National College of Ireland

Configuration Manual

MSc Industrial Internship
MSc in Cybersecurity

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School of Computing
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National College of Ireland

MSc Project Submission Sheet

School of Computing

Student Name:	Mayank Sharma		
Student ID:	X21156913		
Programme:	MSc in Cybersecurity	**Year:**	2022-2023
Module:	MSc Industrial Internship		
Lecturer:	Prof. Vikas Sahni		
Submission Due Date:	06-JAN-2023		
Project Title:	Optimizing Detection of Reentrancy attacks in Solidity Smart Contracts		
Word Count:	**477**	**Page Count: 4**	

I hereby certify that the information contained in this (my submission) is information pertaining to research I conducted for this project. All information other than my own contribution will be fully referenced and listed in the relevant bibliography section at the rear of the project.
ALL internet material must be referenced in the bibliography section. Students are required to use the Referencing Standard specified in the report template. To use other author's written or electronic work is illegal (plagiarism) and may result in disciplinary action.

Signature: Mayank Sharma

Date: 04-JAN-2023

PLEASE READ THE FOLLOWING INSTRUCTIONS AND CHECKLIST

Attach a completed copy of this sheet to each project (including multiple copies)	□
Attach a Moodle submission receipt of the online project submission, to each project (including multiple copies).	□
You must ensure that you retain a HARD COPY of the project, both for your own reference and in case a project is lost or mislaid. It is not sufficient to keep a copy on computer.	□

Assignments that are submitted to the Programme Coordinator Office must be placed into the assignment box located outside the office.

Office Use Only	
Signature:	
Date:	
Penalty Applied (if applicable):	

Configuration Manual

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1 Environment Setup

Technology Prerequisite:

- Python3
- NodeJS along with npm
- Solidity
- Javascript

Static Analysis:

```
npm install -g solc

pip3 install solc-select

solc-select install 0.8.4

solc-select use 0.8.4
```

```
pip3 install slither-analyzer
```

Manual Analysis:

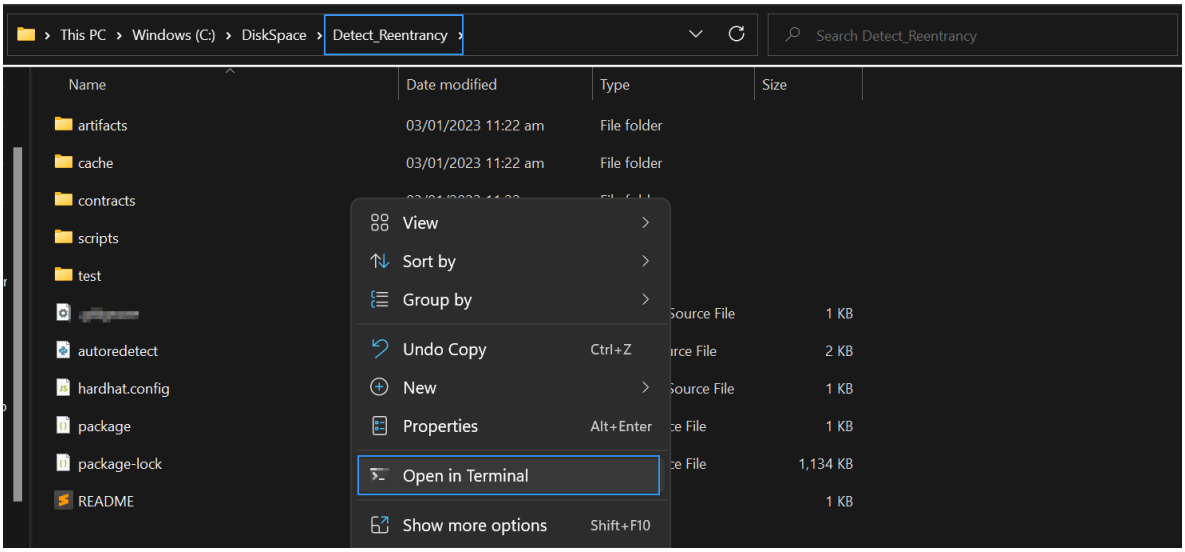
```
npm install --save-dev hardhat
```

```
npx hardhat
```

