User Manual

JUnit Test Generator

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1. Introduction

JUnit Test Generator is an application that allows the user (usually a software developer) to generate JUnit Tests in a semi-automatic way, in an early stage of the project.

It also stores the information of the tests cases (instructions associated to each method) to allow the user modify them (edit, delete and create instructions)

With the application you can even create a simple skeleton for your application from scratch.

1.1. What's JUnit?

JUnit is a framework to create Unit Tests for Java language, that allows testing the correct functionality of any class.

1.2. Why is JUnit or reusing tests useful?

JUnit tests single classes, what reduces the search space, helping you find the error much faster. Otherwise you would realise that there is a problem when joining all together, and you will have to scan each single class to check if the error is there or not.

Storing JUnit Tests lets you modify the class. You can add new methods and then use the application to add more tests to those new methods without having to start over. It also lets you modify the implementation of a method and then, reapply the test to check if you have broken something down.

2. Application Features and Code Constraints

The application has two working modes.

The first is the skeleton generator.

Through the application's GUI, you would be able to define the name of the class, the package of the class, the imports that it needs, the constructors and methods, with their parameters.

Once you have add all the methods and constructors, imports, and package that you want, the application allows you to dump that information into a Java file.

The second is the JUnit Test Generator it-self.

Through the application's GUI, you would be able to load a Java File.

Once loaded you can start creating Objects to use on the test's instructions, create Instructions, or you can Load a previously saved state.

When you finish, or just before closing the application, you can save your progress or/and generate the test file.

The Java Code had this constraints:

- Cannot use extends or implements
- Cannot use abstract, final, etc. modifiers, only **public** or **private**
- Cannot throw exceptions.
- Cannot declare more than one element in the same line (e.g. “private String name, password”, you should split it in two instructions)

3. User Manual usage

In the next section (Menu section), there is a list of all the options that can be available on the application, a small description of what they do, and when they will be visible to the user.

The last section just before the Appendices, is a How-To in which is detailed all the operations that can be performed in the program, step by step.

If you follow it, after finishing the section 5.1 and all its sub-steps and sub-states, you should end up with a skeleton of your class, ready to be filled up with code.

In section 5.2 you should open the file you want to create the tests for, then you can either open the just-generated file (through section 5.1.5) or any simple Java file.

Once it gets loaded, the methods prototypes would be listed on the left column. Now is when you need to create instructions and associate them with a method. To do that, you first need to create at least one object (you can check the steps out in this manual).

During this process, you can either load or save the state.

WARNING: Loading a state, removes all previous information.

Once you have finish, just generate the Test file. To do so, follow the How-To (section 5.8)

Note: This application uses a library called Randomizer, which is filled and compiled by YOU. This library is the one that allows the auto-generation of the inputs on the creation of the objects. (Check section 5.9)

4. Menu

- File
  - Open: Allows to open a Java file to start adding TestCases, and objects.

    {Only visible before choosing either the option Open or New}
  - New Allows to create a Java skeleton file with the methods desired.

    {Only visible before choosing either the option Open or New}
  - Generate Test Takes all the information of the tests and generates a JUnit Java file.

    {Only visible once a file has been opened}
  - Export Skeleton Generates a Java file (skeleton) with the methods, imports and package given.

    {Only visible once the option New has been chosen}
  - Add Import Adds an Import to the import list of the Skeleton to be created.

    {Only visible once the option New has been chosen}
  - Set Package Sets the package of the Java file to be created.

    {Only visible once the option New has been chosen}

- State {Only visible once a Java file has been opened}
  - Load Loads all the test information previously stored from a file.
  - Save Stores all the test information for future runs.

- Object {Only visible once a Java file has been opened and a Constructor has been selected}
  - Create Creates an object to be used in the tests.

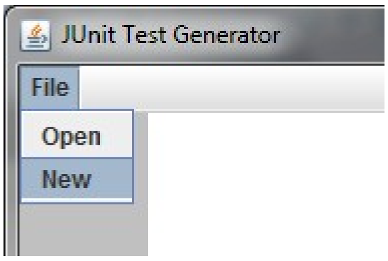
- Instruction {Only visible once a Java file has been opened and a method has been selected}
  - Create Allows to create an instruction as an assert or a custom code one.
  - Edit Selected Allows to edit the selected instruction. {Only visible when an instruction has been selected}
  - Delete Selected Deletes the selected instruction. {Only visible when an instruction has been selected}

