**Assignment 1**

**Automated Test generation Questions & Answers**

1. For each tool (Monkey & Randoop), generate tests for the appropriate applications. Measure the time taken to generate tests. For example, Randoop uses a time limit to generate tests. How many tests does it generate in that duration?

Monkey does not generate any test cases and sends user specified events in random order to application. Monkey does more of stress testing of the app.

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| --- | --- | --- | --- | --- | --- |
| **Tool** | **Time Limit/#Events** | **Source** | **#Regression Tests** | **#Error Tests** | **Crashed At Event** |
| Randoop | 60 | ActiveMQ -13 classes | 121 | 1 | NA |
| Randoop | No Limit | ActiveMQ -13 classes | 239 | 3 | NA |
| Randoop | 60 | Jpacman -8 classes | 456 | 5 | NA |
| Randoop | No Limit | Jpacman -8 classes | 779 | 6 | NA |
| Monkey | 50000 Events | LeafPic App Package | NA | NA | 29970 |
| Monkey | 50000 Events | LeafPic App Package | NA | NA | 451 |
| Monkey | 50000 Events | LeafPic App Package | NA | NA | 47970 |
| Monkey | 50000 Events | LeafPic App Package | NA | NA | 20237 |
| Monkey | 50000 Events | Movieguide App Package | NA | NA | Did not crash |
| Monkey | 50000 Events | Movieguide App Package | NA | NA | 22902. Null Pointer Exception.  Fixed source code is provided in the Movieguide folder |

1. Is the test coverage adequate?

Randoop does capture significant errors in the error revealing test cases which are not being captured in unit testing. Monkey is able to stress test the app with random, multiple events in rapid user provided interval which cannot be done manually.

1. Do the tools find bugs in the applications? You can artificially create bugs to determine if the tools find the bugs.

Randoop identified null pointer exceptions in the error revealing test cases. Monkey also crashed and identified null pointer exceptions in the mobile app.

1. Are the tools easy to use?

Randoop and Monkey are simple and straight forward to use.

1. What are the limitations of the tools?

* Randoop and Monkey don’t have a UI interface which will make it developer friendly and improve the ease of use
* Monkey does not send the events in the same sequence or ordering for multiple runs. This makes it impossible to simulate the same crash or error.
* Except the contractual checks, Randoop doesn’t check for other common error conditions like uninitialized variables, etc

1. How would you improve these tools? Identify at least one improvement for each tool that you believe would be most useful for developers.

* User Interface will be one important value addition for both the tools.
* Monkey should have an option to save the sequence of events sent and then rerun the same sequence. This will provide consistency and help in simulating the bugs easily.

**Monkey**

(a) [MovieGuide](https://github.com/esoxjem/MovieGuide)

API key was received from movie guide site.

**tmdb\_api\_key**=**7e58927f3c0c994fa720453614109035**

Multiple runs were tested using Monkey-movie guide application.

(b) [LeafPic](https://github.com/HoraApps/LeafPic)

Multiple runs were tested using Monkey-Leaf pic application.

Details are available under the monkey folders