**Ministry of education and science of the Kyrgyz Republic**

**Kyrgyz State Technical University named after I.Razzakov**

**Faculty of Information Technologies**

**Department of Software of Computer Systems**

**Major: 710400 «Software Engineering»**

Report

Discipline: «**Object-Oriented Design**»

Software requirements

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**Task1**

**Class Timer**

class Timer {

private:

int seconds;

public:

**Constructors-** Timer() : seconds(0) {}

Timer(int sec) : seconds(sec) {}

Timer(int min, int sec) : seconds(min \* 60 + sec) {}

**Destructor-** ~Timer() {

cout << "Таймер stop" << endl;

}

**Functional requirements**

1. The Timer class should have three overloaded constructors.Sorting records in the table in alphabetical order by the destination point.
2. The countdown should continue until it reaches 0.
3. When the countdown reaches 0, destructor display a message

**Task 2**

**Class Nomenclature**

class Nomenclature {

private:

string Product;

short int Price;

float RozNas;

int Quantity;

public:

Nomenclature(string product, short int price, float roznas, int quantity)

: Product(product), Price(price), RozNas(roznas), Quantity(quantity) {}

~Nomenclature() {

cout << "Товар удален" << endl;

}

**Functional requirements**

1. The Nomenclature class should have a constructor that initializes the object with a product name, wholesale price, retail markup, and quantity.Users should be able to add or remove student records dynamically.
2. The class should provide a function to calculate the net income for selling the product.
3. The class should provide a function to display all information about the product

**Task 3**

class Soft {

private:

string program;

string developer;

double size;

string date;

chrono::system\_clock::time\_point licenseDate;

public:

// Исправленный конструктор с правильным порядком инициализации

Soft(string prog, string dev, double size, string date, chrono::system\_clock::time\_point license)

: program(prog), developer(dev), size(size), date(date), licenseDate(license) {}

~Soft() {

cout << "Информация удалена!" << endl;

}

**Functional requirements**

1. The Soft class should have a constructor that initializes the object with a program name, developer, size, and license expiration date.Simulate a T-shaped sorting node with a main track and a side track.
2. The class should provide a function to calculate the number of days until the license expiration date.
3. The class should provide a function to display all information about the installed software

**Nonfunctional requirements**

1. Response Time: The program should quickly calculate results,
2. Availability-is the system available only when connected to the internet or does it also work offline
3. Usability-The interface must be simple and understandable
4. OS Windows 7 and higher
5. Processor intel core i5 and higher

1. What is a constructor? How is it called?

A constructor is a class method that is automatically executed when an object is created. The constructor is intended to initialize the object.

a. The name of the constructor is the same as the name of the class. b. The constructor is called automatically when an object is created.

2. Features of a constructor that distinguish it from other class methods?

Features of the constructor:

1. The name of the constructor is the same as the name of the class.
2. Constructors do not have return values.
3. There is no return type. You cannot get a pointer to the constructor.
4. If the user does not specify any constructors, the compiler creates them automatically.
5. The constructor is not inherited.
6. The constructor can be overloaded for different arguments.
7. There is a default constructor (without arguments) and a constructor with arguments.

3. What is a default constructor? When should it be used?

A default constructor is a constructor that can be called without passing arguments.

It is used when there is a need for default initialization.

4. Ways of initialization in the default constructor? Which initialization method is preferable?

1. Initialization of object fields using the initialization list:
2. Initialization of object fields by assigning values to them in the body of the constructor.

The second method is not error-free, but it is not recommended.

Reasons:

1. Field initialization should occur before the constructor body starts executing. This allows the constructor body to perform more complex actions than regular initialization.
2. The initialization list is the only way to set initial values for constants and references.

So the first method is preferable.

5. What is a constructor with arguments? When is a constructor with arguments used?

A constructor with arguments is a constructor that has at least one argument. It can initialize fields with values passed to it as arguments. In addition, this constructor greatly simplifies the program code.

When an object needs to be initialized with specific values.

When you want the user to be able to specify values when creating an object.

6. What are the advantages of a constructor with arguments over the Set() method?

a. Initialization during object creation

b. Guarantee of state correctness

c. Constructor with arguments can be more efficient in terms of performance.

7. What is a destructor? What is it used for?

A destructor is a method that is automatically called when an object is destroyed.

The destructor is used to release resources that were allocated during the lifetime of the object.

8. Features of the destructor

Features of the destructor:

1. It has a name that is the same as the name of the constructor, and therefore, the class.
2. It is preceded by a tilde character.
3. It does not return a value.
4. It has no arguments.

9. In what sequence are constructors executed, in what sequence are class destructors?

Constructors of base classes are called in the order of their declaration. Destructors are called in the reverse order.

10. Is it possible to overload a constructor?

Yes, it is possible. Let's consider two main ways to overload a constructor:

Method 1. Using both types of constructors in one program.

Method 2. For overloading, constructors with the same name are used, but with different numbers of arguments.

11. What is a copy constructor?

A copy constructor is a constructor that allows you to make the third way to initialize object fields. In this method, the fields of an existing object are used to initialize the fields of the object.