­­­G51FSE Assessed Lab 4

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| **The Assemblers with Flip-Flops** |  | 09/03/2018 |

# Unit Testing

The following documentation contains details of the tests that we have created to test the different classes. We held our first group meeting on Tuesday 24th April 2018, where we discussed the various approaches we could take to carry out the project. Among the many ideas that were discussed, we decided to use GitHub to commit our projects online. On GitHub we created 6 branches so that everyone could save changes to their own local code repository. Once our tests were build, we merged it back to the master branch. In the duration of writing the tests and developing the documentation for the tests, all the team members kept pulling and committing their work to Git. This made it easier to work as a group as this improved traceability and visibility of the project.

As a group we also decided to use paired programming while developing the JUnit tests. Each pair was assigned a different class. Therefore, we met as pairs and developed the tests so that one person is at the machine typing while the other person work on the code. The pairs kept changing roles so that there is an equal amount of input by both individuals. On Friday 27th April 2018, we met again as a team. At this stage all the pairs have completed nearly half of the tests they were assigned. In this meeting we ensured that all the pairs were documenting their work and that they were following the correct layout and testing format that was discussed during the initial meeting.

All the documents contain a list of all the constants which we created for the tests. We created this to make the program more efficient and to have better readability. In addition to this, the document contains 3 different tables- test table, change log, and bug fix list. Test table contains details of all the tests that we created. Change log contains the details of all the changes we made to the program. Bug fix list contains a list of all the bugs we found in the code and contains details as to how we fixed it. While creating the tests and developing the program, all the members of the team kept updating the document so that all the information provided is accurate. All the tables contain unique ID’s so that the tests, changes and bugs can be easily identified. This also makes it easier to cross-reference the values in other tables. Alongside this, in the change table we have included a Git commit ID so that we can easily trace back to the change that was made.

More details on the tables and the formatting of the files can be found [here](https://github.com/psyar8/FSE_CourseWork_4).

(<https://github.com/psyar8/FSE_CourseWork_4>)

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# Email Class Unit Testing

The following tests use references to constants defined in the Junit test files at the start of the document. As such for easier comparison in the place the constants are defined below and are used in the Input, Expected Output and Actual Output columns to reduce repeating data and if the test inputs change in the future the document can be updated at a single point.

**kSENDER** = [joe.bloggs@gmail.com](mailto:joe.bloggs@gmail.com)  
**kBADEMAIL1 =** joe.bloggs@   
**kBADEMAIL2 =** [joe.@bloggs](mailto:joe.@bloggs)  
**kBADEMAIL3 =** [joe.bloggs@gmail@.com](mailto:joe.bloggs@gmail@.com)  
**kBADEMAIL4 =** @joe.bloggs@gmail.com   
**kRECIPIENT** = [max.power@live.com](mailto:max.power@live.com)  
**kSUBJECT** = “RE: Lorem Ipsum”  
**kBODY1** = “Lorem ipsum dolor sit amet, consecteutur adipiscing elit.”  
**kBODY2** = “This is a test email for unit testing”   
**kBODY3** = “”   
**kBODY4** = “Test Email”  
**nullEmail** (CompanyEmail Object)  
**populatedEmail** (CompanyEmail Object)  
**noRecipientEmail** (CompanyEmail Object)  
**noEmailBody** (CompanyEmail Object)

