Dynamic Arrays

11-7-2001

Opening Discussion

- What did we talk about last class?
- Programming Competition and ExtremeBlue internship.
- Questions on assignment #5?
- Quote from a random Usenet newsgroup

  C isn’t hard; void (*f[])(x) defines f as an array of unspecified size, of pointers to
  functions that return pointers to functions that return void.
  -- btm

Pointer Arithmetic

- You can do arithmetic on pointers just as you can on normal ints, but fewer
  operations make sense.
- Incrementing a pointer moves forward in memory by the size of the type of what the
  pointer points to. Adding more moves more.
- Decrementing moves backwards the same way. Each unit is a full “record”.
- To get the size of a type you use sizeof().
Arrays as Blocks of Memory

- Arrays are just blocks of memory in the computer. An array with n elements has to be able to hold n chunks of memory with each the size of what the type requires or n*sizeof(type).
- When you declare an array normally you get a chunk of memory that size on the stack. If you use new to get such an array it is in the heap.

Arrays as Pointer

- We have actually been using pointers for a while now because arrays are implemented as pointers. An array variable is just a pointer to the beginning of an appropriately sized chunk of memory.
  ```c
  int a[100];
  // These are the same.
  a[j]
  *(a+j)
  ```

Passing Pointers

- You can pass pointer arguments to functions. The syntax is just like declaring a pointer variable. Pointers can point to locations with one record or an array with many.
- Pointers to pointers are like two dimensional arrays.
  ```c
  void takePointer(int *a);
  void takeArray(int *a, int len);
  void take2DArray(int **a, int rows,int cols);
  ```
**Code with Dynamic Arrays**

- Now let's take a minute to look at some code that involves dynamic arrays. We looked at the syntax for allocating these in the last class. Now that you know a little bit more about what a dynamic array is, we can look at code that uses them.

**Minute Essay**

- Write code to get a dynamic array with size n and pass it to a function called fill.
- We have a quiz next class and assignment #5 is due the class after that (next Monday). Make sure you have at least looked at that some. There is only one function that should present a logic challenge to you, but you will need to ask about that next class at the latest.