2 Script[1] Setup

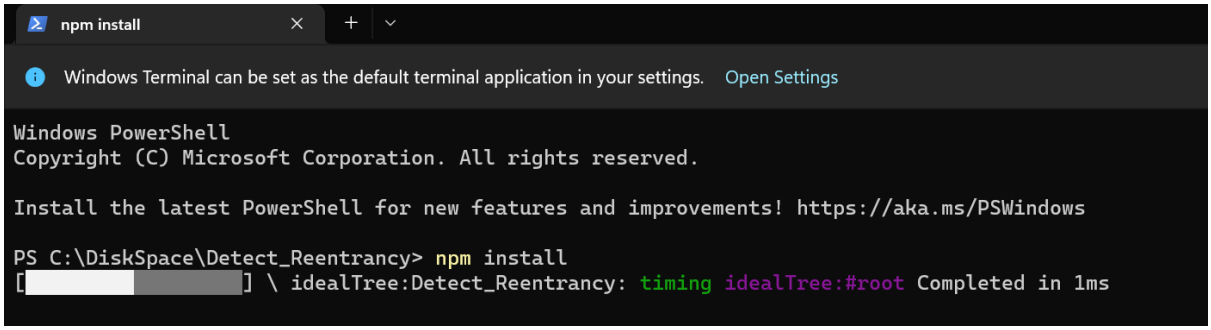
1. Download the shared Zip/artifact.

