SFU SIMON FRASER UNIVERSITY
ENGAGING THE WORLD

Lab 4

Main Goals

- **Analyze** potential format string vulnerabilities in source code
- **Exploit** format string vulnerabilities in different scenarios
- **Gain** a deeper understanding of (some) format string options/modifiers

Task 1: Inspect the Program

- Analyze the provided source code
- Determine the potential format string vulnerability
- Understand the stack layout during a function call

Tasks 2—4

- Task 2: crash the process
- Task 3: read from the stack
    - Arbitrary number of values
- Task 4: read from the heap (how?)

Task 5: Modify a Variable Value

Four subtasks

- Write an arbitrary value
- Write a specific value
- Write a large value
- Write another large value

How can you write values?

Task 5: Modify a Variable Value

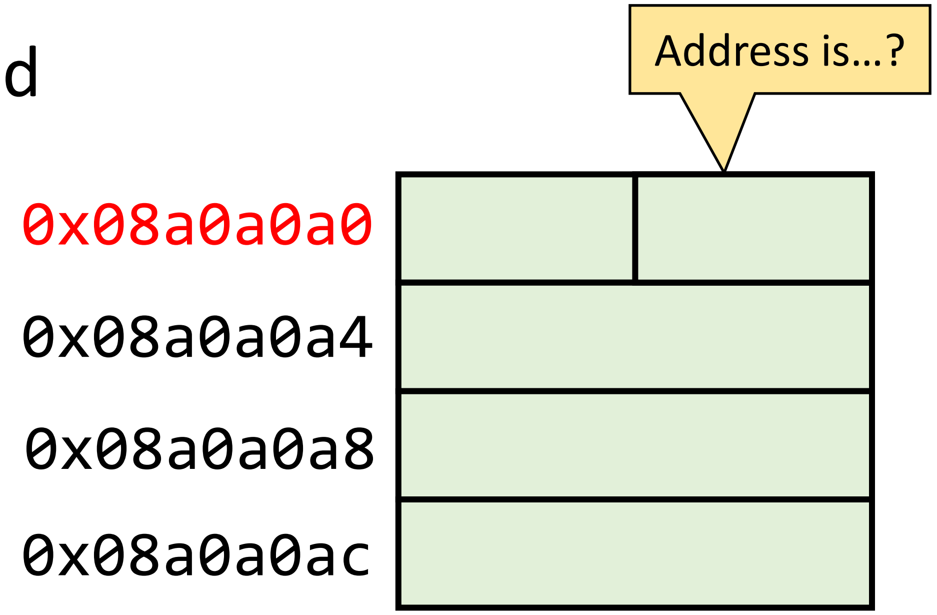
Challenges of writing large values such as `0xff990000`

- The simple approach of using %n → You need to print 4,288,217,088 bytes on the screen!
  - Time consuming and inefficient
- Other ideas?

Task 5: Modify a Variable Value

Assume that the variable address is `0x08a0a0a0`

- Divide `0xff990000` into two-byte values, and write:
  - `0xff99` to the higher memory address
  - `0x0000` to the lower memory address



How can we control the size of written values?

Task 5: Modify a Variable Value

Assume that the variable address is `0x08a0a0a0`

- How can you write `0x0000`?
  - Problem: `printf` has already written a number of bytes

- Ideas?

Questions?