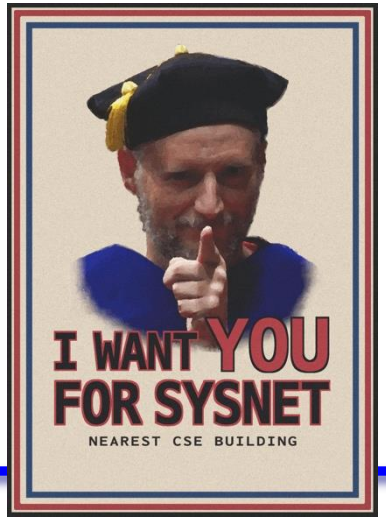
Lecture 8: Pointers



CSE 29: Systems Programming and Software Tools

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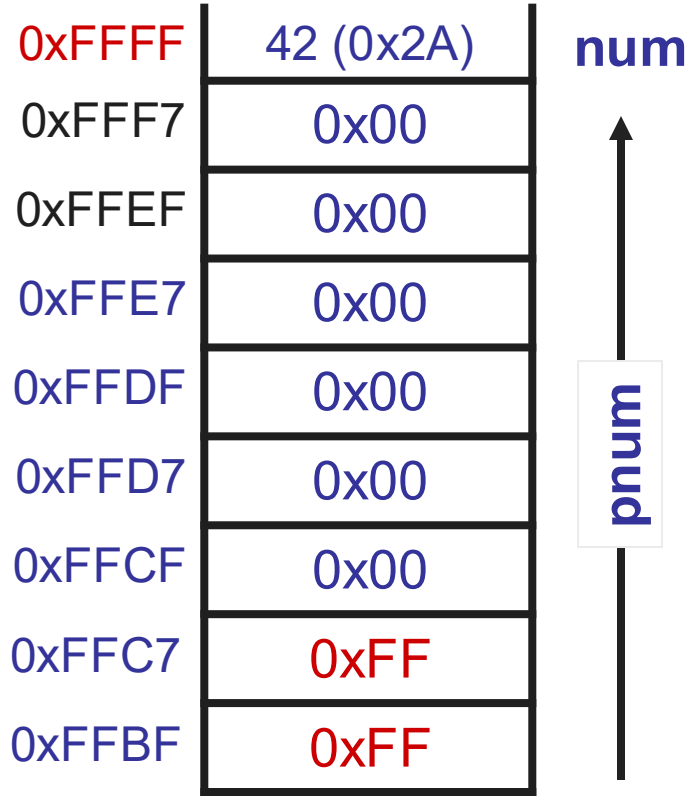
Introducing pointers in C

```
char num[] = { 42 }
char* pnum = num;
assert(pnum[0] == 42);
```

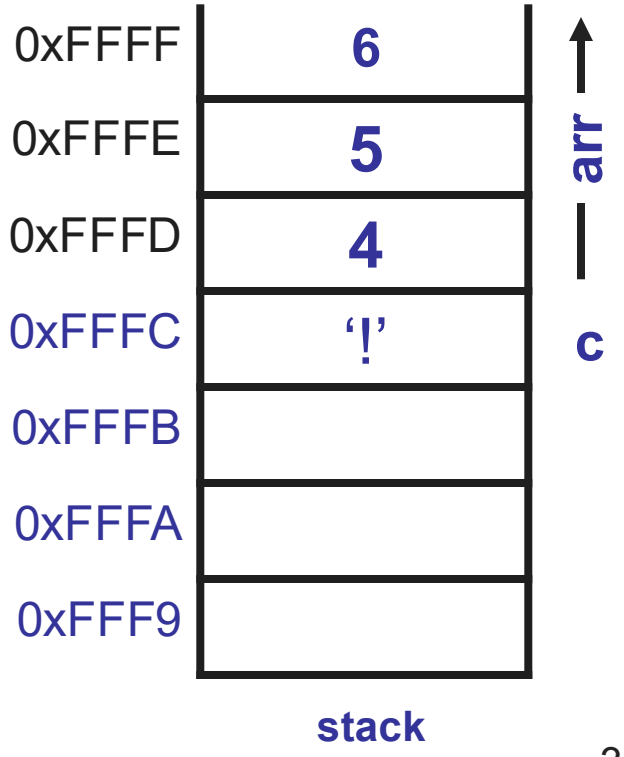


Pointer: A variable in C that can store the address of another variable (or function)

Arrays in memory

```
char arr[] = {4,5,6};
char c = '!'
```

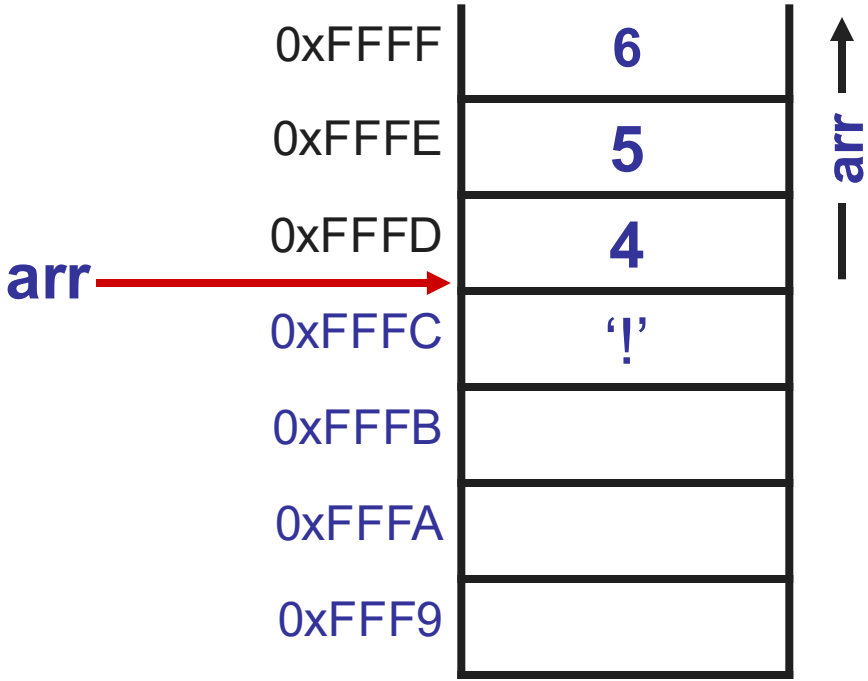
Array: A region of memory allocated to a set of values of a specific data type



Array variables are also pointers

```
char arr[3] = {4,5,6};
printf("arr=%p\n", arr);
```

arr=0xFFFD



Why is an array variable a pointer?

- An array is a *contiguous region* of memory
  - The array variable points to the start of this region
- We add to the pointer to do indexing in the array
  - Array variable points to the start, to index into the array we **add** to this start address
- When you do an array index (e.g., `arr[3]`) the compiler will do pointer math
  - `arr[3]` will turn into `arr + (3 * sizeof(long int))`
- Pointers let us directly read and modify arrays "in place"