CSE 333 – SECTION 1

Introduction to and Working with C

Your TAs

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- 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

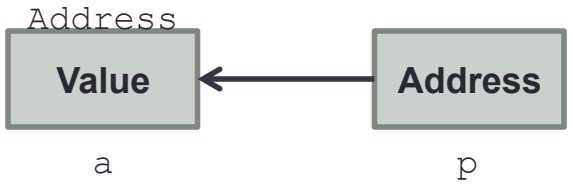
- Do you have any?
- Exercises going ok?
- Lectures make sense?

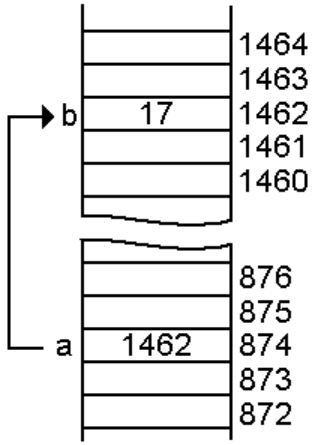
Quick Refresher on C

- 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

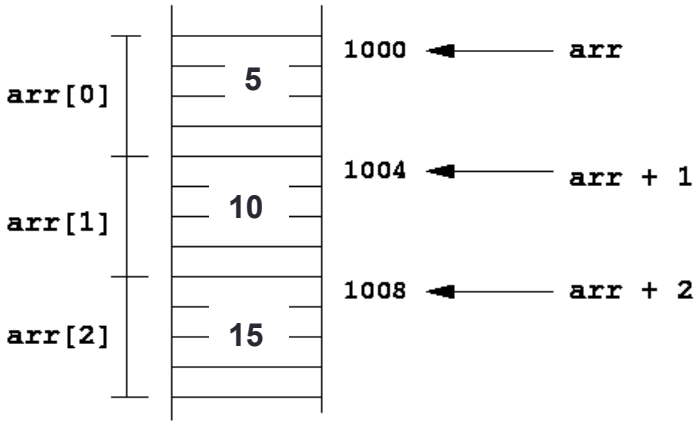




Arrays and pointers

- arr[0] <==> *arr
- arr[2] <==> *(arr + 2)

- How about arr, arr+2, *arr+2 or *arr++?

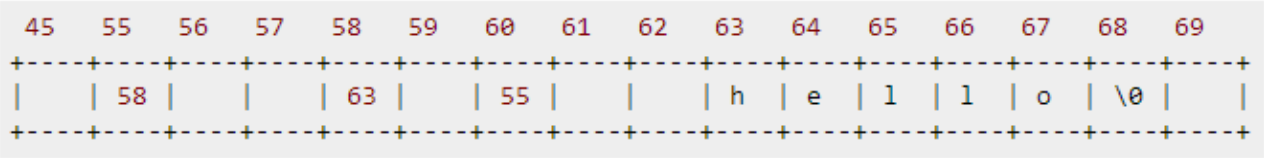


Example

[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 gdb

- Just like in CSE 351, gdb is your friend
- Unlike CSE 351, we will be debugging C/C++ code, not assembly
  - Instead of `n(ext)i` and `s(tep)i`, use `n(ext)` and `s(tep)`
- Your first instinct for bug fixing should be gdb, not printf
- Demo: `[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