CS 161
Intro to CS I
Begin Arrays
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

int student_grades[5];

• How do you access each item?
• What does the array name represent?
• Why is the array name the address of 1\textsuperscript{st} 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;
  }
Demo
Static vs. Dynamic 1-D arrays...
How does freeing memory work?

```c
int *p, *q;
p=new int;
q=new int[5];
delete p;
delete [] q;
```
Passing a 1-D Array (Static/Dynamic)

```c
int main() {
    int array[5];
    ...
    pass_1darray(array);
    ...
}
void pass_1darray(int *a) {
    cout << "Array at zero: " << a[0] << endl;
}
OR
void pass_1darray(int a[]) {
    cout << "Array at zero: " << a[0] << endl;
}
```
Demo...