Al-mustaqbal University collage

Biomedical Engineering Department

Class: First

Subject: Computer Skills & Programming

Lecture 3: Variables and Operators

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In this lecture

▶Variables Types

▸Constants

▸**Standard Input (cin)**

1.1 Variables Types

A variable provides us with named storage that our programs can manipulate. Each variable in C++ has a specific type, which determines the size and layout of the variable's memory; the range of values that can be stored within that memory; and the set of operations that can be applied to the variable .

The name of a variable can be composed of letters, digits, and the underscore character. It must begin with either a letter or an underscore. Upper and lowercase letters are distinct because C++ is case-sensitive :

There are basic types of variables in C ++ as shown in the following table :

Type	Description
bool	Stores either value true or false
char	Typically a single octet (one byte). This is an integer type
int	The most natural size of integer for the machine
float	A single-precision floating point value
double	A double-precision floating point value
void	Represents the absence of type
wchar_t	A wide character type

C ++ also allows you to define various other types of variables, which we will cover in later lectures such as enumeration, index, array, references, data structures, and classes.

Variable Definition in C++ A variable definition tells the compiler where and how much storage to create for the variable. A variable definition specifies a data type, and contains a list of one or more variables of that type as follows :

```
type variable_list;
```

Here, type must be a valid C++ data type including char, w_char, int, float, double, bool or any user-defined object, etc., and variable_list may consist of one or more identifier names separated by commas. Some valid declarations are shown here :

```
int   i, j, k ;

char   c, ch ;

float  f, salary ;

double d ;
```

The line int i, j, k; both declares and defines the variables i, j and k; which instructs the compiler to create variables named i, j and k of type ***int***

Variables can be initialized (assigned an initial value) in their declaration. The initializer consists of an equal sign followed by a constant expression as follows :

```
type variable_name = value ;
```

Example 1

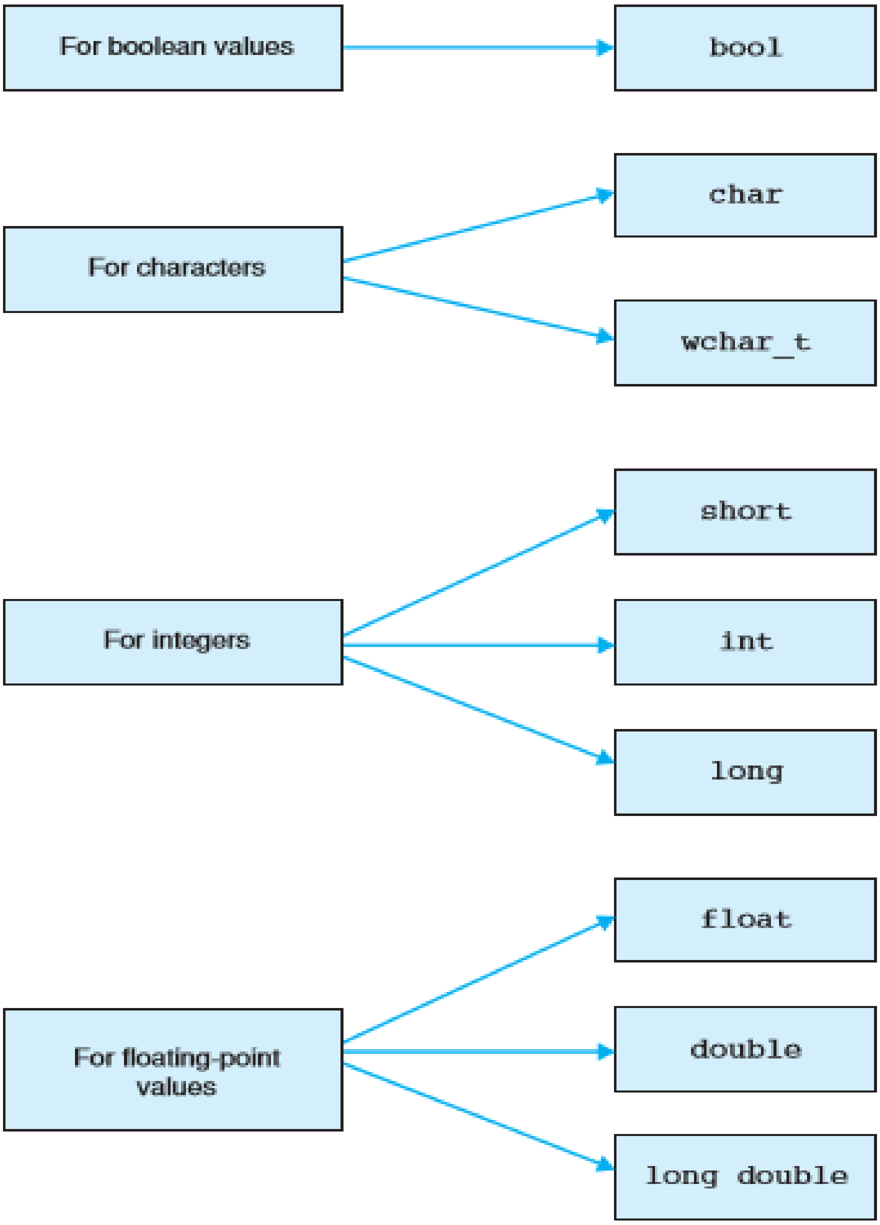
```
#include<iostream.h>

#include<conio.h>

int main(){int number =15;

cout<<number; getch();
```

