constraints on how many aircraft can land or take off at any one time
ER5 - Flight plans must be able to enter and land at an airport or take off from an airport and exit
ER6 - The score must be displayed for a particular game while it is being played
~~ER7 - When a game has finished, the score should be added to a list of high scores~~
~~ER8 - The list of high scores should be available for the user to see~~
ER9 - At least ten flights should be allowed in the airspace at any one time

From assessment 4 (further requirements):

FR1 - there must be at least two landing and takeoff options (such as airports) for the airspace
FR2 - there must be a game mode where at least two people can play at the same time
    2.1 - there must be a score for each player
    2.2 - there must be a full set* of separate keyboard controls for each player
    2.3 - there must be indication of which plane/s are controlled by which player
    2.4 - each plane must be assigned to a player
FR3 - there must be a facility in the game when at least two people are playing such that control of a flight can be handed over from one player to another

*A full set of controls allows the player to select a plane, land, take off and adjust the altitude, speed and heading of a flight.