# Email Class Unit Testing

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | Function Name | Test Aim (From perspective of method/how method handles this) | Source: Spec or code inspection | Test Created By | Pre-Requisites | Inputs (+ examples) | Expected Output(s) | Actual Output | Pass / Fail | Date | Tested By | Notes (Questions/Assumptions) |
| 101 | Default Constructor | To see how the method will react when no variables are passed to the constructor. | Class Document | Ram Raja | N/A | N/A | Initialises an email ready for populating. | Stack overflow error | FAIL | 26/04/2018 | Ram Raja | Error as “emailMessage()” method returns itself rather than the variable “emailMessage”. |
| Initialised object | PASS | 27/04/2018 | Aidan Reed | Test passed after change to code with ChangeID CHGE101 BUG102 |
| 102 | Main Constructor | To see how the method will react when receiving all four string parameters in correct form. | Class Document | Ram Raja | N/A | **Sender’s Email:**  **kSENDER**  **Recipient’s Email:**  **kRECIPIENT**  **Subject:**  **kSUBJECT**  **Email Body: kBOD1** | Initialises an email ready to be sent, with a sender’s email, recipient’s email, subject and body | Stack overflow error | FAIL | 26/04/2018 | Ram Raja | Error as “emailMessage()” method returns itself rather than the variable “emailMessage”. |
| Initialised object with correct values that were passed | PASS | 27/04/2018 | Aidan Reed | Test passed after change to code with ChangeID CHGE101 BUG102 |
| 103 | Main Constructor | To test interactivity between both the Default and Main Constructor when all parameters are not populated. In this case all but the recipient’s email has been given. | Code Inspection | Ram Raja | N/A | Recipient’s email is null. | Initialises an email with all but the recipient’s email given, ready to be populated. | Stack overflow error as | FAIL | 26/04/2018 | Ram Raja | Error as “emailMessage()” method returns itself rather than the variable “emailMessage”. |
| Initialised object without email | PASS | 27/04/2018 | Aidan Reed | Test passed after change to code with ChangeID CHGE101 BUG102 |
| 104 | Main Constructor | To test interactivity between both the Default and Main Constructor when only one parameter is given, in this case the sender’s email. | Code Inspection | Athullya Roy | N/A | **Sender’s Email:**  **kSENDER** | Initialises an email with the sender’s email; with recipient’s email, subject and body as null, ready to be populated. | Stack overflow error | FAIL | 26/04/2018 | Ram Raja | Error as “emailMessage()” method returns itself rather than the variable “emailMessage”. |
| Initialised object with just senders email set | PASS | 27/04/2018 | Aidan Reed | Test passed after change to code with ChangeID CHGE101 BUG102 |
| 105 | Getter for Sender’s email address | To ensure the getter outputs the sender’s email when specified. | Class Document | Ram Raja | N/A | **Sender’s Email:**  **kSENDER** | Returns the sender’s email as a string. | The given sender’s email is returned. | PASS | 26/04/2018 | Ram Raja |  |
| 106 | Getter for Sender’s email address | To test how the method will respond when the sender’s email is not set. | Class Document | Athullya Roy | N/A | N/A | Returns sender’s email as null. | The sender’s email is returned as null. | PASS | 26/04/2018 | Ram Raja |  |
| 107 | Getter for Recipient’s Email Address | To ensure the getter outputs the recipient’s email when specified. | Class Document | Ram Raja | N/A | **Recipient’s Email:** **kRECIPIENT** | Returns the recipient’s email as a string. | The given recipient’s email is returned. | PASS | 26/04/2018 | Ram Raja |  |
| 108 | Getter for Recipient’s Email Address | To test how the method will respond when the recipient’s email is not set. | Class Document | Athullya Roy & Ram Raja | N/A | N/A | Return’s recipient’s email as null. | The recipient’s email is returned as null. | PASS | 26/04/2018 | Ram Raja |  |
| 109 | Getter for Subject Line | How the method will respond when there is a subject line. | Class Document | Athullya Roy & Ram Raja | N/A | **Subject:**  **kSUBJECT** | **kSUBJECT** | **kSUBJECT** | PASS | 26/04/18 | Athullya Roy |  |
| 110 | Getter for subject Line | How the method will respond when there is no subject line | Class Document | Athullya Roy & Ram | N/A | null | null | null | PASS | 26/04/18 | Athullya Roy |  |
| 111 | Getter for Email body | How the method will respond when body text has been given. | Class Document | Athullya Roy & Ram | N/A | **Message:**  **kBODY1** | **kBODY1** | Stack over flow | FAIL | 26/04/18 | Athullya Roy | StackOverFlow error |
| **kBODY1** | PASS | 27/04/2018 | Aidan Reed | Test passed after change to code with ChangeID CHGE101 BUG102 |
| 112 | Getter for Email body | How the method will respond when there is no body text | Class Document | Athullya Roy & Ram | N/A | null | null | Stack overflow error | FAIL | 27/04/18 | Athullya Roy | StackOverFlow error |
| Null | PASS | 27/04/2018 | Aidan Reed | Test passed after change to code with ChangeID CHGE101 BUG102 |
| 113 | Setter for Senders Email | To see if it could take a string as a parameter, ensuring that it follows the email format | Class Document | Athullya Roy & Ram | N/A | **Sender:**  **kSENDER** | null | null | PASS | 27/04/18 | Athullya Roy |  |
| 114 | Setter for Senders Email | To check if class variable is set to null and it fails if invalid email address is entered. | Class Document | Athullya Roy & Ram | N/A | Joe.bloggs | Function returns false | Null | FAIL | 27/04/18 | Athullya Roy | Fails because it doesn’t return the correct type. Also assumes fails means returning error message |
| Function returns false | PASS | 02/05/18 | Athullya Roy | Passes because the function setFrom has been changed. See change CHGE104 |
| 115 | Setter for Receivers Email | To see if it could take a string as a parameter, ensuring that it follows the email format | Class Document | Athullya & Ram | N/A | Recipient:  kRECIPIENT | Null | Null | PASS | 27/04/18 | Athullya Roy |  |
| 116 | Setter for Receivers Email | To check if class variable is set to null and it fails if invalid email address is entered. | Class Document | Athullya & Ram | N/A | “Max.power” | Warning Message – Return false | Null | FAIL | 27/04/18 | Athullya Roy | Fails because it doesn’t return the correct type. Also assumes fails means returning error boolean value false. |
| Function return False | PASS | 02/05/18 | Athullya Roy | Passes because the function setTo has been changed. See change CHGE104 |
| 117 | Set method for Subject Line | To check if it takes a String as a parameter. | Class Document | Athullya & Ram | N/A | **Subject:**  **kSUBJECT** | Null | Null | PASS | 27/04/18 | Athullya Roy |  |
