

How does typecast work internally in C programming? Can you explain with good examples? What are the use cases of typecast in C?

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Typecasting in C is primarily an indication to the compiler that the data is to be treated differently.

In C (and other compiled statically typed languages) the type is essentially a flag to the compiler about how much space to allocate for this data, and what machine code instructions are appropriate for dealing this type; it also changes the syntax allows (you can't use `[]` to get to individual bytes of a float - but if the same space is allocated as an array of bytes, then you can use the `[]` syntax).

Type casting essentially says that the compiler should generate different instructions for this data item.

If you examine the machine code generated, in most cases you won't find a set of instruction that correspond to the typecast instruction; what you will see is a change in the instructions used to deal with this data.

Note: my C is rusty but in some cases a typecast might also involve a data conversion - for instance typecasting an int to a float might actually cause the integer value into a floating point value (rather than simply treating the byte sequence in memory differently).

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Rusty Cashman

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In C programming a variable is just a named chunk of memory. The type the variable is declared as tells the compiler what the size of the named chunk of memory is and how it can be accessed. For example if you declare a variable `x` to be a structure that contains an integer member named `s` then the statement `x.s=3` makes sense and the compiler knows how to implement it, but `x.t = 3` might not make sense and might generate a compile time error, if there is no member in the structure called `t`. A type cast just tells the compiler to treat a variable that was declared as one type as if it were another different type. In that sense it is just a book keeping trick. It is the responsibility of the programmer to make sure that treating a variable that was declared as one type as if it were a different type makes sense.

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I will explain the most general way of doing it that I can think of.

All entities in your program have types. Any expression is associated with a certain type. When you are applying a type casting operator to transform an expression E from type T into type U , it gives the command to the compiler or interpreter to perform a certain operation. The nature of this operation is more arbitrary than you probably think right now.

What follows depends on the context.

1. If the types are "compatible" (meaning the internal representation is the same),