CSE 333 – SECTION 1

Introduction to and Working with C
Your TAs

- Catie Baker – Graduate Student, CSE
- Lauren Milne – Graduate Student, CSE
- Soumya Vasisht – Graduate Student, AA

- Email are posted on the course website
  - But try to use the staff email instead of our individual emails
- Office hours are posted

- Please use the discussion board!
Questions, Comments, Concerns

- Do you have any?
- Exercises going ok?
- Lectures make sense?
Quick Refresher on C

• General purpose programming language
• Procedural
• Often used in low-level system programming
• Supports use of pointer arithmetic
• Provides facilities for managing memory
• C passes all of its arguments by value
  • Pass-by-reference is simulated by passing the address of a variable
Pointers

- A data type that stores an address
- Used to indirectly refer to values
- Can add/subtract to/from the address
  - It's just another number
Arrays and pointers

- \texttt{arr[0] <=> *arr}
- \texttt{arr[2] <=> *(arr + 2)}

- How about \texttt{arr}, \texttt{arr+2}, \texttt{*arr+2} or \texttt{*arr++}?
Example

[basic_pointer.c]

```c
#include <stdio.h>

void f(int *j) {
    (*j)++;
}

int main() {
    int i = 20;
    int *p = &i;
    f(p);
    printf("i = %d\n", i);
    return 0;
}
```
Pointers to pointers

char *c = "hello";
char **cp = &c;
char ***cpp = &cp;

• Why could this be useful?
Function pointers

• We can have pointers to functions as well
• Syntax is a little awkward
  • Example: `int (*ptr_to_int_fn)(int, int)`
  • Makes sense if you think about it hard
• We will be using these in the homework assignments!
• Demo: [function_pointer.c]
Debugging with \textit{gdb}

- Just like in CSE 351, \textit{gdb} is your friend
- Unlike CSE 351, we will be debugging C/C++ code, not assembly
  - Instead of \texttt{\textasciitilde n(e)xt\textasciitilde i} and \texttt{\textasciitilde s(te)p\textasciitilde i}, use \texttt{\textasciitilde n(e)xt} and \texttt{\textasciitilde s(te)p}
- Your first instinct for bug fixing should be \textit{gdb}, not \texttt{printf}
- Demo: [\texttt{buggy\_c}]
Looking up documentation

• Don’t go straight to Google / Stack Overflow / etc.
• Use the built-in man pages
  • `man <program/utility/function>`
  • `man -f <name>` or `whatis <name>`
  • `apropos <keyword>`
• Much more documentation is linked on the 333 home page
  • Under “Resources” on the left side of the page