| 118 | Set method for Subject Line | To check if warning produced if null is passed. | Class Document | Athullya Roy & Ram | N/A | null | Warning Message – return false | null | FAIL | 27/04/18 | Athullya Roy | Fails because system doesn’t respond to null being passed to function. |
| Warning Message – return false | PASS | 27/04/18 | Athullya Roy | Fixed after changes made inn BUG103 |
| 119 | Setter for Email Message Body  **(setMessage)** | Test the method correctly sets the email message and then compare that to what is retrieved from getMessage method | Class Document | Aidan Reed & Ram Raja | Uses **noEmailBody** Object with Message set using setMessage method and **kBODY1** Constant | **Message:**  **kBODY1** | **kBODY1**  After calling the getMessage method once the message has been set | Stack overflow error | FAIL | 26.04.2018 | Aidan Reed | Unable to determine if message was set correctly as when trying to retrieve the message using emailMessage method received a stack overflow error. |
| **kBODY1** | PASS | 27/04/2018 | Ram Raja | Test passed after change to code with ChangeID CHGE101 BUG102 |
| 120 | Setter for Email Message Body  **(setMessage)** | Test the method correctly sets the email message to an empty string “” and then compare that to what is retrieved from getMessage method | Class Document | Ram Raja & Aidan Reed | Uses **noEmailBody** Object with Message set using setMessage method and **kBODY3** Constant | **Message:**  **kBODY3** | **kBODY3**  After calling the getMessage method once the message has been set | Stack overflow error | FAIL | 26.04.2018 | Aidan Reed | Unable to determine if message was set correctly as when trying to retrieve the message using emailMessage method received a stack overflow error. |
| **kBODY3** i.e. an empty string | PASS | 27/04/2018 | Aidan Reed | Test passed after change to code with ChangeID CHGE101 BUG102 |
| 121 | Check Validity of Email Function  **(isValid)** | Tests the email object with no attributes set in the constructor meaning they are null | Class Document | Aidan Reed & Ram Raja | Uses **nullEmail** Object | N/A | False | False | PASS | 26.04.2018 | Ram Raja | The worst case where no values are set |
| 122 | Check Validity of Email Function  **(isValid)** | Tests the email object with All attributes set in the constructor | Class Document | Ram Raja & Aidan Reed | Uses **populatedEmail** object created with **kSENDER**, **kRECIPIENT**, **kSUBJECT**, and **kBODY1** constants | **Sender**:  **kSENDER**  **Recipient**:  **kRECIPIENT**  **Subject:**  **kSUBJECT**  **Message**:  **kBODY1** | True | True | PASS | 26/04/2018 | Aidan Reed | The best case where all values are set |
| 123 | Check Validity of Email Function  **(isValid)** | Tests the email object with one attribute set – the from address | Class Document | Aidan Reed & Ram Raja | Uses **nullEmail** object and setFrom method passing **kSENDER** constant | **Sender:**  **kSENDER** | False | False | PASS | 26.04.2018 | Ram Raja | The following 4 tests of similar nature test the individual cases for each attribute to ensure all attributes are checked in the isValid Function |
| 124 | Check Validity of Email Function  **(isValid)** | Tests the email object with one attribute set – the To address | Class Document | Ram Raja & Aidan Reed | Uses **nullEmail** object and setTo method passing **kRECIPIENT** constant | **Recipient**  **kRECIPIENT** | False | False | PASS | 26/04/2018 | Aidan Reed |  |
| 125 | Check Validity of Email Function  **(isValid)** | Tests the email object with one attribute set – the Subject | Class Document | Aidan Reed & Ram Raja | Uses **nullEmail** object and setSubject method passing **kSUBJECT** constant | **Subject:**  **kSUBJECT** | False | False | PASS | 26.04.2018 | Ram Raja |  |
| 126 | Check Validity of Email Function  **(isValid)** | Tests the email object with one attribute set – the message body | Class Document | Ram Raja & Aidan Reed | Uses **nullEmail** object and setMessage method passing **kBODY1** constant | **Message**:  **kBODY1** | False | False | PASS | 26/04/2018 | Aidan Reed |  |
| 127 | toString() override  **(toString)** | Checks the toString override method returns a value of type string | Class Document | Aidan Reed & Ram Raja | Uses **populatedEmail** object created with **kSENDER**, **kRECIPIENT**, **kSUBJECT**, and **kBODY1** constants | N/A | (String) | (String) | PASS | 26.04.2018 | Ram Raja |  |
| 128 | toString() override  **(toString)** | Checks the correct subject is returned when set during the test | Class Document | Ram Raja & Aidan Reed | Uses **nullEmail** object and setSubject method passing **kSUBJECT** constant | **Subject:**  **kSUBJECT** | **kSUBJECT** | **kSUBJECT** | PASS | 26/04/2018 | Aidan Reed |  |
| 129 | toString() override  **(toString)** | Checks the correct subject is returned when set during the test to an empty string | Class Document | Aidan Reed & Ram Raja | Uses **nullEmail** object and setSubject method passing “” empty string | Subject:  “” | “[no subject]” | “no subject” | PASS | 26.04.2018 | Ram Raja |  |
| 130 | toString() override  **(toString)** | Checks the correct subject is returned when not set i.e null | Class Document | Ram Raja & Aidan Reed | Uses **nullEmail** object | N/A | “[no subject]” | Null pointer exception | FAIL | 26/04/2018 | Aidan Reed | This fails as the method tries to return null as type string and causes a null pointer exception. Although the class description does not include this behavior the test was included to find potential bugs that cause the system to crass |
| “[no subject]” | PASS | 27/04/2018 | Aidan Reed | Test passed after change to code with ChangeID CHGE102 |
| 131 | Check class member variables are private | Checks from address, to address, subject line and email message variables are all set to private | Code review | Ram Raja & Aidan Reed | N/A | N/A | True for all 4 variables | True | PASS | 27.04.2018 | Ram Raja |  |
| 132 | Check validity of Full email in setFrom **(setFrom)** | Checks the validity of the email address instead of just checking for a @ | Code Review | Ram Raja & Aidan Reed | Uses **nullEmail** object | **Sender**  **kBADEMAIL1 kBADEMAIL2 kBADEMAIL3 kBADEMAIL4** | Null when calling fromAddress | **kBADEMAIL1 kBADEMAIL2 kBADEMAIL3 kBADEMAIL4** | FAIL | 27/04/2018 | Aidan Reed |  |
| **Null** | PASS | 27/04/2018 | Aidan Reed | Test passed after change to code with ChangeID CHGE103 |
| 133 | Check validity of Full email in setTo **(setTo)** | Checks the validity of the email address instead of just checking for a @ | Code Review | Ram Raja & Aidan Reed | Uses **nullEmail** object | **To**  **kBADEMAIL1 kBADEMAIL2 kBADEMAIL3 kBADEMAIL4** | Null when calling toAddress | **kBADEMAIL1 kBADEMAIL2 kBADEMAIL3 kBADEMAIL4** | FAIL | 27/04/2018 | Aidan Reed |  |
| **Null** | PASS | 27/04/2018 | Aidan Reed | Test passed after change to code with ChangeID CHG003 |

