

## - Solution

Let's have a look at the solution to the previous exercise in this lesson.

### WE'LL COVER THE FOLLOWING ^

- Solution Review
- Explanation

## Solution Review #

```
// templateTypeTraitsModifications.cpp

#include <iostream>
#include <type_traits>

int main(){

    std::cout << std::boolalpha << std::endl;

    std::cout << "std::is_const<std::add_const<int>::type>::value: " << std::is_const<std::add_const<int>::type>::value << std::endl;
    std::cout << "std::is_const<std::remove_const<const int>::type>::value: " << std::is_const<std::remove_const<const int>::type>::value << std::endl;

    std::cout << std::endl;
    typedef std::add_const<int>::type myConstInt;
    std::cout << "std::is_const<myConstInt>::value: " << std::is_const<myConstInt>::value << std::endl;
    typedef const int myConstInt2;
    std::cout << "std::is_same<myConstInt, myConstInt2>::value: " << std::is_same<myConstInt, myConstInt2>::value << std::endl;

    std::cout << std::endl;

    int fir= 1;
    int& refFir1= fir;
    using refToIntType= typename std::add_lvalue_reference<int>::type;
    refToIntType refFir2= fir;

    std::cout << "(fir, refFir1, refFir2): " << "(" << fir << ", " << refFir1 << ", " << refFir2 << ")" << std::endl;

    fir= 2;

    std::cout << "(fir, refFir1, refFir2): " << "(" << fir << ", " << refFir1 << ", " << refFir2 << ")" << std::endl;

    std::cout << std::endl;

}
```



## Explanation #

Lines 10 and 11 determine at compile-time if the manipulated type is `const`. `myConstInt` is a type alias for an `const int`. Line 17 shows, with the help of the function `std::is_same`, that `myConstInt` and `myConstInt2` are the same types. An lvalue such as `fir` can only be bound to an `lvalue reference`. Line 24 shows this in a complicated way. Line 26 proves that `refFir1` and `refFire2` are references.

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In the next lesson, we'll discuss `constexpr`.