```
=== 演習1 解答例 ============================
--- comile-exec.txt ---
$ g++ -std=c++17 main.cpp timedata-impl.cpp
$ ./a.out
3:50
5:05


--- timedata.hpp ---
#include <string>
class TimeData5 {
   int min{};
   int sec{};
public:
   void add(int m, int s);
   std::string str() const;
};


--- main.cpp ---
#include <iostream>
#include "timedata.hpp"

void print(const TimeData5& t)
{
   std::cout << t.str() <<"\n";
}

int main()
{
   TimeData5 t;
   t.add(3, 50);
   print(t);
   t.add(1, 15);
   print(t);
}


--- timedata-impl.cpp ---
#include <sstream>
#include <iomanip>
#include "timedata.hpp"
void TimeData5::add(int m, int s)
{
   min += m;
   sec += s;
   if (sec >= 60) {
      min += sec/60;
      sec %= 60;
   }
}

std::string TimeData5::str() const
{
   std::ostringstream o;
   o << min <<":"<<
   std::setw(2)<< std::setfill('0')<< sec;
   return o.str();
}
```

```
=== 演習2 解答例 ============================
--- compile-exec.txt ---
$ g++ -std=c++17 main2.cpp timedata-impl.cpp
$ ./a.out < elapse.txt
51:22



--- elapse.txt ---
10:10
3:05
4:20
15:28
18:19


--- timedata.hpp ---
#include <string>
class TimeData5 {
   int min{};
   int sec{};
public:
   void add(int m, int s);
   std::string str() const;
};


--- main2.cpp ---
// 時間の合計
#include <iostream>
#include "timedata.hpp"

int main()
{
   TimeData5 total;
   int m, s;
   char c;
   while (std::cin >> m >> c >> s)
      total.add(m, s);

   std::cout << total.str() <<"\n";
}



--- timedata-impl.cpp ---
#include <sstream>
#include <iomanip>
#include "timedata.hpp"
void TimeData5::add(int m, int s)
{
   min += m;
   sec += s;
   if (sec >= 60) {
      min += sec/60;
      sec %= 60;
   }
}

std::string TimeData5::str() const
{
   std::ostringstream o;
   o << min <<":"<<
   std::setw(2)<< std::setfill('0')<< sec;
   return o.str();
}
```

```
=== 演習3 解答例 ============================
--- compile-exec.txt ---
$ g++ -std=c++17 main3.cpp
$ ./a.out < elapse.txt
51:22



--- elapse.txt ---
10:10
3:05
4:20
15:28
18:19


--- timedata6.hpp ---
#include <sstream>
#include <iomanip>
class TimeData6 {
   int sec{};
public:
   void add(int m, int s);
   std::string str() const;
};

void TimeData6::add(int m, int s) {
   sec += m*60 + s;
}

std::string TimeData6::str() const {
   std::ostringstream o;
   o << sec/60 <<":"<<
   std::setw(2)<< std::setfill('0')<< sec%60;
   return o.str();
}


--- main3.cpp ---
// 時間の合計
#include <iostream>
#include "timedata6.hpp"

int main()
{
   TimeData6 total;
   int m, s;
   char c;
   while (std::cin >> m >> c >> s)
      total.add(m, s);

   std::cout << total.str() <<"\n";
}
```

```
=== 演習4 解答例 ============================
--- compile-exec.txt ---
$ g++ -std=c++17 ex4-frac.cpp
$ ./a.out
0/1 = 0
1/2 = 0.5
-1/4 = -0.25
1/3 = 0.333333



--- ex4-frac.cpp ---
// 分数クラス
#include <iostream>
#include <sstream>
#include <numeric>

class Frac {    // Fraction, 分数
   int nume{0}; // numerator, 分子
   int deno{1}; // denominator, 分母
public:
   void set(int n, int d) {
      if (d < 0) {
         n = -n;
         d = -d;
      }
      int gcd {std::gcd(n, d)};
      nume = n/gcd;
      deno = d/gcd;
   }
   double value() const { return static_cast<double>(nume)/deno; }
   std::string str() const {
      std::ostringstream o;
      o << nume <<"/"<< deno;
      return o.str();
   }
};

void print(const Frac& f)
{
   std::cout << f.str() <<" = "<< f.value() <<"\n";
}

int main()
{
   Frac a;
   print(a);
   a.set(2, 4);
   print(a);
   a.set(32, -128);
   print(a);
   a.set(-3, -9);
   print(a);
}
```