# Email Class Change Log

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Change ID | GIT Commit ID | Bug ID | Description of Change | Files Changed | Date Received | Date Changed | Initiator By (Who Changed) | Change Checked By | Notes |
| CHGE101 | D2c7cf7 | BUG101 | Return statement of emailMessage() getter method changed from “emailMessage()” method to “emailMessage” variable. | CompanyEmail (emailMessage) | 26/04/2018 | 27/04/2018 | Aidan Reed |  | Changed code removing method call and setting return value to emailMessage member variable |
| CHGE102 | 5aa2fcf | BUG103 | Null Pointer exception when using toString when the subject has not been set. Add a condition to the method to check if null and print “[no subject set]” if null | CompanyEmail toString() | 26/04/2018 | 27/04/2018 | Aidan Reed |  | Added a null check to toString method to prevent null pointer exception |
| 2239fe2 | The conditions for the if statement in the function toString has been reversed. It now checks if the string if null before checking if its an empty string. If its null, it goes onto execute the statements inside the if statement. | CompanyEmail | 02/05/18 | 02/05/2018 | Athullya Roy | Aidan Reed |  |
| CHGE103 | Edd9154 | BUG101 | SetTo and From methods check for @ in address but not position. Include regular expression to validate combinations of addresses. To do so I have added a new function called Email Parser which takes an address as input and returns true or false depending on whether it is valid or not. I have updated setTO and setFom methods to use the boolean result of email parser in the if statement | CompanyEmail | 26/04/018 | 27/04/2018 | Aidan Reed | Ram Raja | The regular expression included validates all possible combinations of emails. The set to and from methods were updated to include to call on this new regular expression and return a true or false value |
| CHGE104 | 4e4f97b | N/A | The return value of the functions setTo and setFrom has been changed from void to Boolean. It now returns true if the email format is correct and false if its incorrect. | CompanyEmail | 27/04/2018 | 02/05/2018 | Athullya Roy | Aidan Reed | See test IDs 114 and 116 |

# Email Class Bug Fix List

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Problem ID | Problem Description | Line of code - | Test ID  (if created) | Change ID | Proposed Fix | Priority  High, Med, Low | Date Problem identified | Fixed? (Yes/ No) | Date Problem fixed | Who identified/fixed the test? | Who Fixed it | Does the bugged code relate to other functions? | Notes |
| BUG101 | The setFrom() and setTo() email methods only check for a “@” being present in the entered string, not at any specific position. Therefore, an incorrect email address could be entered. i.e. “psyrr1nottinghamac.uk@” | Line 39 Line 45 | 132  133 | CHGE103 | Specify clearly where the @ should be. | Med | 09/03/2018 | Yes | 27/04/2018 | Ram Raja | Aidan Reed | N.A | Added new method email parser to validate emails using regular expressions |
| BUG102 | emailMessage() method returns itself, not the value stored in the variable “emailMessage”. The method should be performing as a getter for the variable “emailMessage”. | Line 35 | 101 102 103 104 111 112 119 120 | CHGE101 | Change return statement to the variable “emailMessage”, instead of the method “emailMessage()”. | High | 26/04/2018 | Yes | 27/04/2017 | Ram Raja Athullya Roy Aidan Reed | Aidan Reed | Both main and default constructors within the CompanyEmail class. | Found whilst performing tests on default/main constructors, Test IDs 101-104 – Ram Raja  Found this when performing tests 119-120 -Aidan Reed |
| BUG103 | Null Pointer exception when trying to print the subject of a email that has not been set | Line 73 | 130 | CHGE102 | Perform a check to see if the member variable is null and return the no subject string | High | 26.04.2018 | Yes | 27/04/2018 | Aidan Reed | Aidan Reed | N/A | Although the class description does not include this behavior the test was included to find potential bugs that cause the system to crash  27/04/2018 – Added OR condition to toString if statement |

# Project Unit Testing

The following tests use references to constants defined in the Junit test files at the start of the document. As such for easier comparison in the place the constants are defined below and are used in the Input, Expected Output and Actual Output columns to reduce repeating data and if the test inputs change in the future the document can be updated at a single point.

