National College of Ireland

Configuration Manual

MSc Research Project
Programme Name

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MSc Project Submission Sheet

School of Computing

Student Name: …….Anurodhan Pradhan……

Student ID: ……X22134638……..……

Programme: ……MSc Cybersecurity…… **Year:** ……2023-24..

Module: ……MSc Research Project……..……

Lecturer: …… Eugene Mclaughlin ……..……

Submission Due Date: ……14 December 2023……..……

Project Title: Homomorphic Encryption as a Counter Measure for Data Breach and Insider Threat

Word Count: …573…… **Page Count:** ……5……..……..……

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.
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Configuration Manual

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1 Introduction

This document provides a detailed description for setting up and executing the proposed project. This project maps out the technical gap in the traditional encryption technique and implements Homomorphic Encryption in data as data security. This implementation is done using Python. This configuration manual will help to replicate and execute the proposed project.

2 System Requirements

Table 1:Software requirements

Software	Version
Python	3.9.6
PyCharm	2023.3 community edition

Table 2: Hardware requirements

Operating System	Windows 11
Processor	Inte I5 10th generation
Hard Drive(SSD)	6 GB
Memory(RAM)	8 GB
Python 3	3.9.6
PyCharm	2023.3 community edition

3 Dependency

3.1 Installing Python

Step 1: Download Python from the official site https://www.python.org/downloads/
Step 2: Run the installer
Step 3: Verify installation by checking in command line interface(CLI)
type 'python –version' and press Enter.

3.2 Installing PyCharm

Step 1: Download PyCharm from https://www.jetbrains.com/pycharm/download/?section=windows and choose the community version as it is free.
Step 2: Run the installer.
Step 3. Launch PyCharm.

4 Libraries Required

NumPy	It stands for Numerical Python, renowned for its powerful N-dimensional array object. It deals with numerical operations. It offers comprehensive mathematical functions, random number generators, linear algebra, and polynomials. The speed and versatility come from efficiently handling large arrays and matrices in numeric data and its ability to perform complex mathematic operations on arrays efficiently.

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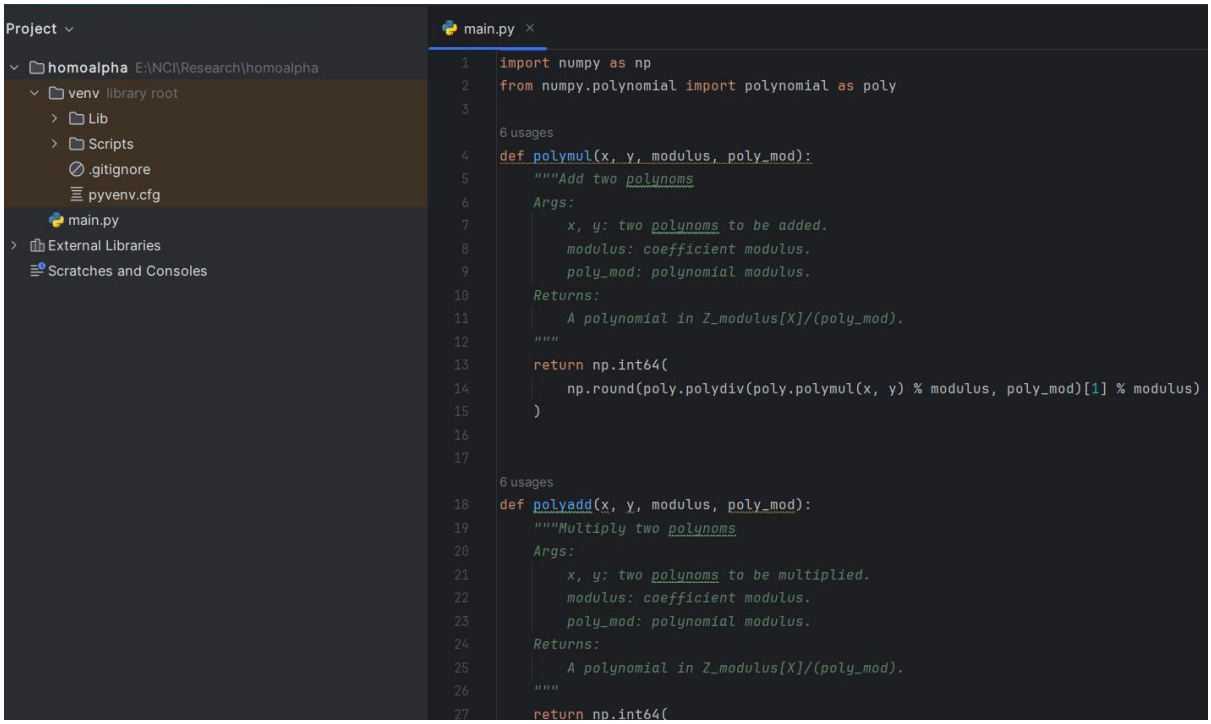
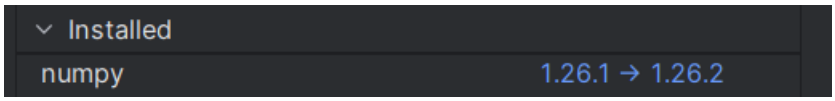
5 Project Setup

In this section we are going to show the step-by-step process to execute the code.



1. Opening the file in PyCharm



2. Go to Python Packages and install NumPy library

```
E:\NCI\Research\homoalpha\venv\Scripts\python.exe E:\NCI\Research\homoalpha\main.py
Enter the value: Test
Original String: Test
Encrypted String [(array([28208, 31803,  3370, 28243, 14294, 11792, 26668, 19156, 27022,
       21207, 18567,  1632,  7108,  6238, 26604,  6162], dtype=int64), array([18478,  2107, 25978,  1428, 19153, 16495, 11504, 20790, 18150,
       27836, 25473, 25292, 16894,  4139, 12846,  8632], dtype=int64)), (array([17258, 22610, 25719, 29142, 21848, 29665, 19137, 14582, 27625,
       24096, 18273, 28725, 11811,  6990, 29505,  3320], dtype=int64), array([20088, 15900, 11033, 22847, 18231,  9940, 12792, 14644, 31499,
        4691, 19676, 11081, 22733, 16355,  7705, 24167], dtype=int64)), (array([20977,  7979,  8767,   158,   915, 27922, 10330,  1476, 10736,
       29770, 17082, 19366, 12725, 21590,  4968,  2480], dtype=int64), array([  368, 28199, 32221,  1600, 23628, 22861, 30212, 23746, 26517,
       11886, 25937, 19380,   270, 22095, 21481,  7436], dtype=int64)), (array([10325, 29016,  8908, 32591, 29689, 31724, 21199,  1416, 32096,
        1982, 19662,  7129,  5330, 19174, 20693, 17005], dtype=int64), array([21984, 26116, 15922, 29886, 11180, 15948, 17304, 20268, 23238,
         784, 32246, 31650,  6775, 19621, 17295, 12810], dtype=int64))]
Decrypted String: Test
```

3. Run the code.

The code is executed successfully, and the output is displayed.

6 References

Foundation, T. P. (2023, Oct 2). *Python 3.12.0 documentation.* Retrieved from python.org: https://docs.python.org/release/3.12.0/

s.r.o, J. (2023, Dec 01). *Install PyCharm.* Retrieved from https://www.jetbrains.com/: https://www.jetbrains.com/help/pycharm/installation-guide.html