FAST National University of Computer and Emerging Sciences Peshawar

OOP Lab # 1.3

C++ Type Conversion/Type Casting

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C++ Type Conversion or Type Casting

C++ allows us to convert data of one type to that of another. This is known as type conversion.

There are two types of type conversion in C++.

1. Implicit Conversion
2. Explicit Conversion (also known as Type Casting)

1) Implicit Type Conversion

- The type conversion that is done automatically done by the compiler is known as implicit type conversion.
- This type of conversion is also known as automatic conversion.
- Let us look at two examples of implicit type conversion.

Example 1: Conversion from int to double

```
#include <iostream>
using namespace std;
int main() {
   // assigning an int value to num_int
   int num_int = 9;

   // declaring a double type variable
   double num_double;

   // implicit conversion
   // assigning int value to a double variable
   num_double = num_int;

   cout << "num_int = " << num_int << endl;
   cout << "num_double = " << num_double << endl;

   return 0;
}
```

Output:

num_int = 9
num_double = 9

Example 1: Conversion from int to double…

In the program, we have assigned an int data to a double variable.

```
num_double = num_int;
```

Here, the int value is automatically converted to double by the compiler before it is assigned to the num_double variable.

This is an example of implicit type conversion.

Example 2: Automatic Conversion from double to int

```cpp
#include <iostream>
using namespace std;

int main() {

    int num_int;
    double num_double = 9.99;

    // implicit conversion
    // assigning a double value to an int variable
    num_int = num_double;

    cout << "num_int = " << num_int << endl;
    cout << "num_double = " << num_double << endl;

    return 0;
}
```

Output:

num_int = 9
num_double = 9.99

Example 2: Automatic Conversion from double to int…

In the program, we have assigned a double data to an int variable.

```
num_int = num_double;
```

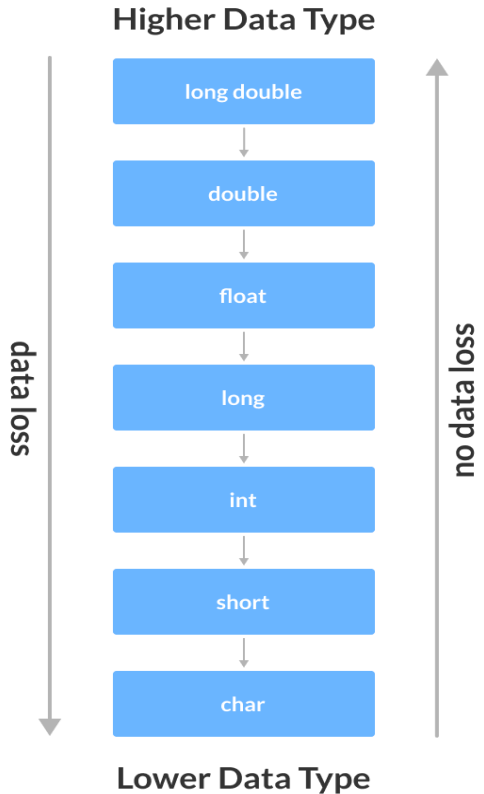
Here, the double value is automatically converted to int by the compiler before it is assigned to the num_int variable. This is also an example of implicit type conversion.

Note: Since int cannot have a decimal part, the digits after the decimal point are truncated in the above example.

Data Loss During Conversion (Narrowing Conversion)

- As we have seen from the above example, conversion from one data type to another is prone (risk) to data loss.
- This happens when data of a larger type is converted to data of a smaller type.

Data Loss During Conversion (Narrowing Conversion)



2) C++ Explicit Conversion

- When the user manually changes data from one type to another, this is known as **explicit conversion**. This type of conversion is also known as **type casting**.
- There are three major ways in which we can use explicit conversion in C++. They are:

1. C-style type casting (also known as **cast notation**)
2. Function notation (also known as **old C++ style type casting**)
3. Type conversion operators

i) C-style Type Casting

As the name suggests, this type of casting is favored by the **C programming language**. It is also known as **cast notation**.
The syntax for this style is:

(data_type)expression;

```
// initializing int variable
int num_int = 26;

// declaring double variable
double num_double;

// converting from int to double
num_double = (double)num_int;
```

ii) Function-style Casting

We can also use the function like notation to cast data from one type to another.
The syntax for this style is:

data_type(expression);

```
int num_int = 26;

// declaring double variable
double num_double;

// converting from int to double
num_double = double(num_int);
```

Example 3: Type Casting

```cpp
#include <iostream>
using namespace std;
int main() {
    // initializing a double variable
    double num_double = 3.56;
    cout << "num_double = " << num_double << endl;

    // C-style conversion from double to int
    int num_int1 = (int)num_double;
    cout << "num_int1   = " << num_int1 << endl;

    // function-style conversion from double to int
    int num_int2 = int(num_double);
    cout << "num_int2   = " << num_int2 << endl;

    return 0;
}
```

Output:

```
num_double = 3.56
num_int1   = 3
num_int2   = 3
```

Example 3: Type Casting…

- We used both the **C style type conversion** and the **function-style casting for type conversion** and displayed the results.
- Since they perform the same task, both give us the same output.

References

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THANK YOU