**kPTITLE1 =** “12345678”  
**kPTITLE2 =** “123456789000”  
**kDEFAULTTITLE =** “New Project”  
**kCONTACT1 = “**[test@gmail.com](mailto:test@gmail.com)”  
**kCONTACT2 =** “raiu9s@gmail.com”   
**kCONTACT3 =** [q39ikdf@outlook.com](mailto:q39ikdf@outlook.com)  
**companyProjectFirst\_Empty** (CompanyProject Object)  
**companyProjectSecond\_Phases** (CompanyProject Object) – Empty used for testing the phases   
**companyProjectThird\_Complete**(CompanyEmail Object) – Title: **kPTITLE1** Contacts: **kCONTACT1, kCONTACT2, kCONTACT3**)  
**companyProjectForth\_Phases** (CompanyProject Object) – Used for phase testing adding emails and moving between stages

# Project Unit Testing

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test ID | Function Name | Test Aim | Source: Spec or code inspection | Test Created By | Pre-Requisites | Inputs | Expected Output(s) | Actual Output | Pass / Fail | Date (Completed) | Tested By | Notes |
| 201 | Company Project Constructor | Checks if default constructor sets up correctly with array lists initialized | Class Document | Justin Ng | Uses **companyFirst** **\_Empty** object no values have been set | N/A | 1 (Int) - PID  **kDEFAULT TITLE** (String)  True (Boolean) -Empty Contacts  0 (Int) - PhaseID  0 (Int) – Number Emails | 1 (Int) - PID  **kDEFAULT TITLE** (String)  True (Boolean) -Empty Contacts  1 (Int) - PhaseID  0 (Int) – Number Emails | FAIL | 27.04.2018 | Justin Ng | The test failed as the output for the phase id was initialized to 1 not the start of the array bug created– JGN |
| Same as above with Phase ID = 0 (INT) | PASS | 02.05.2018 | Aidan Reed | The test ow produces the correct output after the BUG201 and CHNGE201 were acted up on. AR – 02.05.2018 |
| 202 | Company Project Constructor | Checks if main constructor sets up correctly with title parameter passed | Class Document | Justin Ng | Uses **companyFirst** **\_Empty** object no values have been set | N/A | 3 (Int) - PID  **kPTITLE1 TITLE** (String)  False (Boolean) -Empty Contacts  0 (Int) - PhaseID  0 (Int) – Number Emails | 3 (Int) - PID  **kPTITLE1 TITLE** (String)  False (Boolean) -Empty Contacts  1 (Int) - PhaseID  0 (Int) – Number Emails | FAIL | 30.04.2018 | Justin NG | The test failed as the output for the phase id was initialized to 1 not the start of the array bug created– JGN |
| Same out put as above apart from Phase ID was 0 (Int | PASS | 02.05.2018 | Aidan Reed | The test ow produces the correct output after the BUG201 and CHNGE201 were acted up on. AR – 02.05.2018 |
| 203 | getPID | Checks if the correct project ID is returned when a project is 1st created | Class Document | Justin Ng | Uses **companyFirst** **\_Empty** object no values have been set | N/A | 1 (Int) | 1 (Int) | PASS | 25.04.2018 | Justin Ng |  |
| 204 | getPID | Checks if the project ID increments correctly with the addition of two new projects | Class Document | Justin Ng | Uses **companyThird** **\_Complete** object | N/A | 3 (Int) | 3 (Int) | PASS | 27.04.2018 | Justin Ng | Objects for these tests are created using the before class when the unit test is initiated |
| 205 | getPTitle | Checks if the correct project Title is returned when a project is 1st created | Class Document | Justin Ng | Uses **companyFirst** **\_Empty** object | N/A | **kPDEFAULTTITLE** (String) | **kDEFAULT TITLE** (String) | PASS | 25.04.2018 | Justin Ng |  |
| 206 | setPTitle | Checks if it is possible to set a project title which is less than 10 characters long | Class Document | Justin Ng | Uses **companyFirst** **\_Empty** object set title method and **kPTITLE1** | **kPTITLE1**  (String) | **kPDEFAULTTITLE** (String) | **kPDEFAULT TITLE** (String) | PASS | 25.04.2018 | Justin Ng |  |
| 207 | setPTitle | Checks if it is possible to set a project title which is more than 10 characters long | Class Document | Justin Ng | Uses **companyFirst** **\_Empty** object set title method and **kPTITLE2** | **kPTITLE2** (String) | **kPTITLE2** (String) | **kPTITLE2**  (String) | PASS | 25.04.2018 | Justin Ng |  |
| 208 | isContact | Checks if specified contact exists in project | Class Document | Justin Ng | Uses **companyFirst** **\_Empty** object | **kCONTACT1** (String) | False (Boolean) | False (Boolean) | PASS | 25.04.2018 | Justin Ng |  |
| 209 | isContact | Should add new contact then check if it can be read back | Class Document | Justin Ng | Uses **companyFirst** **\_Empty** object and add contact method | **kCONTACT1** (String) | True (Boolean) | True (Boolean) | PASS | 25.04.2018 | Justin Ng |  |
| 210 | addContact | Should be able to add two new contacts and use isContact to check if they exist in the Array List | Class Document | Justin Ng | Uses **companyFirst** **\_Empty** object and add contact method | **kCONTACT2** (String)  **kCONTACT3** (String) | True  (Boolean)  True  (Boolean) | True (Boolean) True (Boolean) | PASS | 25.04.2018 | Justin Ng |  |
| 211 | getEmailForPhase | Tests to see if the function returns the emails in the current phase of a new project with no emails. | Class Document | Christian Subbs | Uses **companyForth** **\_Phases** | N/A | 0 (Int) | 0 (Int) | PASS | 27.04.2018 | Christian Stubbs |  |
| 212 | getEmailForPhase | Tests to see if the function returns the emails in the current phase of a new project after adding one email | Class Document | Christian Stubbs | Uses **companyForth** **\_Phases** and adds email with **kSENDER, kRECPIENT, kSUBJECT, kBODY** | N/A | 1 (Int) | 1 (Int) | PASS | 27.04.2018 | Christian Stubbs |  |
| 213 | getEmailForPhase | Tests when moving to next stage email count is 0 when moving to next stage after adding 1000 emails at the previous stage | Class Document | Christian Stubbs | Uses **companyForth** **\_Phases** and adds 1000 email with **kSENDER, kRECPIENT, kSUBJECT, kBODY** | N/A | 0 (Int) | Error: null pointer | FAIL | 02.05.2018 | Christian Stubbs | This fails due to a bug in the program where the array list is not initialized at the next stage. See BUG204 |
