

Section 6: Variables & Constants

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Lecture 45. Declaring and Initializing Variables

Declaring and Initializing Variables

Naming Variables

Legal	Illegal
Age	int
age	\$age
_age	2014_age
My_age	My age
your_age_in_2014	Age+1
INT	cout
Int	return

```
BEGINNING C++ PROGRAMMING
Declaring Variables

#include <iostream>
using namespace std;

// This program will calculate the area of a room in square feet

int main() {
    cout << "Enter the width of the room: ";
    int room_width (0);
    cin >> room_width;

    cout << "Enter the length of the room: ";
    int room_length (0);
    cin >> room_length;

    cout << "The area of the room is " << room_width * room_length << " square feet" << endl;

    return 0;
}
```

mingw32-make.exe[1]: Entering directory 'C:/Users/frank/Documents/Section6/InitializingVariables'

C:/MinGW/bin/g++.exe -c 'C:/Users/frank/Documents/Section6/InitializingVariables/main.cpp' -std=c++14 -Wall -g -O0 -std=c++14 -Wall -o ./Debug/main.cpp.o -L C:/MinGW/bin/g++.exe -o ./Debug/InitializingVariables @'InitializingVariables.txt' -L

mingw32-make.exe[1]: Leaving directory 'C:/Users/frank/Documents/Section6/InitializingVariables'

====0 errors, 0 warnings====

Lecture 47. C++ Built-in Primitive Types

C++ Primitive Data Types

Character Types

- Used to represent single characters, 'A', 'X', '@'
- Wider types are used to represent wide character sets

Type Name	Size / Precision
char	Exactly one byte. At least 8 bits.
char16_t	At least 16 bits.
char32_t	At least 32 bits.
wchar_t	Can represent the largest available character set.

BEGINNING C++ PROGRAMMING
Primitive Types



Integer Types

- Used to represent whole numbers
- Signed and unsigned versions

Type Name	Size / Precision
<i>signed short int</i>	At least 16 bits.
<i>signed int</i>	At least 16 bits.
<i>signed long int</i>	At least 32 bits.
<i>signed long long int</i>	At least 64 bits

Type Name	Size / Precision
<i>unsigned short int</i>	At least 16 bits.
<i>unsigned int</i>	At least 16 bits.
<i>unsigned long int</i>	At least 32 bits.
<i>unsigned long long int</i>	At least 64 bits

Lecture 49. What is a Constant ?

What is a constant?

- Like C++ variables
 - Have names
 - Occupy storage
 - Are usually typed

However, their value cannot change once declared!

Types of constants in C++

- Literal constants
- Declared constants
 - `const` keyword
- Constant expressions
 - `constexpr` keyword
- Enumerated constants
 - `enum` keyword
- Defined constants
 - `#define`

- Integer Literal Constants
 - 12 - an integer
 - 12U - an unsigned integer
 - 12L - a long integer
 - 12LL - a long long integer

- Floating-point Literal Constants
 - 12.1 - a double
 - 12.1F - a float
 - 12.1L - a long double

- Character Literal Constants (escape codes)

```

\n - newline
\r - return
\t - tab
\b - backspace
\' - single quote
\" - double quote
\\ - backslash

```

```

cout << "Hello\tthere\amy friend\n";
Hello      there
my friend

```

Types of constants in C++

Literal constants

- The most obvious kind of constant

```

x = 12;
y = 1.56;
name = "Frank";
middle_initial = 'J';

```

Types of constants in C++

Declared constants

- Constants declared using the `const` keyword

```
const double pi {3.1415926};  
  
const int months_in_year {12};  
  
pi = 2.5;    // Compiler error
```

Types of constants in C++

Defined constants

- Constants declared using the `const` keyword

```
#define pi 3.1415926
```

Don't use defined constants in Modern C++

Defined constants were very commonly used in older c and c++ code. These constants are defined using the pound define preprocessor directive.

I'm showing you defined constants because you may run into them since there is so much c++ legacy code out there.

Here you're telling the preprocessor that wherever it sees the word pi replace it with 3.1415926.

Think of this as a blind find replace as you might do in a word processor. The preprocessor will gladly substitute one for the other.

Since the preprocessor doesn't know c++, it can't type check and this could lead to difficult to find errors.

So please don't use defined constants in modern c++ code.