5. How To …

5.1. … Create an Skeleton with the application

1st Run the application

2nd Click on File → New



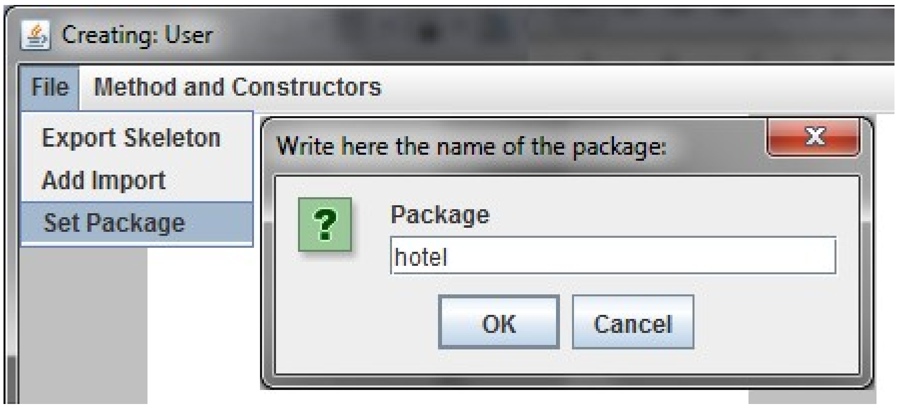
3rd Choose a folder an a name for the file to create. (User.java for example)

4th Follow 2.1.X. instructions.

5.1.1. … Set File's package

1st Click on File → Set Package

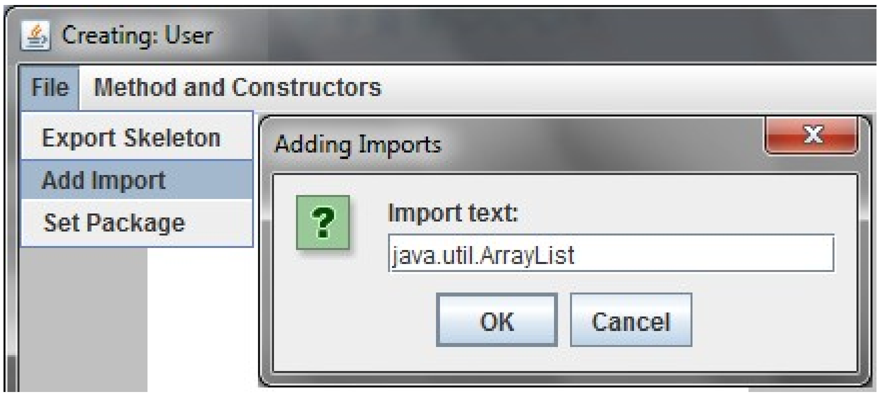
2nd Write the package and click OK



5.1.2. … Add an Import

1st Click on File → Add Import

2nd Write the package and class to import and click OK



java.util.ArrayList

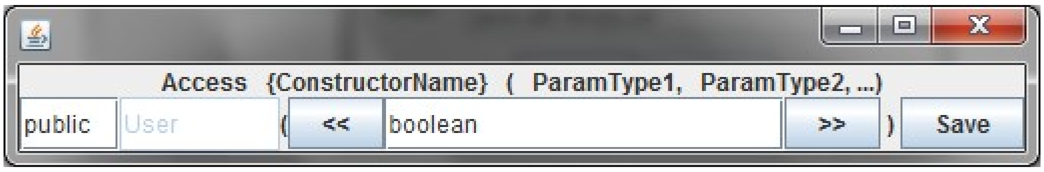
5.1.3. … Add a constructor

1st Click on Method and Constructors → New Constructor

2nd Write the access (public or private) on the first Field

3rd Write the type of the nth parameter on the last Field and click on >>

4th Repeat step 3 until you finish, then click on Save



public User boolean

5.1.4. … Add a method

1st Click on Method and Constructor → New Method

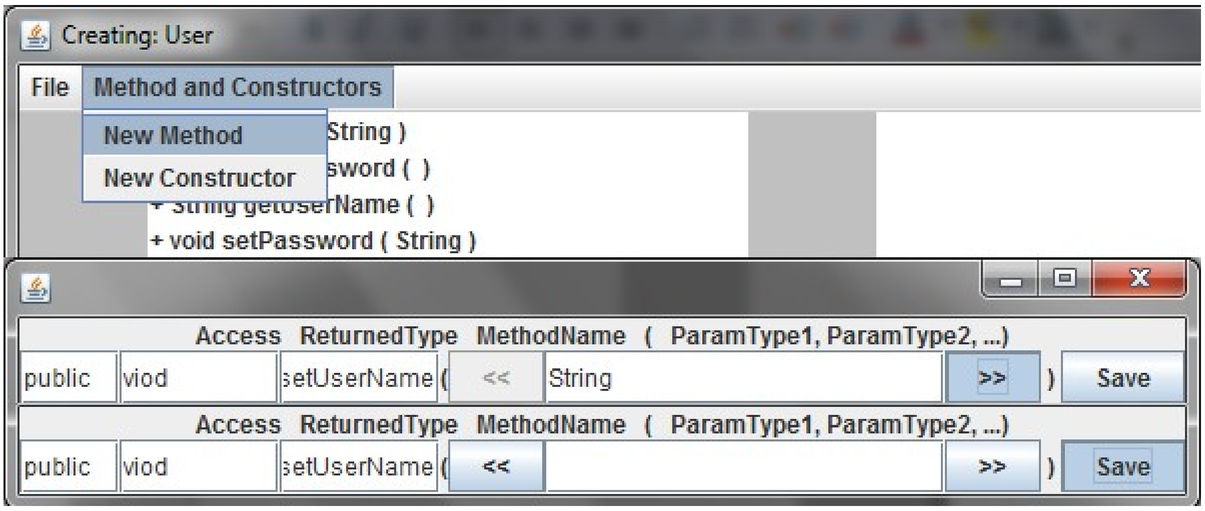
2nd Write the access (public or private) on the first Field