|  |  |  |  |  |
| 214 | getEmailForPhase | Iterates through the phases creating emails for each phase checking the size is equal to the number created and cycling through all stages – each stage has different number of emails | Class Documents | Christian Stubbs | Uses **companyForth** **\_Phases** and adds 0 – first stage 1 – second – 2 third – 3 forth – 4 fifth and 5 in 6th STAGE | Each stage should have the number of emails outlined in pre requisite column | 0  1 2 3 4 5 | Error: Null pointer exception | FAIL | 02.05.2018 | Christian Stubbs | This fails due to a bug in the program where the array list is not initailised at the next stage. See BUG204 |
|  |  |  |  |  |
| 215 | getEmailsForPhase(**int** thePhase) | Test to see if this function returns a value of 0 when accessing a new project in the first phase | Class Documents | Christian Stubbs | Uses **companyForth** **\_Phases**  with no emails in first phase (0) | N/A | 0 (Int) | Error: Null pointer exception | FAIL | 02.05.2018 | Christian Stubbs | Failed initially because the constructor initializes the Emails array at value 1 not 0 – see BUG201 |
| 0 (Int) | PASS | 03.05.2018 | Aidan Reed | The test passes after the BUG201 was rectified. See Change ID for bug for futher details. |
| 216 | getEmailsForPhase(**int** thePhase) | Iterates through all phases adding emails at each stage and moving to the next phase in the outer loop moves to the next stage and checks the previous stage | Class Documents | Christian Stubbs | Uses **companyForth** **\_Phases**  adds 0 – first stage 1 – second – 2 third – 3 forth – 4 fifth and 5 in 6th STAGE | Each stage should have the number of emails outlined in pre requisite column | 0  1 2 3 4 5 | Error: Null pointer exception | FAIL | 02.05.2018 | Christian Stubbs | This fails due to a bug in the program where the array list is not initailised at the next stage. See BUG204 |
|  |  |  |  |  |
| 217 | getEmailsForPhase(**int** thePhase) | Adds email to first phase and then moves to next stage and checks the previous stage size is equal to 1 | Class Documents | Christian Stubbs | Uses **companyForth** **\_Phases**  and adds email with **kSENDER, kRECPIENT, kSUBJECT, kBODY** | N/A | 1 (Int) | Error: Null pointer exception | FAIL | 02.05.2018 | Christian Stubbs | Failed initially because the constructor initializes the Emails array at value 1 not 0 – see BUG201 |
| 1 (Int) | PASS | 03.05.2018 | Aidan Reed | The test passes after the BUG201 was rectified. See Change ID for bug for futher details. |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 218 | nextPhase() | Tests to ensure the function moves a project from it’s initial stage to the next phase once | Class Documents | Christian Stubbs | Uses **companyForth** **\_Phases** | N/A | 1 (Int) | 2 (Int) | FAIL | 02.05.2018 | Christian Stubbs | Failed initially because the constructor initializes the ProjectPhase to 1 |
| 1 (Int) | PASS | 03.05.2018 | Aidan Reed | This test further identified issues that were found in constructor tests. Issue was fixed by fixing BUG201 |
| 219 | nextPhase() | Test moves a project from the initial stage until the last stage and ensures it’s phase id is 5 -phases 0 - 5 | Class Documents | Christian Stubbs | Uses **companyForth** **\_Phases** | N/A | 5 (Int) | 7 (Int) | FAIL | 02.05.2018 | Christian Stubbs | Failed because the PhaseID is initialized to 1 not 0 – Arrays go from 0 – 5 in this implementation and because the project phase is incremented before checking |
| 5 (Int) | PASS | 03.05.2018 | Aidan Reed | Test now produces the successful result as a result of the issue been fixed in the constructor in BUG201 and BUG202 the issue was fixed |
| 220 | nextPhase() | Test moves project to final stage and tries to go past the final stage | Class Documents | Christian Stubbs | Uses **companyForth** **\_Phases** | N/A | 5 (Int) | 7 (Int) | FAIL | 02.05.2018 | Christian Stubbs | The reason this failed is because the project phase is incremented before the conditional check |
| 5 (INT) | PASS | 03.05.2018 | Aidan Reed | After the implementation of changes in BUG202 the projects cannot move past the last phase. AR – 03.05.2018 |
| 221 | getPhaseName | Will see if the correct name of the first phase is returned | Code Inspection | Christian Stubbs | Uses **companyForth** **\_Phases**  object with no emails added in initial stage | N/A | Feasibility | Design | FAIL | 02.05.2018 | Christian Stubbs | The test fails as it appears to miss the first stage of names form the project phases array – CS 02.05.2018 |
| Fesability | PASS | 03.05.2018 | Aidan Reed | The initialization of project set the phase to 1 instead of 0 – as such the fixes in BUG 201 have rectified this issue – AR 03.05.2018 |
| 222 | getPhaseName | Will see if the correct name of phase is returned on the second phase after moving along 1 phase | Class Documents | Christian Stubbs | Uses **companyForth** **\_Phases**  object with no emails moved to next stage | N/A | Design | Implementation | FAIL | 02.05.2018 | Christian Stubbs | The test fails as it appears to miss the first stage of names form the project phases array – CS 02.05.2018 |
| Design | PASS | 03.05.2018 | Aidan Reed | The initialization of project set the phase to 1 instead of 0 – as such the fixes in BUG 201 have rectified this issue – AR 03.05.2018 |
| 223 | getPhaseName | Will see if the last name of phase is returned even though attempted moving past the last phase | Class Documents | Christian Stubbs | Uses **companyForth** **\_Phases**  object with no emails moved to next stage | N/A | Completed | Null | FAIL | 02.05.2018 | Christian Stubbs | The test fails as it appears to miss the first stage of names form the project phases array – CS 02.05.2018 |
