CSE320 System Fundamentals II

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Lecture overview

Pointers in Depth
- ◦ Pointer initialization
- ◦ Pointers vs Arrays
- ◦ Pointer arithmetic
- ◦ Pointers in standard c functions
- ◦ Pointers for multiple return values from functions
- ◦ Double/Triple Pointers

Bit operations
- ◦ Masks
- ◦ Extracting Bits / Bit fields from a word
- ◦ Replacing Bits / Bit fields in a word

Variable length argument lists

Implementing Data Structures

Managing Dynamic Memory
- ◦ Avoiding access to bad pointers
- ◦ Avoiding memory leaks

Using gdb to debug multithreaded applications

Pointers in Depth

◦ Pointer initialization

  ◦ pointer1.c

◦ Pointers vs Arrays

  ◦ pointer1.c

◦ Pointer arithmetic

  ◦ pointer3.c

◦ Pointers in standard c functions

  ◦ pointer2.c

◦ Pointers for multiple return values from functions

  ◦ pointer4.c

◦ Double/Triple Pointers

  ◦ pointer3.c

Bit Operations

◦ Masks

◦ Extracting Bits / Bit fields from a word

◦ Replacing Bits / Bit fields in a word

  ◦ bits.c

Variable Length Function Argument Lists

sumvalues.c

Managing Dynamic Memory

◦ Avoiding access to bad pointers

◦ Avoiding memory leaks
  ◦ memmanage.c

Using gdb to Debug Multithreaded Applications

Quick reference: https://ftp.gnu.org/old-gnu/Manuals/gdb/html_node/gdb_24.html

Commands:

- info threads
- thread # -- Switch to thread (# is the thread number you wish to work with next)
- thread apply [#]/[all] [command] – Apply [command] to a specific thread given by # or to all threads **all**

Implementing Data Structures

Some basic data structures in C:

Linked List

Hash tables

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Questions?