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CECS 282 S6 Lab 9

Part 1

```
#include <iostream>
using namespace std;

class time12
{
private:
bool pm; //true = pm, false = am
int hrs; //1 to 12
int mins; //0 to 59
public:
    //no-arg constructor
time12() : pm(true), hrs(0), mins(0) {}
//3-arg constructor
time12(bool ap, int h, int m) : pm(ap), hrs(h), mins(m)
{ }
void display() const //format: 11:59 p.m.
{
cout << hrs << ':';
if(mins < 10)
cout << '0'; //extra zero for "01"
cout << mins << ' ';
string am_pm = pm ? "p.m." : "a.m.";
cout << am_pm;
}
};

class Time24
{
private:
int hours; //0 to 23
int minutes; //0 to 59
int seconds; //0 to 59
public: //no-arg constructor
operator time12();
Time24() : hours(0), minutes(0), seconds(0)
{ }
Time24(int h, int m, int s) : //3-arg constructor
hours(h), minutes(m), seconds(s)
{ }
void display() const //format: 23:15:01
{
if(hours < 10) cout << '0';
cout << hours << ':';
if(minutes < 10) cout << '0';
cout << minutes << ':';
if(seconds < 10) cout << '0';
cout << seconds;
}

};
```

```
Time24::operator time12() {
    return time12((hours > 12), hours -  12 * (hours > 12), minutes);
}

int main()
{
int h, m, s;

while(true)
{ //get 24-hr time from user
cout << "Enter 24-hour time: \n";
cout << " Hours (0 to 23): "; cin >> h;
if(h > 23) //quit if hours > 23
return(1);
cout << " Minutes: "; cin >> m;
cout << " Seconds: "; cin >> s;

Time24 t24(h, m, s); //make a time24
cout << "You entered: "; //display the time24
t24.display();

time12 t12 = t24; //convert time24 to time12

cout << "\n12-hour time: "; //display equivalent time12
t12.display();
cout << "\n\n";
}
}
```

Enter 24-hour time:
Hours (0 to 23): 14
Minutes: 53
Seconds: 20
You entered: 14:53:20
12-hour time: 2:53 p.m.

Enter 24-hour time:
Hours (0 to 23): 24
Part 2:

```
#include <iostream>
#include "gamma.h"
using namespace std;

int main()
{
    gamma g1;
    gamma::showtotal();

    gamma g2, g3;
```

```
    gamma::showtotal();

    g1.showid();
    g2.showid();
    g3.showid();
    cout << "----------end of program----------\n";
    return 0;
}
```

```
//
// Created by Shawn on 10/27/20.
//

#ifndef LAB9P2_GAMMA_H
#define LAB9P2_GAMMA_H


class gamma {
public:
    gamma();
    ~gamma();
    static void showtotal();
    void showid() const;
private:
    int id;
    static int total;
};


#endif //LAB9P2_GAMMA_H
```

```
//
// Created by Shawn on 10/27/20.
//
#include <iostream>
#include "gamma.h"
using namespace std;

int gamma::total = 0;

gamma::gamma() {
    id = total++;
}

void gamma::showtotal() {
    cout << "Total is " << total << endl;
}

void gamma::showid() const {
    cout << "ID number is " << id << endl;
}

gamma::~gamma() {
    cout << "Destroying ID number " << id << endl;
```

```
    total--;
}
```

Total is 1
Total is 3
ID number is 0
ID number is 1
ID number is 2
----------end of program----------
Destroying ID number 2
Destroying ID number 1
Destroying ID number 0