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C & UNIX

Intro to C

The Basics

C is a command line language. The basic syntax of any C program code is

```
#include <stdio.h>
int main(void) {
    /* Program */
}
```

If the program takes command line arguments, then the function instead becomes

```
int main(int argc, char *argv[])
```

A string is treated as an array of characters where the last element is `\0` and is declared by `char *`. For a constant variable, use `const` as a prefix in the declaration. Alternatively,

```
#define NAME value
```

may be used. Numbers in base 8 and 16 are prefixed by `0` and `0x`, respectively. An enumeration is an array of constants, with syntax

```
enum type { c1 = value, c2, c3 = value ...};
int x = c2
```

where the values are optional.

Formatting Output

The `printf()` function outputs text. In the output string, `%.xf` formats the respective float such that there are `x` and `y` characters to the left and right of the decimal point, respectively.

For example, `printf("%6.1f string", 42.42)` outputs 42.4 string.

To cast a variable is to change it from one type to another, via

```
int var = (int)(var2);
```

where `var2` need not be an int. Additionally, use `x.f` to convert the int `x` to type float.

Conditionals

The ternary condition `x = exp1 ? a : b` is equivalent to

```
if (exp1) x = a;
else x = b;
```

The code `c = (a > b)? a : b` is equivalent to `c = max(a,b)`.

The switch statement is a condensed if-else-if-else... statement, with the general form

```
switch (exp) {
    case 1: statements; break;
    case 2: statements; break
    ...
    default: statements
}
```

Note **break** is optional. If not included, the next case may be executed. Otherwise, it branches out of a statement or loop (except for if-else).

The **continue** command is used in a nested if statement to skip a certain iteration(s) of the outer loop. It is often used to skip certain elements, as follows:

```
while (exp) {
    if (condition) continue; /* skip statements */
    statements;              /* if !condition... */
}
```