- Solutions

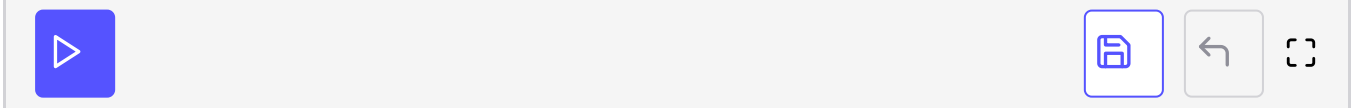
Here are the solutions to all the exercises in the previous lesson.

WE'LL COVER THE FOLLOWING

The solutions to both of the exercises can be found in the code below:

```
#include <iostream>
#include <ostream>

namespace Distance{
  class MyDistance{
    public:
      MyDistance(double i):m(i){}

      friend MyDistance operator +(const MyDistance& a, const MyDistance& b){
        return MyDistance(a.m + b.m);
      }
      friend MyDistance operator -(const MyDistance& a, const MyDistance& b){
        return MyDistance(a.m - b.m);
      }

      friend MyDistance operator *(double m, const MyDistance& a){
        return MyDistance(m*a.m);
      }

      friend std::ostream& operator<< (std::ostream &out, const MyDistance& myDist){
        out << myDist.m << " m";
         return out;
      }
    private:
      double m;

  };

  namespace Unit{
    MyDistance operator "" _km(long double d){
      return MyDistance(1000*d);
    }
    MyDistance operator "" _m(long double m){
      return MyDistance(m);
```

```
    }
    MyDistance operator "" _dm(long double d){
      return MyDistance(d/10);
    }
    MyDistance operator "" _cm(long double c){
      return MyDistance(c/100);
    }
    MyDistance operator "" _ft(long double d){
      return MyDistance(0.348*d);
    }
    MyDistance operator "" _mi(long double d){
        return MyDistance(1609.344 *d);
    }
  }
}

using namespace Distance::Unit;

int main(){

  std:: cout << std::endl;

  std::cout << "1.0_km: " << 1.0_km << std::endl;
  std::cout << "1.0_m: " << 1.0_m << std::endl;
  std::cout << "1.0_dm: " << 1.0_dm << std::endl;
  std::cout << "1.0_cm: " << 1.0_cm << std::endl;
  std::cout << "1.0_ft: " << 1.0_ft << std::endl;
  std::cout << "1.0_mi: " << 1.0_mi << std::endl;

  std::cout << std::endl;

  std::cout << "0.001 * 1.0_km: " << 0.001 * 1.0_km << std::endl;
  std::cout << "10 * 1_dm: " << 10 * 1.0_dm << std::endl;
  std::cout << "100 * 1.0cm: " << 100 * 1.0_cm << std::endl;

  std::cout << std::endl;
  std::cout << "1.0_km + 2.0_dm +  3.0_dm + 4.0_cm: " << 1.0_km + 2.0_dm +  3.0_dm + 4.0_cm <
  std::cout << std::endl;

  Distance::MyDistance work = 63.0_km;
  Distance::MyDistance workPerDay = 2 * work;
  Distance::MyDistance abbrevationToWork = 5400.0_m;
  Distance::MyDistance workout = 2 * 1600.0_m;
  Distance::MyDistance shopping = 2 * 1200.0_m;

  Distance::MyDistance myDistancePerWeek = 4 * workPerDay - 3 * abbrevationToWork + workout +

  std::cout << "4 * workPerDay - 3 * abbrevationToWork + workout + shopping: " << myDistanceP

  std::cout << "\n\n";

}
```



Explanation

Exercise 1

- The feet unit, `ft`, is implemented in lines 42-44.
- The mile unit, `mi`, is implemented in lines 45-47.

Exercise 2

- The components `work`, `workPerDay`, `workout`, `abbrevationToWork` and `shopping` are defined in lines 74-78.
- `workPerDay` is simply twice the value of `work`. Hence, it replaces `work * 2` in the original formula.
- The `work` variable has the `_km` suffix whereas all the others have the meter unit, denoted by the `_m` suffix.
- In line 80, we have computed `myDistancePerWeek` using the components we had defined above.

In the next chapter, we'll start our discussion on **types**.