3rd Write the returned type on the second Field

4th Write the name of the method on the third Field

5th Write the type of the nth parameter on the last Field and click on >>

6th Repeat step 5 until you finish, then click on Save



5.1.5. … Create the skeleton once finished

1st Click on File → Export Skeleton

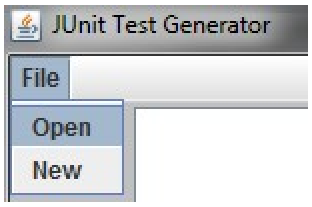
2nd The file would be created in the folder specified at the beginning.

It is possible to see the example in the Appendix 1.

5.2. … Open a Java File

1st Run the application

2nd Click on File → Open



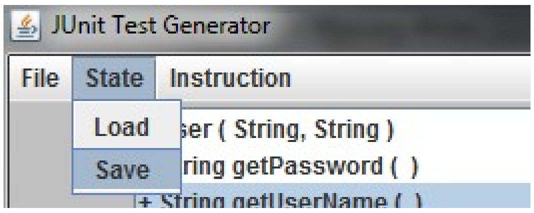
3rd Browse the file that you want to create the Test for

5.3. … Load or Save the progress of the Test Class

{ Needs to have opened a Java file}

1st Click on State → Load or State → Save

2nd Choose the file to read / write

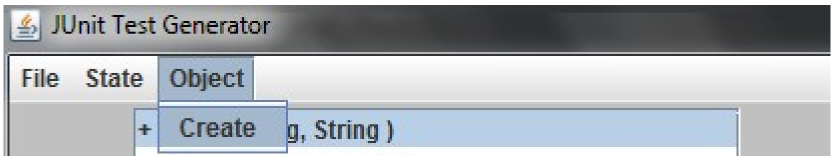


5.4. … Add a new Object

{ Needs to have opened a Java file}

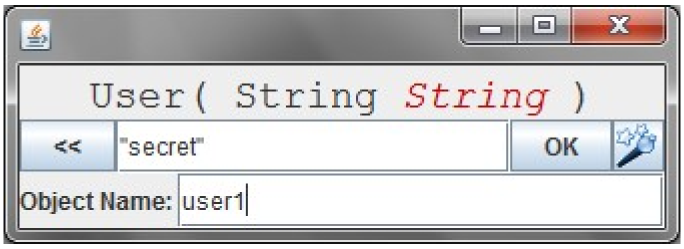
1st Click on a Constructor in the list on the left

2nd Click on Object → Create



3rd Fill the fields.

- Through << and >> buttons you can change the information of the different parameters.
- You can use the wand button to auto-generate the inputs
- You need to provide a name for the object



"secret"

Object Name: user1

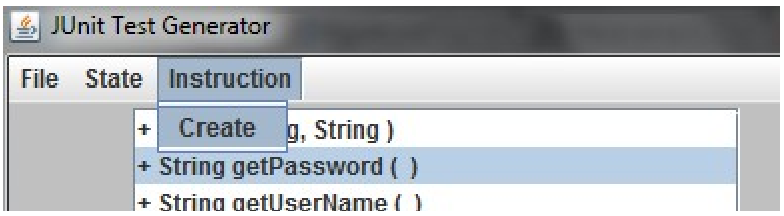
4th Click on OK

5.5. … Add a new Instruction

{ Needs to have opened a Java file}

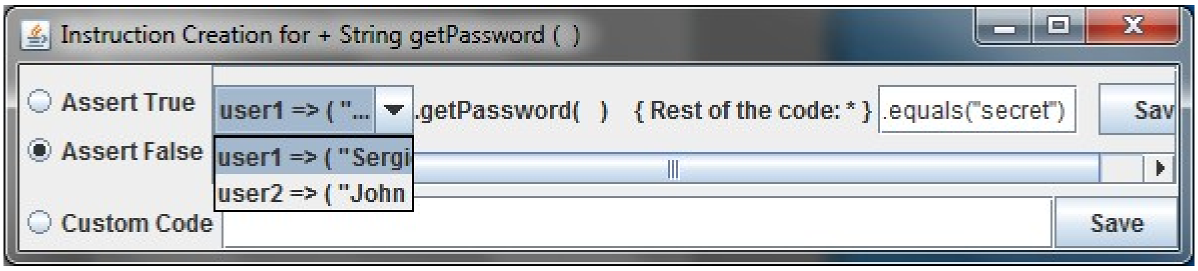
1st Click on a public method

2nd Click on Instruction → Create



3rd Here you can choose between the asserts or a custom code:

- Asserts: Choose the object to use from the options, fill the parameters and, in case you need it, add some extra code at the end.



