Object Oriented Programming

Week 04
Template and Class Implementation

Cảm ơn thầy Trần Duy Quang đã cung cấp template cho môn học

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1 Content

In this lab, we will review the following topics:

- How to create your own class template

2

Assignments

A: YY = 01

H: YY = 02

2.1. MyVector

(~ 23 methods)

Define the following methods for your own class, MyVector, a class template.

In the main() function, create a ***vector of integers*** and a ***vector of fractions*** to test your defined methods.

```
template<class T>
class MyVector{
private:
        T *arr;
        int size;
public:
        // empty array
        MyVector();

        // n zeros
        MyVector(int n);

        MyVector(T *a, int n);
        MyVector(const MyVector &v);

        ~MyVector();

        int getSize();
        T getItem(int index);
        void setItem(T value, int index);

        void add(T value);
        void addRange(T *a, int n);
        void clear();
        bool contains(T value);
        void toArray(T *arr, int &n);
        bool equals(const MyVector &v);
        int indexOf(T value);
```

```
        int lastIndexOf(T value);
        void insert(T value, int index);
        void remove(T value);
        void removeAt(int index);
        void reverse();
        string toString();

        void sortAsc();
        void sortDesc();
};
```

2.2. ABC Farm

On a farm, there were two kinds of animals: dairy cows and goats. Each animal on the farm has the following attributes:

- Identifier: an integer
- Weight: a real number
- Age: a real number

a) Please declare the **DairyCow** and **Goat** classes with the following properties and methods:

+ Above properties.

+ Constructors (default, parameterized, copy): each object of these two classes is created with the information code, weight, age.

+ The Identifier value of a dairy cow or goat is only set once at initialization and cannot be changed later. The remaining values (weight, age) can be changed, please declare all possible setters/ getters for 2 classes.

+ ***ToString*** method: output all information of the object to the screen.

b) Declare and define the assignment operator for the above 2 classes.

c) The age and weight of a cow or goat must be a positive number, so write the methods to check for the validity of these attribute values.

d) Given the class “ABCFarm” to represent the farm information:

```
class ABCFarm{
    private:
        vector<DairyCow> cows;
        vector<Goat> goats;
    public:

};
```

```
void Input();
void Output();
void OutputByAge(int min, int max);
```

The method ‘OutputByAge(int min, int max);’ allows to output the information of dairy cows and goats on the farm whose age ranges from min to max. Let's define the above method and add the declarations of other methods needed to support the method ‘OutputByAge(int min, int max);’ (if necessary).