
CENG 331

Computer Organization

Bomb Lab Recitation

Fall 2022

Outline

- Introduction
- Getting Started
- Running the Bomb
- Useful Commands
- Tracing Assembly with gdb
- Resources, Tips

Introduction

- Goal: Deactivating “bombs”, compiled binaries that you need to enter specific strings to “defuse” phases.
- 6 phases in each bomb, each bomb has different set of phases and solution strings.
- Practice your assembly reading skills and understand the way compiler converts C to x86.

Getting Started



Getting Started



Getting Started

Get the bomb from:

- <http://momcorp.ceng.metu.edu.tr:15513>

You have to be on the campus network or use METU VPN for your connection.

To get the bomb you need:

- Username: 6 digit username: eXXXXXX
- Email: Any proper email that is reachable
- Usersecret: 16 digit secret that we have provided to you.

Getting Started

momcorp.ceng.metu.edu.tr:15513

METU CENG Binary Bomb Request

Link to the [scoreboard](#)

Fill in the form and then click the Submit button.

Do not request multiple bombs.

Grade reductions count for any explosion from any bomb you request.

You will be graded on your **worst** bomb attempt.

Legal characters are spaces, letters, numbers, underscores ('_'), hyphens ('-'), at signs ('@'), and dots ('.').

User name <small>Enter your student ID</small>	<input type="text" value="eXXXXXX"/>
Email address	<input type="text" value="eXXXXXX@metu.edu.tr"/>
User Secret	<input type="text" value="XXXXXXXXXXXXXXXX"/>
	<input type="button" value="Submit"/>

Getting Started

- You are **NOT** allowed to get multiple bombs.
- If you do so, your lowest grade bomb will be considered while grading.
- Moreover, we will count the total number of explosions of your bombs.

$$\text{Grade} = \text{MIN}(\text{bombgrades}) - \text{SUM}(\text{explosions}) * 0.5$$

Running the Bomb

- You can run the bomb on inek machines from [1,100]. You are not allowed to use your personal computers for this homework.
- You can put your bombs to inek machines using sftp or scp.
- And work on the inek machines from home using ssh.

Running the Bomb

Your important actions (bomb defusals, explosions) will be notified to the bomb server. You can follow them from:

- <http://momcorp.ceng.metu.edu.tr:15513/scoreboard>

momcorp.ceng.metu.edu.tr:15513/scoreboard

Bomb Lab Scoreboard

This page contains the latest information that we have received from your bomb. If your solution is marked **invalid**, this means your bomb reported a solution that didn't actually defuse your bomb.

Last updated: Tue Oct 25 04:07:22 2022 (updated every 30 secs)

#	Bomb number	Submission date	Phases defused	Explosions	Score	Status
1	bomb4	Tue Oct 25 03:31	7	0	100	valid
2	bomb3	Tue Oct 25 03:30	5	1	75	valid
3	bomb2	Tue Oct 25 03:30	3	4	33	valid
4	bomb1	Tue Oct 25 03:27	0	6	-3	valid

Summary [phase:cnt] [1:0] [2:0] [3:1] [4:0] [5:1] [6:0] [7:1] total defused = 1/4

Useful Commands

- `objdump -d` Disassembles instruction related parts of the object file.
- `strings` prints printable strings of length ≥ 4 found in the file.
- `objdump -t` prints the symbol table of the object file.

Useful Commands

> gdb bomb := start gdb with bomb

`gdb> run` := run program with `cmd_args`

`gdb> break` := put a break point to the specified label or addr

`gdb> info break` := list active breakpoints

`gdb> delete <#>` := delete breakpoint with number “#”

`gdb> continue` := run program until a breakpoint is hit

`gdb> stepi` := run a single instruction

`gdb> nexti` := run a single instruction, if it is a function call, run program until function returns

`gdb> kill` := terminate the program

`gdb> disas` := lists assembly code of the current function

`gdb> disas` := lists assembly around instruction addr, label or for the whole function.

Useful Commands

`gdb> print ($rsp)` := print contents of `%rsp` as decimal signed number

`gdb> tui <enable/disable>` := enables/disables a more gui like view

`gdb> layout <asm/regs/source>` := changes tui view to your liking

`gdb> focus <asm/regs/cmd>` focuses cursor for the specified window in tui mode.

Resources and Tips

- A cheat sheet about GDB:
 - <http://csapp.cs.cmu.edu/2e/docs/gdbnotes-x86-64.pdf>
- Chapter 3 of the textbook
- Read homework carefully, there are some tips and important details there.