2. Open CMD/WSL/ Powershell inside Detect_Reentrancy Folder

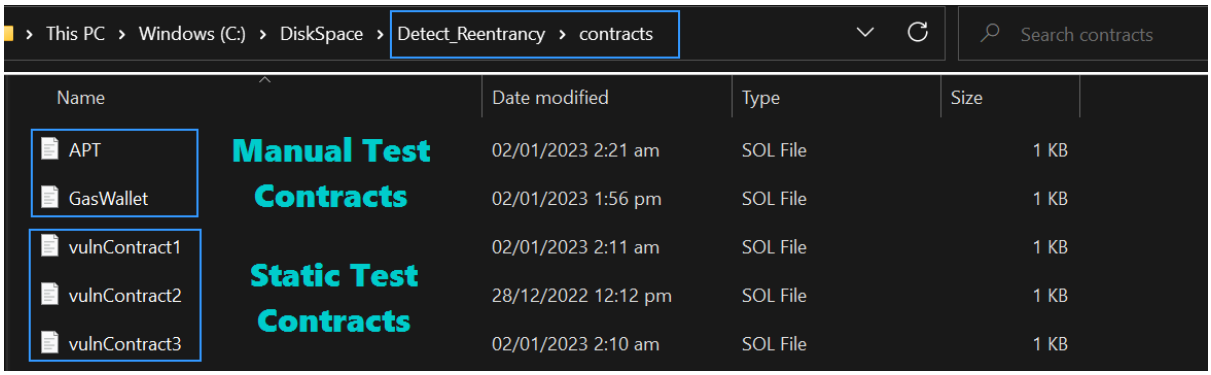


3. Install Dependencies:

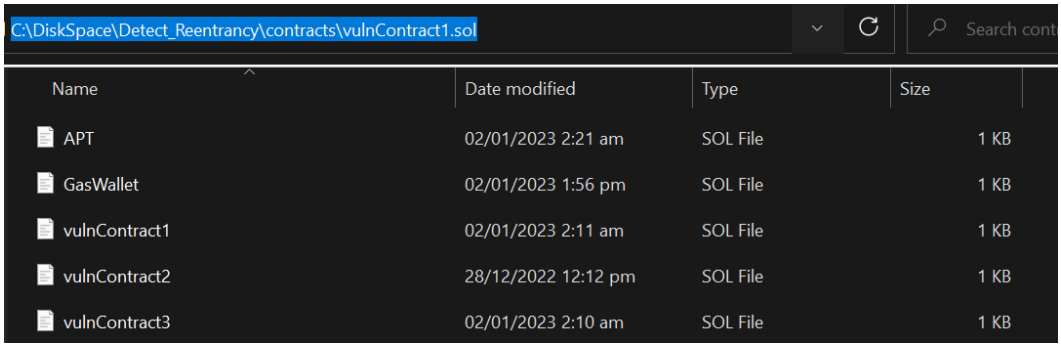
```
npm install
```



4. Open the contracts folder found inside the Detect_Reentrancy folder.

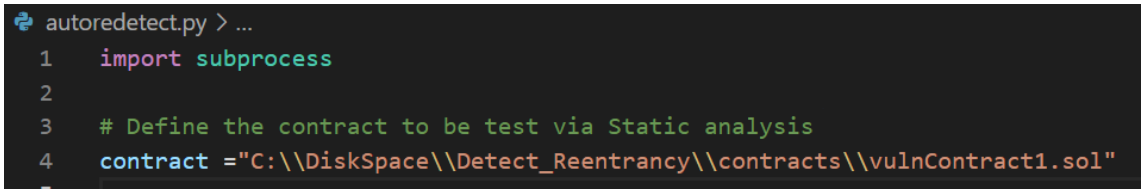


5. Take a path of any static test contract which needs to be tested, an update in the file *autoredetect.py*.



Note - For manual unit testing manual test[1] contracts would be utilized by default as shown in step 4. As those smart contracts are custom created for the testing and APT.sol is the attacker contract which will utilize via hardhat network.

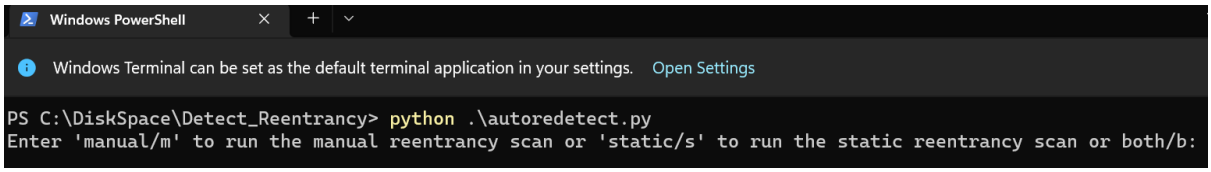
6. Open the python file and update the smart contract file and save it.



Note – Please add \\ in place of single \ and it should look as in the above screenshot.

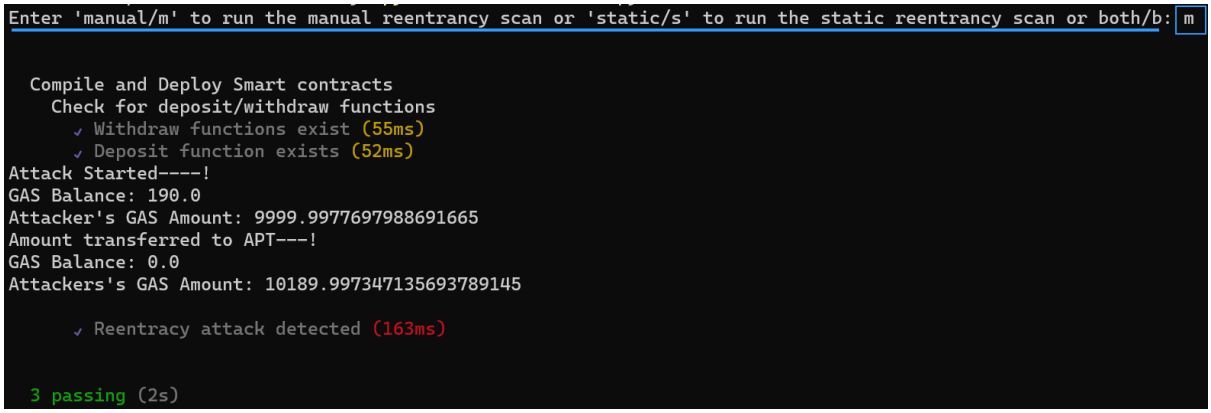
7. From the terminal run the python script (Should be run via Python 3.x only)

```
Python3 autoredetect.py or Python autoredetect.py
```



