CS 161
Intro to CS I

1-D Arrays, Strings, and Command Line Arguments
Chap. 5
Dynamically Allocate Memory

• We need to create the address space.
• How do we do this?
  – new type;
• For example:
  int *x;
  x = new int;  //new returns an address
  *x = 10;
• http://www.youtube.com/watch?v=i49_SNt4yfk
What is an Array?

- **Array (ar·ray) n.** An ordered arrangement of related items.
  - Example: Array of colors in a rainbow.
    - Related items?
    - Ordered arrangement?
  - Class examples?
  - Computer Science
    - Same data type/data structure
    - Contiguous memory locations
Create 1-D Array

```c
int student_grades[5];
```

- How do you access each item?
- What does the array name represent?
- Why is the array name the address of 1st element?
- What are the initial values?
Initialize/Assign Values

• Declaration
  int student_grades[5] = {0, 0, 0, 0, 0};

• Individual Elements
  student_grades[0]=0;
  ...
  student_grades[4]=0;

• Why is this incorrect?
  student_grades={0, 0, 0, 0, 0};
Initialize/Assign Values...

• **Using a Loop**
  While Loop Example:
  ```
  i=0;
  while (i<5) {
    student_grades[i]=0;
    i++; 
  }
  ```

  **For Loop Example:**
  ```
  for(i=0; i<5; i++)
    student_grades[i]=0;
  ```

• **Which is better to use with arrays and why?**
Read/Print 1-D Array Values

• Read Values From User
  
  for(i=0; i<5; i++) {
    cout << "Enter final grade for student: ";
    cin >> student_grades[i];
  }

• Print Values
  
  for (i=0; i<5; i++) {
    cout << "Student's final grade is " << student_grades[i] << endl;
  }
```cpp
#include <stdio.h>
#include <iostream>
#include <cstring>

using std::cout;
using std::cin;
using std::endl;

void print_intro(char name[]){
    cout << "Hello, " << name << endl;
}

int main(){
    char name[20];
    cout << "Enter your name: ";
    cin.getline(name, 20);

    printf("Address of name & 1st element: %d %d\n", name, &name[0]);
    cout << "First letter in name and addr: " << name[0] << endl;
    cout << "Length: " << strlen(name) << endl;
    //How do we print the last letter?
    //printf("Address of 2nd and 3rd elements: %d %d\n", &name[1], &name[2]);
    //cout << "what if we go a little off: " << name[20] << endl;
    //cout << "what if we go way too far: " << name[100000] << endl;
    print_intro(name);
    return 0;
}
Command Line Arguments

```cpp
#include <iostream>
#include <cstring>

using std::cout;
using std::cin;
using std::endl;

int main(int argc, char *argv[]) {
    cout << "Number of args: " << argc << endl;
    cout << "Name of program: " << argv[0] << endl;
    if(argc > 1)
        cout << "2nd argument: " << argv[1] << endl;
    return 0;
}
```