Programming challenges in C++

3. Basic data types in C++

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1. Basic data types

In this short session, we are going to check the basic data types that we have in C++. To deal with basic data types (integer or floating point numbers, characters, boolean values and strings) we have the following data types in C++:

- `int` for integer numbers
- `float` and `double` for real numbers
- `char` for characters
- `bool` for boolean types, whose values may be *true* or *false* (they are interpreted as 1 and 0, respectively)
- `string` for strings

Some of these types can be modified with the words `signed`/`unsigned` or `short`/`long`. For instance:

```
unsigned short int number;
```

The ranges of these types can be searched at many webs. For instance, the *int* type goes from -2147483648 to 2147483647, whereas *unsigned long int* goes from 0 to 18,446,744,073,709,551,615. There is an even larger integer type, which is *long long*.

1.1. Conversions between basic data types

If we need to convert one basic data type into another, there are some useful shortcuts that we can take into account:

- For any numeric type (integers, real numbers and even chars) we can just do a typecasting. For instance:
- There are other typical conversions, such as converting from string to integer or real. In this case, we can use `atoi` and `atof`, respectively. You must include stdlib.hs library to use these functions and, besides, you need to explicitly convert strings intro char arrays through `c_str()` function.

Here you can see an example:

```
#include <iostream>
#include <stdlib.h>

using namespace std;

int main()
{
    float f1 = 3.1416;
    int i1 = (float)f1;

    float f2;
    int i2;
    string numberString;

    cout << f1 << "---" << i1 << endl;

    cout << "Enter an integer:" << endl;
```

```
    cin >> numberString;
    i2 = atoi(numberString.c_str());
    cout << i2 << " x 2 = " << (i2 * 2) << endl;

    cout << "Enter a real number:" << endl;
    cin >> numberString;
    f2 = atof(numberString.c_str());
    cout << f2 << " x 2 = " << (f2 * 2) << endl;

}
```

1.2. Try yourself: Tirando bolos

To finish with this short session, you can try this challenge.