ITU Computer Engineering Department
BLG252E Object Oriented Programming
3rd Homework (due May 8 at 23:55)

For this homework assignment, you will be writing **Shop**, **Cookie**, **Candy**, and **Icecream** classes in support of a Dessert Shop which sells candy by the kg, cookies by the dozen and ice cream by litre. You will use these classes for the checkout system and the classes are described below. You should take into account some rules and if the given rules are not met, error messages must be thrown.

- **Candy** class has a *weight* and a *price per kg* which are used to determine its *cost*.
- **Cookie** class has a *number* and a *price per dozen* which are used to determine its *cost.*
- **Icecream** class has a *litre* and a *price per litre* which are used to determine its *cost.*
- Discount percentage for any item must be in range of [0, 30] and an exception should be thrown for an invalid value.
- Any type of dessert shop (e.g. cookie, candy, icecream, shop<cookie>) can be stored as a dynamic array and the total cost can be calculated according to tax rate (static defined 8%) and discount rate.
- All the dynamic data members should be declared as **private**.
- You should successfully **deallocate** all of the allocated memory before termination of your program.
- You are also required to read dessert stock from a text file ("stock.txt") and customer order from ("order.txt") and then write the total cost with 10% discount to "checkout.txt".

A test program "DessertShop.cpp" is given to guide the design of your classes. It illustrates the usage of all methods and operators you will implement. Your implementation must be compatible with this test program. Without erasing the given content, you may add libraries, fields or other methods.

* Note that before catching an exception it is must to be thrown first. This means that there should be a code somewhere in the program that could catch the exception.

```
#include <iostream>
#include <cstdlib>
#include <string>
#include "shop.h"
#include "candy.h"
#include "cookie.h"
#include "icecream.h"
using namespace std;


int main() {
	Cookie cookie1("Chocolate Chip Cookies",10, 180); //(name, pieces,
priceperdozen)
	Cookie cookie2("Cake Mix Cookies", 16, 210);

	Shop<Cookie> cookieShop(cookie1);
	cookieShop.add(cookie2);
	cout<<cookieShop<<endl;

	//Catch an exception here while trying to access the element at(2)
	 cout << cookieShop[2] << endl;

	 Icecream icecream1("Chocolate ice cream",1.5, 170); //(name, litre,
priceperlitre)
	 Shop<Icecream> icecreamShop(icecream1);
	 cout<<icecreamShop<<endl;

	 //Catch an exception here while trying to set the discount to(50)
	 icecreamShop.setDiscount(50);

	 Candy candy2("Gummi bears",12,89); //(name, weight, priceperkg)
	 Candy candy3("Hanukkah gelt",8,110);

	 Shop<Candy> candyShop(candy2);
	 candyShop.add(candy3);

	candyShop.setDiscount(15);
	cout<<candyShop<<endl;

/*You will also
1) Read dessert stock and customer order from "stock.txt" and "order.txt",
respectively.
2) Write the total cost with 10% discount to "checkout.txt".
Expected output for checkout:

!!! We don't have 7 (Orange Jelly Candy)s.
!!! We don't have 11 (Chocolate ice cream)s.
------------------------
Number of items:4
1: Chocolate Chip Cookies #2 Cost: 100
2: Orange Jelly Candy #5 Cost: 750
3: Chocolate ice cream #2 Cost: 480
4: Cake Mix Cookies #10 Cost: 150
**********************
Total cost: 1598.40
Discount: %10
Discount amount: -159.84
Discounted cost: 1438.56
**********************
*/
```

Output of test program:

```
**********
Number of items:2
1: Chocolate Chip Cookies #10 Cost: 150

2: Cake Mix Cookies #16 Cost: 280

**********
Total cost: 464.4
**********
We don't have enough cookies!
**********
Number of items:1
1: Chocolate ice cream #1.5 Cost: 255

**********
Total cost: 275.4
**********
Discount rate is out of range!
**********
Number of items:2
1: Gummi bears Cost: 1068

2: Hanukkah gelt Cost: 880

**********
Total cost: 2103.84
Discount: 15%
Discount amount: -315.576
Discounted cost: 1788.26
**********
```

Submission

- Please submit all .h and .cpp files to **only** Ninova system **on time**. Late submission will not be accepted. Your source code should be named as “shop.h”, “cookie.h”, “candy.h”, icecream.h” and (if required) “shop.cpp”, “cookie.cpp”, “candy.cpp”, “icecream.cpp”.
- Make sure you write your name and number to all the header files of your project.
- Please use comments in your code to explain what you did and write your own code and also make sure that GNU C++ compiler (g++) compiles your project.
- Plagiarism and any other forms of cheating will have serious consequences as in the previous assignments. If you have any questions about homework, you can ask Mine Yasemin via e-mail (yaseminm@itu.edu.tr).