

Variables and Constants

C++ Notes

Mrs. Alano

Most programmers refer to memory locations using symbolic names called **variables**. The programmer gives his variables meaningful names that reflect their role in the program. The compiler takes care of all the details – allocation of memory space for the variables and representation of data in the computer memory.

The term **variable** is borrowed from algebra because, as in algebra, variables can assume different values and can be used in **expressions**.

In a computer program, variables are actively manipulated by the program. A variable may be compared to a slate on which the program can, from time to time, write a new value and from which it can read the current value.

Example:

```
a = b + c;
```

This DOES NOT represent an algebraic equality, but instead a set of instructions:

1. get the current value of b;
2. get the current value of c;
3. add the two values;
4. assign the result to a (write the result in a)

Data Types:

C++ has the following eleven **built-in** types designated by reserved words:

char	unsigned char
int	unsigned int
short	unsigned short
long	unsigned long
float	
double	
long double	

****Because variables of different types occupy different amounts of memory space, we say that they have *different sizes*.**

WE WILL MOSTLY USE THE ***char, int, float,*** and ***double data types.***

TYPE	SIZE	USE
char	1 byte	One character, or a small integer in the range from 128 to 127
int	2 or 4 bytes	An integer in the range from -2^{15} to $2^{15} - 1$ or from -2^{31} to $2^{31} - 1$, respectively
float	4 bytes	A real number in floating point representation (decimal)
double	8 bytes	A double-precision real number in floating point representation.

Constants:

Constants are sometimes used in a C++ program. The most important reason for using constants is easier program maintenance. If the program is modified in the future and the value of a constant has to be changed, only the constant declaration has to be changed by the programmer.

Examples:

```
const double HAMBURGER_PRICE = 1.19;  
const double CHEESEBURGER_PRICE = HAMBURGER_PRICE + .20;
```

OR

```
const double HAMBURGER_PRICE = 1.19,  
const double CHEESEBURGER_PRICE = HAMBURGER_PRICE + .20;  
const double TAX_RATE = .08;
```

...

```
taxAmt = amt * TAX_RATE;
```