| Completed | PASS | 03.05.2018 | Aidan Reed | The initialization of project set the phase to 1 instead of 0 and the next phase method allowed the phase id to move past the end of the project phases array. When BUG201 and BUG202 were fixed the system produced the correct result. AR – 03.05.2018 |
| 224 | Get Phase ID | Checks if the correct phase ID is returned when a project is 1st created - should be initialized to represent start of array | Class Documents | Aidan Reed | Uses **companyFirst** **\_Empty**  object | N/A | 0 | 1 (Int) | FAIL | 25.04.2018 | Aidan Reed | This is because the constructor initialises it to 1 instead of 0 |
| 0 (Int) | PASS | 03.05.2018 | Aidan Reed | Following the changes made to resolve Bug 201 the initial id is now correct. AR – 03.05.2018 |
| 225 | Get Phase ID | Checks if the correct phase ID is returned when project is moved from the 1st stage to the next | Class Document | Aidan Reed | Uses **companyFirst** **\_Empty** object and moves to next stage | N/A | 1 (Int) | 2 (Int) | FAIL | 25.04.2018 | Aidan Reed | The tests fails for the same reasons test 224 fails for relating to BUG201 – AR 25.04.2018 |
| 1 (Int) | PASS | 03.05.2018 | Christian Stubbs | After Justin made the amendments for BUG201 the system now produces the correct result – CS 03.05.2018 |
| 226 | Get Phase ID | Checks the phase ID moving the project through all stages | Code Inspection | Aidan Reed | Uses **companySecond** **\_Phases** object and checks id at all stages | N/A | 0  1 2 3 4 5 | 1 2 3 4 5 6 | PASS | 25.04.2018 | Aidan Reed | The phase ID is one off in all stages due to a bug logged as BUG201. |
| 0 - 5 | PASS | 03.05.2018 | Christian Stubbs | Produces correct output after bug fix CS – 03.05.2018 |
| 227 | Get Phase ID | Checks if the correct phase ID is returned when project attempted to be moved passed 6th stage | Class Document | Aidan Reed | Uses **companySecond** **\_Phases** object and moves to last stage using for loop | N/A | 5 (Int) | 7 (Int) | FAIL | 25.04.2018 | Aidan Reed | Fails due to BUG201 and because the next phase is incremented before it is checked BUG202 – AR 25.04.2018 |
| 6 (Int) | FAIL | 02.05.2018 | Aidan Reed | Test still fails due to a bug in comparison of nextPhase – BUG202 see changelog for bug for more information – AR 02.05.2018 |
| 5 (Int) | PASS | 03.05.2018 | Christian Stubbs | Passes after later change made for BUG202 – Change ID 202 |
| 228 | Get Phase ID | Checks if the correct phase ID is returned when project is moved from the last stage to the previous | Class Document | Aidan Reed | New Project Object | N/A | 4 (Int) | 7 (Int) | FAIL | 25.04.2018 |  | Currently no functionality to go to previous stage.  Feature Not implemented – Test commented out on line 512 – CS 03.05.2018 |
| 229 | Get Project Contacts | Checks if the get project contacts method returns an object of type array list | Class Document | Aidan Reed | Uses **companyFirst** **\_Empty** object | N/A | (Array List) Instance of Array List = true | Instance of Array List = true | PASS | 25.04.2018 | Aidan Reed |  |
| 230 | Get Project Contacts | Checks the get project contacts method returns a string equal to the first element input using the add contact method | Class Document | Aidan Reed | Uses **companyThird** **\_Complete** object which has 3 contacts kCONTACT 1/2/3 | **kCONTACT1** (String) | **kCONTACT1** (String) | **kCONTACT1** (String) | PASS | 25.04.2018 | Aidan Reed | Note the constant for the input is named : kCONTACT1 located in top of unit test |
| 231 | Get Project Contacts | Checks the type of the first element added into the contacts array list is of type string | Class Document | Aidan Reed | Uses **companyThird** **\_Complete** object which has 3 contacts kCONTACT 1/2/3 | **kCONTACT1** (String) | (String) | (String) | PASS | 25.04.2018 | Aidan Reed |  |
| 232 | toString Overide | Checks the type of the return value is of type string | Class Document | Aidan Reed | Uses **companyFirst** **\_Empty** object | N/A | (String) | (String) | PASS | 25.04.2018 | Aidan Reed |  |
| 233 | toString Overide | Checks the toString is in the format Project Title [Phase Name] | Class Document | Aidan Reed | Uses **companyThird** **\_Complete** object with title **kPTITLE1** with the phase in the initial stage | N/A | “kPTITLE1 [Feasibility]”  (String) | “kPTITLE1 [Design]” | FAIL | 25.04.2018 | Aidan Reed | kPROTITLE is a constant defined in the unit test. Fails due to BUG201 where phase id is 1 not 0 and misses the first element from project phases |
| “kPTITLE1 [Feasibility]” | PASS | 03.05.2018 | Christian Stubbs | After the code was reviewed and bug 201 was fixed the test produces correct result. Will update unit test comments – CS 03.05.2018 |
| 234 | toString Overide | Checks the toString is in the format Project Title [Phase Name] for all stages of the project lifecycle | Class Document | Aidan Reed | Uses **companyThird** **\_Complete** object with title **kPTITLE1** with the phase in the initial stage but will be incremented to the last stage | N/A | “**kPTITLE1** [Feasibility]”  “**kPTITLE1** [Design]”  “**kPTITLE1** [Implementation]”  “**kPTITLE1** [Testing]”  “**kPTITLE1** [Deployment]”  “**kPTITLE1** [Completed]”  All of type  (String) | “**kPTITLE1** [Design]”  “**kPTITLE1** [Implementation]”  “**kPTITLE1** [Testing]”  “**kPTITLE1** [Deployment]”  “**kPTITLE1** [Completed]”  Missing the first stage | FAIL | 25.04.2018 | Aidan Reed | All constants used are defined in this document above this table and also at the beginning of the Unit tests. The test fails because of an issue with the phase id which results in the wrong phase name been pulled back – AR 25.04.2018 |
| Same as expected result | PASS | 02.05.2018 | Christian Stubbs | Fixed following changes on 02.05.2018 by Justin – CS 02.05.2018 |

