Number Guessing

Author

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Time Taken

~ 3 Hours

Overview

The purpose of this project was to show my ability to properly navigate IDA in order to reverse all functionalities of a disassembled C++ program.

Objectives

- Disassemble & Reverse the game, naming every method & defining all structures/classes used by the main method.
- Write a script that leverages knowledge of how the game actually works to win it.
- Identify & decrypt the winning message.
- Identify & use any hidden features in the game

Terminology

- Disassemble: To convert machine language code into human-readable assembly code.
- Structure: A way to group several related variables into one place.

Key Technologies/Tools Used

- IDA Educational 8.3
- Visual Studio Code
- Cyber Chef

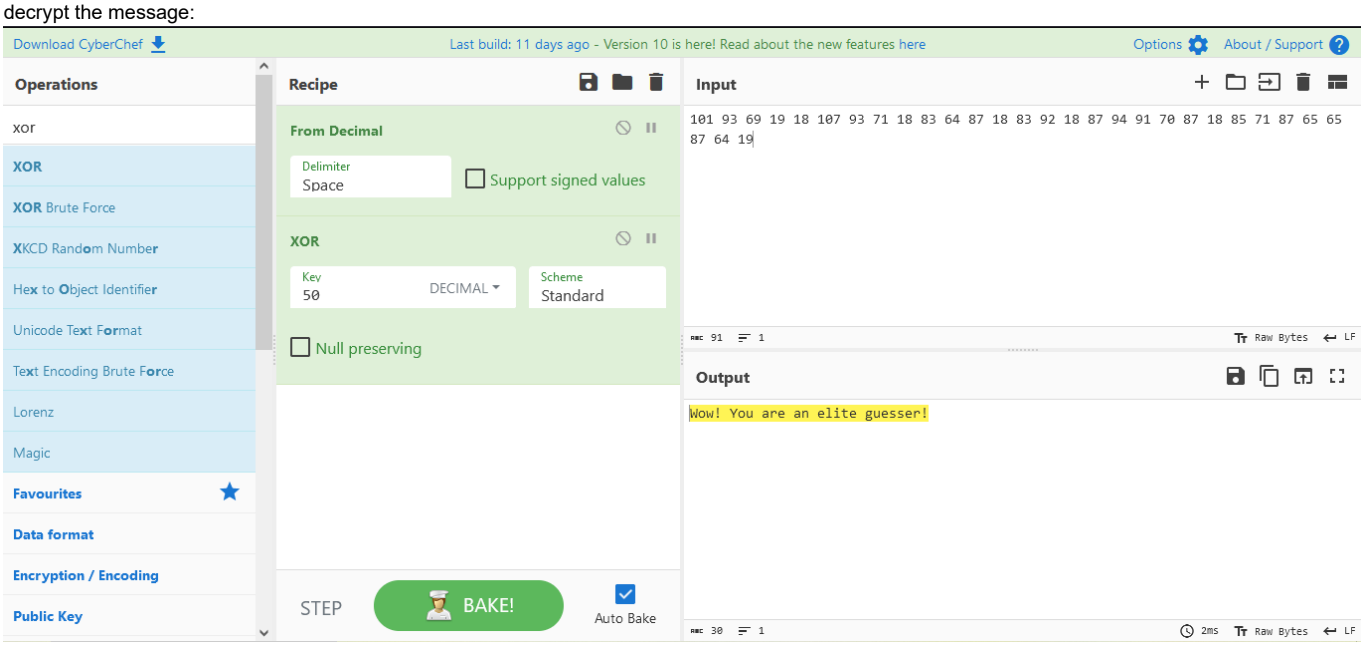
Challenges

My biggest challenge was labeling the structures when reversing the program. This is a relatively new process for me, so it will take some time to adjust.

Results/Findings

My completely labeled project can be seen in the included i64 file. The script I wrote to win the game leveraged the finding that the game uses the system time as the seed for the random number generator. I replicated this in python when writing my version, and luckily there were no discrepancies of system time between the executable and my python program. The only secret functionality that I found was the ability to run the program with a debug flag. This allows for the user to see both the system time and random number used for each iteration of the program. Since my solution is in the form of a command line interface, I implemented this functionality as well as an optional flag. This script allowed me to win the game and obtain the secret message, however, in order to glean as much practice as I could out of this project, I also reversed the secret message by hand. I found that it was simply being encrypted using xor, with a key of the decimal value of 50. I plugged the values of the array into cyber chef, and used the proper filters to

decrypt the message:



Conclusion

This project was a simple, yet super fun introduction to reverse engineering programs using IDA. It showed me how fun and rewarding reversing can be, and excites me to learn more about the subject.

References

https://docs.python.org/3/library/subprocess.html