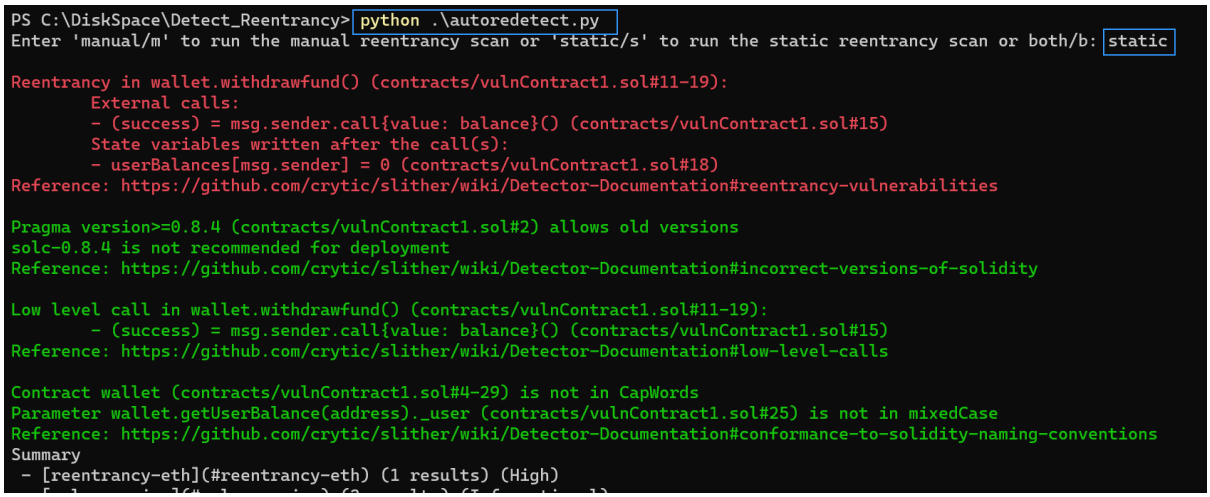
8. Type either manual/m or static/s.

Test case 1: manual/m testing



[1]https://github.com/dappuniversity/Reentrancy-attack-Smart-Contract-Security

Test case 2: static/s testing



3 References

Feist, J., Grieco, G. & Groce, A., 2019. Slither: A Static Analysis Framework for Smart Contracts. *2019 IEEE/ACM 2nd International Workshop on Emerging Trends in Software Engineering for Blockchain (WETSEB),* Issue 10.1109/WETSEB.2019.00008, pp. 8-15.

Monthly Internship Activity Report

The Internship Activity Report is a 1-page monthly summary of the activities performed by you and what you have learned during that month. The Internship Activity Report must be signed off by your Company and included in the configuration manual as part of the portfolio submission.

Student Name: Mayank Sharma_____ Student number: X21156913_____

Company: TheSecOps Group_____ Month Commencing: Sep_____

Performed PT on WEB

Researched Blockchain Attacks and vulnerabilities.

Finalized the topics for research about the reentrancy attacks in smart contracts.

Penetration testing (PT) is a security testing method that involves simulating an attack on a computer system, network, or web application to identify vulnerabilities that could be exploited by an attacker. PT can be performed on various types of systems, including web-based systems.

Blockchain technology is a distributed, decentralized, and secure method of recording and storing data. It is used to create and maintain a digital ledger of transactions that cannot be altered. However, like any technology, blockchain is not immune to attacks and vulnerabilities.

Employer comments

Mayank has completed the given tasks successfully.

