Binary Exploitation I — Winter 2023/24
Practical Course

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Exploiting buggy C programs on modern x86_64 Linux systems.
What is this?

Exploiting buggy C programs\(^1\) on modern x86_64 Linux systems.

\(^1\)Disclaimer: There might be a little C++ as well...
What is this?

Exploiting buggy C programs\(^1\) on modern x86\textunderscore 64\(^2\) Linux systems.

\(^1\)Disclaimer: There might be a little C++ as well...
\(^2\)Disclaimer: There might be a little 32-bit x86 as well...
What is this?

Exploiting buggy C programs\(^1\) on modern x86\_64\(^2\) Linux\(^3\) systems.

\(^1\)Disclaimer: There might be a little C++ as well...
\(^2\)Disclaimer: There might be a little 32-bit x86 as well...
\(^3\)Just kidding — no Windows (yet). We kindly refer you to abx.😊
You should...

► ...understand how computers work
► ...know the basics of the Intel x86 assembly language
► ...have a reasonable grasp of the C programming language

...but most importantly:
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► ...know the basics of the Intel x86 assembly language
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...but most importantly:
► ...enjoy banging your head against tough challenges
Process

Phase I (∼ 10 weeks):
▶ “Usual” practical course (weekly meetings and assignments)

Phase II (∼ 4 weeks):
▶ Final project (vulnerable program, exploit and presentation)
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**Graphs**

The graphs show the position of the teams over time, with different lines representing different teams. The x-axis represents the date and time, and the y-axis represents the position in the race. The graphs provide a visual representation of how the teams progressed throughout the event.
Process — Phase I

- Teams of two
- Every week: Introduction to a new topic
  - Submission of solutions before the following week’s meeting
  - Presentation of the solution during that meeting
Process — Phase II

Final project
- Development of a **vulnerable application**
- Creation of an **exploit** (ab)using the vulnerability/ies
- **Presentation** (about 20 minutes)
- **Hack the other teams’** applications 😊
- Create **Write-Up(s)** about other teams’ applications
- Details follow when the time has come
Contents

- Analysis and debugging tools
- Hijacking the control flow
- Shellcode
- Format string vulnerabilities
- Stack- and heap-based buffer overflows
- Exploiting heap management logic
- Bypassing protection mechanisms
Don’t say we didn’t warn you

- Assume up to **30h of workload per week**
- (But: You reach **state-of-the-art uber 1337 h4x0r skillz** knowledge about binary exploitation techniques on Linux systems)
Time and place

When? Wednesday, 14:00
Where? TBA
Registration

- Solve our **qualification challenge individually**!
- Available at: 
  [honeynet.sec.in.tum.de:47331](honeynet.sec.in.tum.de:47331)
- Registration [honeynet.sec.in.tum.de/bx](honeynet.sec.in.tum.de/bx)
- **Deadline**: 2023-07-24 (23:59 pm)
- Registration using the **matching system** (formally required)
- **20** slots
Contact me at kilger@sec.in.tum.de
Contact me at kilger@sec.in.tum.de

Questions?