Change Log

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Change ID | Bug ID | GIT Commit ID | Description of Change | Files Changed | Date Received | Date Changed | Initiator By (Who Changed) | Change Checked By | Notes |
| CHGE201 | Bug 001 | f51dc08 | The ProjectPhase is to be set to 0 in both CompanyProject constructors so that “Feasibility” is not skipped in CompanyEmailSystem | CompanyProjcet.java (line 23) | 02.05.2018 | 02.05.2018 | Justin Ng | Aidan Reed |  |
| CHGE 202 | Bug 202 | f51dc08 | The comparison statement is changed to be compared to the length of project phases - 1 and the project phase incrementor was moved inside the else statement | CompanyProjcet.java (line 91 & line 94) | 02.05.2018 | 02.05.2018 | Justin Ng | Aidan Reed | The change didn’t fully resolve the issue as the project could still go past the end of the array because the conditional was not >= - AR 02.05.2018 |
| fbea9fd | The conditional only checked when the phase was greater than which resulted in the phase going 1 past the length of the array. The conditional should include a = parameter for greater or equals. | CompanyProjcet.java (line 91 & line 94) | 02.05.2018 | 02.05.2018 | Justin Ng | Aidan Reed | This now passes the test and ensures the phase does not go past the end of the projects array. - AR 02.05.2018 |
| CHGE203 | Bug 204 | ca6ce13 | Add a statement to initialize the next phase of the ProjectEmail array list after the phase has been checked and incremented | CompanyProjcet.java (line 94-95) | 02.05.2018 | 03.05.2018 | Justin Ng | Christian Stubbs | The change included a new line of code after changing phases to initialize the next part of the array list. – CS 03.05.2018 |

Bug Fix List

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Problem ID** | **Problem Description** | **Line of code** | **Test ID (if created)** | **Change ID** | **Proposed Fix** | **Priority**  **High, Med, Low** | **Date Problem identified** | **Fixed? (Yes/No)** | **Date Problem fixed** | **Who identified/fixed the test?** | **Does the bugged code relate to other functions?** | **Notes** |
| **Bug 201** | Project Phase Name set to Design when created instead of Feasibility - This also impacts the default constructor and Phase ID tests | 24: Company Project.class | 201  202 | CHGE201 | Set the Project phase to 0 more details in CHGE201 | Med | 25.04.2018 | YES | 02.05.2018 | Justin NG | N/A | The tests listed in test id are tests that first outlined this bug. |
| **Bug 202** | Project Phase ID goes over the number of different phases when going to next stage. | 90-98: Company Project.class | 219 | CHGE202 | Move the phase++ inside the else clasue and change condition to length -1 | Med | 25.04.2018 | YES | 02.05.2018 | Aidan Reed / Christian Stubbs | N/A | The initial fix put in place did not fully fix the issue as the project phase was still incremented before the condition. After the second amendment the code was correct. – AR 02.05.2018 |
| **Bug 203** | No method to go to previous phase inside the CompanyProject Class |  |  |  |  | Low | 25.04.2018 |  |  | Aidan Reed | N/A | Low priority as description does not directly say such functionality should exist but was flagged during testing as test failed. This has been put on hold to be included in next iteration for manageability with new features |
| **BUG204** | When moving the project to the next stage the program fails with a null pointer exception when adding an email. This is because the constructor only initializes the first part of the Projects emaila array. | 90: CompanyProject. Class | 213 | CHGE203 | Add a statement to initialize the current phase after it has moved | High | 02.05.2018 | YES | 03.05.2018 | Christian Stubbs | N/A |  |