

Intro to Programming II
Intro to C

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19-2: Introduction to C

- 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.

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19-3: Introduction to C

- 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.

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19-4: Some examples

- hello world
- computing averages
- Factorial

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19-5: Things that are the same in C and Java

- primitive types
 - int, char, double (no boolean, though)
- if/else
 - including && and ||
- while
- for
- blocks delimited with { }
- comments are /* ... */

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19-6: 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.

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19-7: Headers

- Unlike Java, C distinguishes between a function's declaration and its definition.
- Functions are typically defined in a separate file that provides the signature.

19-8: Exercise 1

- 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?

19-9: Strings

- 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:

```
char *myString = "hello world";
int i;
for (i = 0; i < strlen(myString); i++) {
    printf("%c", myString[i]);
}
```

19-10: Exercise 2

- Write a C program that takes the string "Oh how I love to program in C" and prints out all the vowels.

19-11: More on printing

- `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.

19-12: More on printing

```
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);
```