Intro to Programming II

Intro to C

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C is a compiled language
  - Produces a binary that executes on one architecture/OS

Java compiles to an intermediate representation (bytecodes)
  - A Java program can be executed by a Java interpreter on any system.
C is not object-oriented

- Functions rather than methods
- No classes or objects.
- Structs can be used to group data, but not to associate methods.
19-2: Some examples

- hello world
- computing averages
- Factorial
19-3: Things that are the same in C and Java

6 primitive types
   △ int, char, double (no boolean, though)

6 if/else
   △ including && and ||

6 while

6 for

6 blocks delimited with { }

6 comments are /* ... */
19-4: Things that are different in C and Java

- No built-in String class
- No classes/objects/methods
- Memory allocation
- No garbage collection
- Much fewer standard libraries
- Java has references; C allows you to directly manipulate pointers.
Unlike Java, C distinguishes between a function’s declaration and its definition.

Functions are typically defined in a separate file that provides the signature.
Write a C program that prints all prime numbers between 1 and 100.

- Start by making a header file that contains the function `isPrime`.
- A number is prime if no number between 2 and it divides it evenly.
  - Use `floor` and `sqrt` here.
- What about types?
A big difference between C and Java is the treatment of strings.

In C, strings are just arrays of characters.

You can deal with constant strings by doing:

```c
char *myString = ``hello world'';
int i;
for (i = 0; i < strlen(myString); i++) {
    printf(``%c'', myString[i]);
}
```
Write a C program that takes the string “Oh how I love to program in C” and prints out all the vowels.
printf is a bit different from println() in Java.

Takes an arbitrary number of arguments.

First argument is the string to print.
  ▲ It may contain control characters.

Remaining arguments are values to replace in the string.
printf("hello world
n");
printf("hello %s
n", "bob");
printf("The first number is %d and the second number is %lf
n", i, j)
printf("average: %2lf total %4.2lf", i,j);