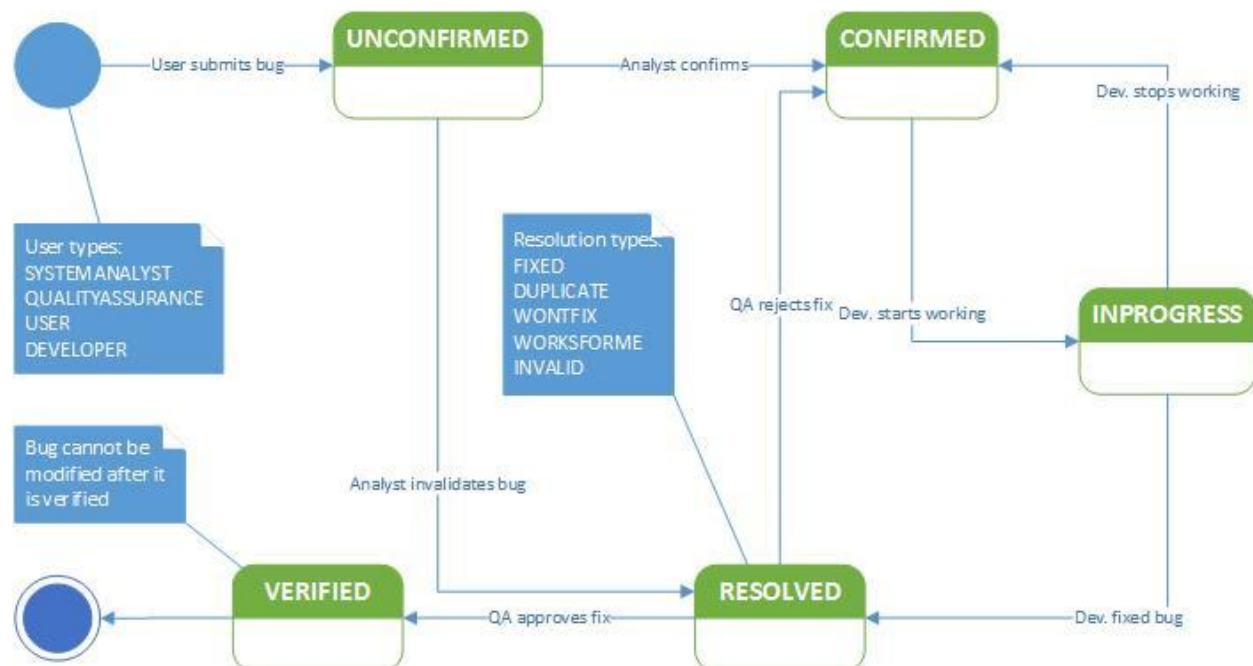The assignment requires to add error handling to a small application using contracts and exceptions. The application allows to manage a database of bugs based on the state chart shown below. The task is limited to four files – Bug, Bugzilla, BugzillaException and ProgramTest (for testing)

The assignment has the following tasks:

1. Write the specification for the class "Bug" – Add pre-conditions and post-conditions for the public methods (including the constructor) and the Invariant of the class.
2. Write specification for the following methods in class Bugzilla –
   1. register
   2. login
   3. logout
   4. submitBug
   5. confirmBug
   6. invalidateBug
   7. startDevelopment
   8. stopDevelopment
   9. fixedBug
   10. approveFix
   11. rejectFix

3. Write tests in the ProgramTest to test the contracts (only **test for Preconditions** are required for the task). Use the testrun script for the task.
4. Based on the contracts add exceptions to the methods in in the classes Bug and Bugzilla. The task requires to throw exception only for the Preconditions. Add exception types and messages to the class BugzillaException.

The contracts are based on the state chart below:

Class Bug handles the consistency of the state of the bug, whereas class `Bugzilla` handles the users and actions.

Please do not modify the existing source code other than the additions required for exception handling. The goal of the task is to prevent the application from failing on any action. This is accomplished using exceptions. We need to write the exceptions based on the contracts.

The first step is to write the contracts and test them using the scripts as done in the lab exercises. After the contracts are set, add the exceptions based on the contract and execute the application as a java program to test the actions.

There are two scripts:

`testrun.bat` – Test using cofoja as used before.

`testapp.bat` – Test the java application without cofoja.

1. Start with writing the contracts/tests and execute them with the `testrun.bat` script as done in previous works. Only consider the Preconditions for testing
2. Once you complete writing and testing contracts, start adding exceptions to the methods in the application. You can test it with the `testapp.bat` script. You can also run the program in eclipse, but you may have to add the lib/*.jar files in the class path.

The `Bugzilla` class writes the data to a file (`bl.bin`). However, when testing the contracts in step 1 above, using `testrun.bat`, **please disable file handling** by passing `false` to the constructor as shown in the first test of `ProgramTest.java`. During the testing process in step 2 above, if required you may delete the file and start the application again.

The solution should prevent incorrect actions/calls in the application based on contracts and exceptions. As an example, "*a developer should not be able to resolve a bug which another developer is already working on*" or "*login operation must not allow an unregistered user to log in*". **Please read the comments in the source file for details.**

The task can be done individually or in groups. Group work is **strongly recommended**. The group size must not exceed eight members. Please submit the task by **4ᵗʰ Jan 2016 23:55**.