

CS250 Intro to CS II

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Strain 201

Office hours: MWF 10-11am

Or by appointment

Welcome!

- Web Page <http://zeus.cs.pacificu.edu/ryand/cs250/2017>
- Syllabus
- Calendar
- Text Book
- Visual Studio 2015

Progression!

- CS 150
 - C++ mechanics
 - Visual Studio mechanics, Debugger
- CS 250
 - C++ mechanics (structs, classes)
 - Object oriented programming and design
 - Graphics (SDL 2)
- CS 485 (Spring 2019)
 - C++ mechanics (C++11, C++14, templates, STL)
 - Object oriented design
 - Design patterns

What I think you know

- Variables & data types
- Relational & logical operators
- Decision statements
- Repetition statements including nesting
- Functions
- Files
- Arrays
- Character processing
- Visual Studio
- Debugger

This class

- More C++ mechanics
 - Arrays
 - Structs
 - Classes
 - Pointers
- Graphics programming
 - SDL
- Object Oriented Design

Review

- Review Reading: pp. 265-284 (files)
pp. 375-425 (arrays)
- Topics to Review
 - Files (Reading & Writing)
 - Arrays (1D & 2D)
 - Character Processing

Files

- What is a stream?
- How do we create a stream for reading from a file?

One-dimensional arrays

- Consider

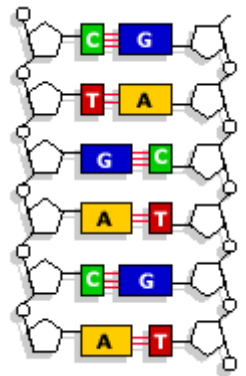
```
int aIntArray[] = {1, 2, 3, 4, 5};
```

```
double aDoubleArray[10];
```

1. What are the index values for each array?
2. How many elements does each array have?
3. Arrays consist of *homogeneous* data. What does this mean?

Problem #1

DNA Length



- A DNA string represents the order of nucleobases along one strand of a double-stranded DNA molecule
- The other strand is the ***reverse complement*** of the string
- DNA strings are constructed from the alphabet $\{A, C, G, T\}$ representing the bases adenine, cytosine, guanine, and thymine

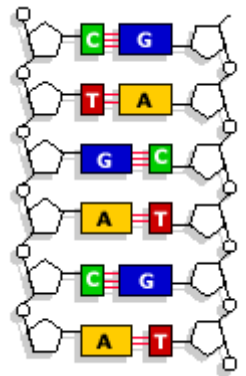
Problem #1

DNA Length

- The DNA string AAGATGCCGT has length 10 nucleobases (or just bases)
- Write a function **getDNALength** that accepts a character array (that ends with null) and returns the length of a DNA string

Problem #2

Reverse Complement



- In DNA strings, the symbols A and T are complements of each other as are C and G
- The reverse complement of a DNA string s is formed by reversing the contents of s and then taking the complement of each symbol
- The DNA string AAAACCCGGT has the reverse complement ACCGGGTTTT

Problem #2

Reverse Complement

- The data file dnastrings.txt contains an unknown number of DNA strings where each string has length at most 1000 bases
- Write a program to output
 - each DNA string
 - the reverse complement of each DNA string
- Let's write
 - well-defined function prototypes
 - each function definition
 - main function for solving the stated problem