



ITU Computer Engineering Department  
BLG252E Object Oriented Programming  
3<sup>rd</sup> Homework

**Due Date: May 4, 2015 23:00**

In this homework, you will implement **Trip**, **Cruise** and **Flight** classes for a travel agency company. On the trip class, any type of journey (e.g., cruise, flight, trip<flight>) may be stored as a dynamic array and the total cost of the trip can be calculated accordingly defined discount rate for the trip. Some rules must be taken into consideration and if the given rules are not met, error messages must be thrown.

- Design and implement these classes in C++ while **avoiding code repetition** as much as possible for all classes and providing **data hiding**.
- Test code is given to guide the design of your classes.
- All the dynamic data members should be declared as **private**.
- Cruise and flight classes should contain name and cost of the related journey. Flight class also has a flight number.
- Discount rate for a trip must be in range of [0, 40] and an exception should be thrown for an invalid values.
- You should successfully **deallocate** all of the allocated memory before termination of your program.
- **Add** method of the trip class should dynamically increase the size of trip array.
- Make sure that GNU C++ compiler (g++) compiles your project, and the application runs in Linux smoothly.
- **You are not allowed to use the standard template library (STL) or make any changes in the test code.**

A test program is given below. It illustrates the usage of all the methods and operators you will implement. Your implementation must be compatible with this test program.

```
#include <iostream>
#include <cstdlib>
#include <ctime>
#include <string>
#include "trip.h"
#include "cruise.h"
#include "flight.h"
using namespace std;
int main() {

    Flight flight1("Istanbul-Ankara","TK213",212.5);
    Trip<Flight> flightTrip(flight1);

    try {
        flightTrip[0].setCost(186.5);

        // trying to get the element at(1)
        // should give an error
        cout << flightTrip[1] << endl;

    } catch (const string & err_msg) {
```

```

        cout << err_msg << endl;

    }

    cout<<flightTrip<<endl;

    Flight flight2("Ankara-Istanbul","TK312",203.5);
    flightTrip.add(flight2);

    cout<<flightTrip<<endl;

    Flight *flightArray= new Flight[2];

    flightArray[0]= Flight("Istanbul-Izmir","TK113",183.5);

    flightArray[1]= Flight("Izmir-Istanbul","TK311",162.5);

    Trip<Flight> flightTrip2(flightArray,2);

    delete [] flightArray;

    flightTrip+=flightTrip2;

    try {

        flightTrip.setDiscount(10);

        // trying to set the discount to(50)
        // should give an error
        flightTrip.setDiscount(50);

    } catch (const string & err_msg) {

        cout << err_msg << endl;

    }

    cout<<flightTrip<<endl;

    Trip<Trip<Flight> > multipleTrips;
    multipleTrips.add(flightTrip);
    multipleTrips.add(flightTrip2);
    multipleTrips.setDiscount(20);

    cout<<multipleTrips<<endl;

    Cruise c("Istanbul-Izmir",180.2);
    Trip<Cruise> crouseTrip(c);
    crouseTrip.setDiscount(15);

    cout<<crouseTrip<<endl;

}

```

## Expected outcome:

Index out of bounds!

\*\*\*\*\*

Trip transfer count:1

1:Flight Name: Istanbul-Ankara #TK213 Cost: 186.5

\*\*\*\*\*

Trip total cost: 186.5

\*\*\*\*\*

\*\*\*\*\*

Trip transfer count:2

1:Flight Name: Istanbul-Ankara #TK213 Cost: 186.5

2:Flight Name: Ankara-Istanbul #TK312 Cost: 203.5

\*\*\*\*\*

Trip total cost: 390

\*\*\*\*\*

Discount out of range!

\*\*\*\*\*

Trip transfer count:4

1:Flight Name: Istanbul-Ankara #TK213 Cost: 186.5

2:Flight Name: Ankara-Istanbul #TK312 Cost: 203.5

3:Flight Name: Istanbul-Izmir #TK113 Cost: 183.5

4:Flight Name: Izmir-Istanbul #TK311 Cost: 162.5

\*\*\*\*\*

Trip total cost: 736

Discount: %10

Discount amount: -73.6

Discounted cost: 662.4

\*\*\*\*\*

\*\*\*\*\*

Trip transfer count:2

1:\*\*\*\*\*

Trip transfer count:4

1:Flight Name: Istanbul-Ankara #TK213 Cost: 186.5

2:Flight Name: Ankara-Istanbul #TK312 Cost: 203.5

3:Flight Name: Istanbul-Izmir #TK113 Cost: 183.5

4:Flight Name: Izmir-Istanbul #TK311 Cost: 162.5

\*\*\*\*\*

Trip total cost: 736

Discount: %10

Discount amount: -73.6

Discounted cost: 662.4

\*\*\*\*\*

2:\*\*\*\*\*

Trip transfer count:2

1:Flight Name: Istanbul-Izmir #TK113 Cost: 183.5

2:Flight Name: Izmir-Istanbul #TK311 Cost: 162.5

\*\*\*\*\*

Trip total cost: 346

\*\*\*\*\*

\*\*\*\*\*

Trip total cost: 1008.4

Discount: %20

Discount amount: -201.68

Discounted cost: 806.72

\*\*\*\*\*

\*\*\*\*\*

Trip transfer count:1

1:Cruise Name: Istanbul-Izmir Cost: 180.2

\*\*\*\*\*

Trip total cost: 180.2

Discount: %15

Discount amount: -27.03

Discounted cost: 153.17

\*\*\*\*\*

**Note:** If you face with an anomaly with the assignment or given test program, contact me (Res. Asst. Çağatay KOÇ) as soon as possible via e-mail (kocca@itu.edu.tr) or in person (Res. Lab. 3).

## **Submission Procedure:**

1. Your source code should be named as “trip.cpp”, “trip.h”, “flight.cpp”, “flight.h”, “cruise.cpp” and “cruise.h”.
2. Make sure you write your name and number to all the header files of your project with the following format.

```
/*  
 * @Author  
 * Student Name: !! enter here !!  
 * Student ID : !! enter here !!  
 * Date:  
 */
```

3. Make sure that GNU C++ compiler (g++) compiles your project, and the application runs in Linux smoothly. You can use [ITU ssh server](#) to compile and test your application. This is important because we will evaluate your homework in Unix using g++.
4. Use comments wherever necessary in your code to explain what you did.
5. After you make sure that everything is compiled smoothly, archive all files into a zip file. Submit this file through [www.ninova.itu.edu.tr](http://www.ninova.itu.edu.tr). Ninova enables you to change your submission before the submission deadline.

**Academic dishonesty including but not limited to cheating, plagiarism, collaboration is unacceptable and subject to disciplinary actions.**