EECS 161
Intro to Programming I

Finish Recursion, Strings
Chap. 13.2, 9.3, and 5.1
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;
  }
String Class/OOP

• What is a class?
  – User-defined type w/ access to...
    • Member variables/objects
    • Member functions

• What is the difference between object and variable?

• C++ string vs. C string
Strings

• Two types
• C-strings
  • Array of char values
  • End of string is null, or “\0”
  • Inherited from C
• Strings (in C++) are a class
C-String Variables

- Array of characters
  ```c
  Char a[5];
  ```
  - Declares a c-string variable with 4 characters
  - And one null character
- As with any array must be large enough for the largest quantity expected
- Difference from a ‘standard’ array?
  - MUST contain a null character
C-String Storage

• Consider `char a[4];` again
  - If `a` holds “Ow!” it is stored as:

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<thead>
<tr>
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</tr>
</tbody>
</table>
C-String Initialization

- `char myString[10] = “howdy”;
  - Doesn’t need to fill the array
  - The null (‘\0’) is put in for you
Strings

- Two types
Reading/Assignments

• Finish Assignment #3!!!
• Read Chap. 5 and 9.3