- Solution

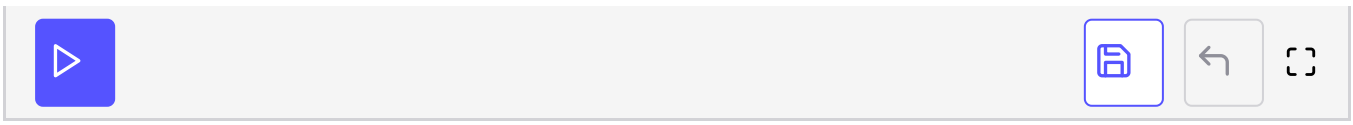
Let's have a look at the solution of the last exercise.

WE'LL COVER THE FOLLOWING

Solution Review

```
// TypeErasureTypeInfo.cpp

#include <iostream>
#include <memory>
#include <string>
#include <typeinfo>
#include <vector>

struct Object{
   std::string getTypeName() const { return _inner->getTypeName(); }
   struct Concept{
      using ptr = std::unique_ptr<Concept>;
      virtual std::string getTypeName() const = 0;
   };
   template <typename T>
   struct Model : Concept{
      std::string getTypeName() const override { return typeid(T).name(); }
   };
private:
   typename Concept::ptr _inner;
};

template <>
struct Object::Model<long long> : Object::Concept{
        std::string getTypeName() const override { return "long long";}
};

template <>
struct Object::Model<std::string> : Object::Concept{
        std::string getTypeName() const override { return "std::string<char>";}
};

template <>
struct Object::Model<std::vector<int>> : Object::Concept{
        std::string getTypeName() const override { return "std::vector<int>";}
```

```
};



template <typename T>
void printType(T&& t){
   std::cout << t.getTypeName() << std::endl;
}

class Test{};

int main(){

   printType(Object::Model<int>{});
   printType(Object::Model<double>{});
   printType(Object::Model<void>{});
   printType(Object::Model<Test>{});
   printType(Object::Model<Object>{});
   printType(Object::Model<long long>{});
   printType(Object::Model<std::string>{});
   printType(Object::Model<std::vector<int>>{});

}
```



Explanation

The function template `printType` returns a string representation for each type. In the general case, the primary template `Model` (lines 15 – 18) is used. The implementation uses the `typeid` operator to get the name. Full specializations are also available for the types `long long` (lines 23 – 26), `std::string` (lines 28 – 31), and `int` (lines 33 – 36). The full specializations provide personalized string representations.

In this chapter, we have learned about design techniques of C++ templates. In the next chapter, we'll look at the future concepts in C++20.