- Custom Code: just write your code in the field next to "Custom Code" option

4th Click on Save (any of them)

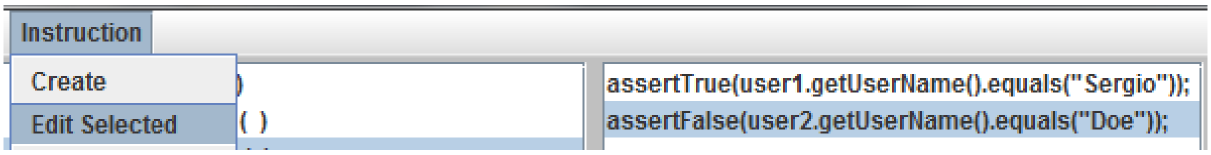
5.6. … Edit an Instruction

{ Needs to have opened a Java file}

1st Click on a method that has instructions associated

2nd Click on the instruction that you want to edit

3rd Click on Instruction → Edit Selected



assertTrue(user1.getUserName().equals("Sergio"));
assertFalse(user2.getUserName().equals("Doe"));

4th Modify the fields you want

5th Click on Save

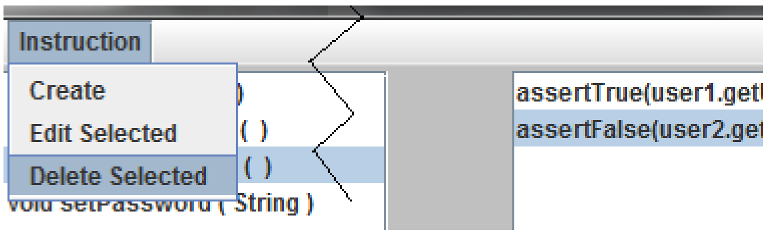
5.7. … Delete an Instruction

{ Needs to have opened a Java file}

1st Click on a method that has instructions associated

2nd Click on the instruction that you want to edit

3rd Click on Instruction → Delete Selected



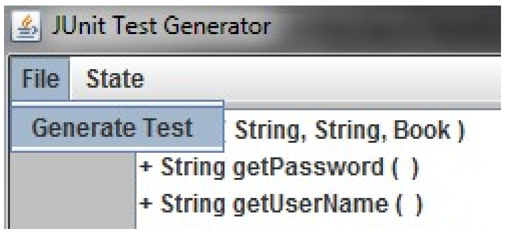
void setPassword (String)

assertTrue(user1.get
assertFalse(user2.ge

5.8. … Generate the Test File

{ Needs to have opened a Java file}

1st Click on File → Generate Test



2nd Browse where you want it to be created and Save

5.9. … Add a new type to the Randomizer

With the application is given a library Randomizer.jar and its Source Code. This library is the one used to generate automatically the types of the fields. If your code is using a type that is not in the Randomizer and you use the **wand button** while creating an Object, it would give a warning message. If you want those types to be generated, you should create those methods and compile Randomizer. The methods should be public, and return some Java built-in type that, by calling toString(), it returns how it should created.

For example, if we want to add to the Randomizer the User, we should create the function getUser() as shown in Appendix 2

Once the code is ready, build the jar file and copy it to *_lib folder.

Appendix 1

Code generated by the application showed in the HowTo section

```
package hotel;


import java.util.ArrayList;

public class User{

        // TODO Write your own class properties


        public User(String arg0, String arg1){

                // TODO Write body

        }

        public String getPassword(){

                // TODO Write body

        }

        public String getUserName(){

                // TODO Write body

        }

        public void setPassword(String arg0){

                // TODO Write body

        }

        public viod setUserName(String arg0){

                // TODO Write body

        }

}
```

Appendix 2

Example of code to add to the Randomizer class to generate Objects of type User randomly.

```
public Object getUser(){

        String letters = new String("abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ");

        String username = new String();

        String password = new String();

        for (int i = 0; i<10; i++){

                username += letters.charAt((int)(Math.random()*letters.length()));

                password += letters.charAt((int)(Math.random()*letters.length()));

        }

        return new String("new User(\"" + username + "\", \"" + password + "\")");

}
```