LECTURE 4: CONTROL STATEMENTS, RELATIONAL OPERATORS, CHARACTER CONSTANTS (K&R §§ 1.5.2–1.5.3)

counting characters, version 1 (K&R, page 18)

```
#include <stdio.h>

int main(void) {
  int m;
  m = 0;
  while(getchar() != EOF)
    ++m;
  printf("%d\n",m);
}
```

counting characters, version 2 (K&R, page 18)

```
#include <stdio.h>

main() {
  int m;
  for(m = 0; getchar() != EOF; ++m)
    ;
  printf("%d\n",m);
}
```

IF, ELSE IF, ELSE STATEMENTS

A way to express multiway decisions.

if (condition$_1$)
  statement$_1$
else if (condition$_2$)
  statement$_2$
[...]
else
  statement$_n$
	conditions are evaluated in order
	if a condition is satisfied:
	  corresponding statement is executed
	  entire construction is finished
	if no condition is satisfied
	  else statement is executed
	  if there is no else statement
	    nothing happens

note:	there can be any number of else ifs

RELATIONAL OPERATORS

Relational operators are used to check the relationship between the values of their operands.

Defined by specification to always evaluate to 1 (true) or 0 (false).

	condition required to evaluate to 1 (true)
x == y	the values of x and y are equal
x != y	the values of x and y are not equal
x > y	x is greater than y
x < y	x is less than y
x >= y	x is greater than or equal to y
x <= y	x is less than or equal to y

== VERSUS =

Remember the distinction between	= (assignment operator)
	== (equality operator)

example:

if(c == '\n')	if(c = '\n')
checks if c is equal to '\n' if it is, executes if body	assigns '\n' to value of c executes body

INCREMENT/DECREMENT OPERATORS

operator	equivalent to
++x;	x = x + 1; prefix increments before the variable is used
x++;	x = x + 1; postfix increments after the variable is used
--x;	x = x-1; (prefix)
x--;	x = x-1; (postfix)

When used just for the increment/decrement effect, there is no difference, but we will see situations where it makes a big difference.

FOR LOOP NOTES

The grammatical rules of C require a for statement to have a body, so we have an empty statement (called a null statment).

As with while loops, the body is not executed if the condition is false upon entry.

CONSTANTS

Fixed values the program may not alter during its execution.

CHARACTER CONSTANTS

A character written between single quotes represents an integer value equal to the numerical value of the character in the machine's character set.

This is another way to write a small integer.

escape sequences	Way to indicate hard-to-represent characters. Preceded by backslash (\). Count as one character.		
\n	new line	\\	backslash
\t	horiz. tab	\?	question mark
\v	vert. tab	\’	single quote
\b	backspace	\”	double quote
\r	carr. ret	\a	audible alert
\f	form feed		
\xhh	hex number	(where ‘hh’ is one or more hex digits)	
\ooo	octal number	(where ‘ooo’ is 1-3 octal digits)	

Note:	You cannot write a decimal value with a leading 0, it will be interpreted as octal.