CS50 Week 3

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Agenda

gdb – debugging

Asymptotic notation

Binary search

Sorting: bubble, insertion, selection

Distribution Code

gdb

command line debugger

run with “gdb ./<executable>”

Useful to step through programs or parts of programs one line at a time and “poke around”

gdb cheatsheet

break [line]

break [function]

next

step

list

print [variable]

display

Exercise: gdb example

www.samuelgreen.org/cs50_2015/

Debugging Tips

(1) Be patient!

(2) Test as you go

(3) Isolate bugs

(4) Use gdb to examine more closely.

Asymptotic Notation

O, Ω

Big *O:* upper bound

"ignore lower order terms"

Big *Ω*: lower bound

"ignore higher order terms"

Sometimes used to express "best case" and "worst case"

Why do we care? Where does this apply?

Binary Search

When did we see binary search?

What's the deal with sorting?

What does halving have to do with this?

How can we describe its running time?

Bubble Sort

"Swap Neighbors"

What's its time complexity?

What's its space complexity?

Selection Sort

“Find the smallest and grab it”

Insertion Sort

Select an element, figure out where it goes.

Merge Sort

Divide and Conquer

Recursion!

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Questions?

Makefiles

study50