Agenda

- News
- Buflab Questions
- Structs overview
- Basic Performance Optimizations
- Begin Review Exam in 1 week!
News

- Buflab due Thursday
- Exam in 1 week!
BufLab Questions
Structs Overview

```c
struct node {
    char * ptr;
    char data[128];
}
```

Structs allow you to declare contiguous blocks of memory that can be referred to by name and can include various types such as:

```c
set_node(Struct node *node1){
    strcpy(Node1->data, "hello world!");
}
```
## Structs and alignment

- **Elements of a struct can be referred to by** `struct->item` **but should not be referenced by** `(*struct)+1`
- **Here is why:**
  - Various types have boundary requirements
  - `struct node{
      char a;
      int x;
    }

This will take 8 bytes not 5
Basic Performance Optimizations

- **Code Hoisting**
  - void func(int a, int b, char [] data){
    for(i=0; i<10; i++)
      data[a*b+i] = "A";
  }
  
  a*b can be computed outside of the loop: anytime you can do something before the loop do so, including computing values in the for(...) itself such as for(i=0; i<a+b; i++)

- **Common sub expression elmination**
  - void func(int a, int b, char[] data){
    for(i=0; i<10; i++){
      if(data[i] < "z" && data[i]!="\n")
        data[i]++
    }
  }

  Can declare char c = data[i] in for loop and avoid recalculating it 2-3 times in the if statement
Exam Review

- **Topics to review**
  - Floating Point!
  - Assembly code (writing and interpreting)
  - Stack discipline
  - structs and alignment

- **Old exams are on the website (with solutions 😊)**