Overview


For boolean values
bool
For characters
char
wchar_t
For integers
short
int
long
For floating-point values
float
double
long double

1.2 Constants

there are three types of constants : string constants , numeric constants and character constants

1- **String Constants :**

You already know string constants, which were introduced for text output using the cout stream. A string constant consists of a sequence of characters enclosed in double quotes whose maximum is 255 characters

.

EXAMPLE: "Today is a beautiful day"

2- **Numeric constants :**

are positive or negative numbers . there are four types of numeric constants : integer , floating , hexadecimal and octal .

A) Integer Constant : Positive or negative numbers that do not contain decimal points: Short integer: fill in 2^{15} to 2^{15}-1 (i. e. from – 32768 to 32767). Long integer: fill in $\mathbf{2}^{31}$ to $2^{31} - \mathbf{1}$ (i. e. from – 2147483648 to 2147483647).

Declaration of the integer constants is as follows :

int x,y ;

short int x , y ;

long int x , y ;

B) Floating Constants Positive or negative numbers that and can represented in exponential form. Examples : 4.5 ,12.73 , 65.0 , 54.9E3. Declaration of the float constants is as follows : float x , y , z ;

c) Hexadecimal constants: Hexadecimal numbers are integer numbers of base 16 and their digits are 0 to 9 and A to F.

d) Octal constants: Octal numbers are numbers of base 8 and their digits are 0 to 7.

3-Character Constants: A character represented within single quotes denotes a character constant. Here are some examples,

'A'   'a'   ' : '   ' ? '

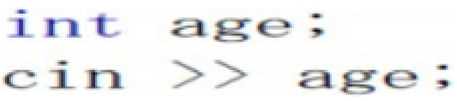
Declaration of the character constants is as follows :

char X;

char x , y , z;

1.3 Standard Input (cin)

The standard input device is usually the keyboard. Handling the standard input in C++ is done by applying the overloaded operator of extraction (>>) on the cin stream. The operator must be followed by the variable that will store the data that is going to be extracted from the stream. For example:



```
int age;
cin >> age;
```

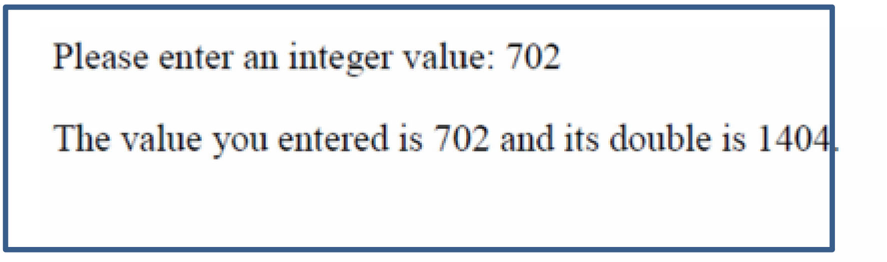
The first statement declared a variable of type integer (int) called age, and the second one waits for an input form cin (the keyboard) in order to store it in this integer variable.

You can also use cin to request more than one datum input from the user:

cin>>a>>b;

is equivalent to : cin>>a; cin>>b;

EX2: Write a C++ program that inter any integer value and find its double, the screen output should be like:



```
Please enter an integer value: 702

The value you entered is 702 and its double is 1404.
```

```
#include <iostream.h>

#include<conio.h >

int main(){

int i ;

cout << "Please enter an integer value: ";

cin >> i;

 cout << "The value you entered is " << i;

cout << " and its double is " << i*2;

getch();

}
```

Exercise

1- Write a program that declares two constant A and B

a) Initialize A =1 and B=2.2

b)Declare an int named C and float named D

c) Initialize C =A and D=B.

d) Write statements to print C and D to screen

Thank you