Student Signature: Mayank Sharma_____ Date: 28-DEC-2022____

Industry Supervisor Signature: SGadhiya_____ Date: 28-DEC-2022

Monthly Internship Activity Report

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Student Name: Mayank Sharma_____ Student number: X21156913_____

Company: TheSecOps Group_____ Month Commencing: Oct_____

Performed PT on WEB and API.

"Read about the reentrancy vulnerabilities and their Tools Tactics and detection in smart contacts." This task involves learning about the characteristics and impacts of reentrancy vulnerabilities in smart contracts, as well as techniques and tools that can be used to detect and prevent these vulnerabilities.

"Learned fundamentals about blockchain, and Ethereum and understood the reentrancy vulnerability in solidity smart contracts." This task involves gaining a basic understanding of blockchain technology and the Ethereum platform, as well as how reentrancy vulnerabilities can occur in smart contracts written in the Solidity programming language.

"Created a sample and used a few open-source tools to detect the attacks." This task involves creating a sample smart contract and using available tools to test for reentrancy vulnerabilities. The tools used may be open-source, meaning they are freely available to use and modify.

"Read about the hardhat framework and worked on the implementation of the proposed solution." This task involves learning about the Hardhat framework, which is a toolkit for developing and testing Ethereum smart contracts, and implementing a solution to address reentrancy vulnerabilities in smart contracts using this framework. It is not specified what the proposed solution is or how it is being implemented.

Employer comments

Mayank has completed the given tasks successfully and provided an update on the research he has been working on.

Student Signature: Mayank Sharma_____ Date: 28-DEC-2022____

Industry Supervisor Signature: Sruthiya_____ Date: 28-DEC-2022

Monthly Internship Activity Report

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Student Name: Mayank Sharma_____ Student number: X21156913_____

Company: TheSecOps Group_____ Month Commencing: Nov_____

"Completed the Abstract and Literature Review." This task involves writing a summary of the research project, known as the abstract, as well as reviewing and synthesizing relevant literature on the topic of reentrancy vulnerabilities in smart contracts. The literature review is an important part of the research process, as it helps to establish the context and background for the study and identify any gaps in the existing knowledge on the topic.

"Worked on finalizing the detection approach manual followed by static analysis to detect the reentrancy attack." This task involves developing and finalizing a method or approach for detecting reentrancy vulnerabilities in smart contracts. The detection approach may involve both manual techniques, such as manual code review, and automated techniques, such as static analysis, which involves analyzing the code of a smart contract without actually executing it. The goal of this task is to develop a reliable and effective method for detecting reentrancy vulnerabilities in smart contracts.

Employer comments

Mayank has completed the given tasks successfully.

Student Signature: Mayank Sharma_____ Date: 28-DEC-2022____

Industry Supervisor Signature: _____ Date: 28-DEC-2022

Monthly Internship Activity Report

The Internship Activity Report is a 1-page monthly summary of the activities performed by you and what you have learned during that month. The Internship Activity Report must be signed off by your Company and included in the configuration manual as part of the portfolio submission.

Student Name: Mayank Sharma_____ Student number: X21156913_____

Company: TheSecOps Group_____ Month Commencing: Dec_____

"Worked on the research methodology and implementation, evaluation, and completion of the research along with implementing the solution completely by creating the test case to detect reentrancy attacks in the smart contract." This task involves developing a research methodology and plan for conducting the research on reentrancy vulnerabilities in smart contracts, implementing the solution to address these vulnerabilities, and evaluating the effectiveness of the solution. The task also involves creating test cases, which are specific scenarios or conditions that are used to test the functionality and behavior of a smart contract, to detect reentrancy attacks. The goal of this task is to complete the research and fully implement the solution for detecting and preventing reentrancy vulnerabilities in smart contracts.

Employer comments

Mayank has completed the given tasks successfully.

Student Signature: Mayank Sharma_____ Date: 28-DEC-2022____

Industry Supervisor Signature: SGandhiji Date: 28- DEC- 2022