Object-Oriented Programming

Spring Semester 2022

Homework Assignment 3.

26/04/2022

Contents

Introduction

1. Try to provide clear and careful solutions.
2. You should provide comments for your code so it will be completely clear what you are trying to achieve. WARNING! Lack of comments might lead to points reduction.
3. Please note the following few points which may lead to points reduction during the submission check:
   (a) Avoid using *magic numbers*. For example: "if (i>17)", 17 is a magic number. If 17 is representing, for example, the number of shoes, then instead you should write: "if (i>shoesNumber)".
   (b) Try to avoid code duplication as much as possible.
   (c) You should not globally enable *std* namespace usage or any other namespaces, e.g. *using namespace std;*.

Learning from past experience, please note that some (small) updates to the definitions and requirement of the assigment might be published in next few days and that following said updates and the HW forum is required.

Definitions

Read carefully!

For the third homework, you will work with the Inhertiance mechanism in C++.

In this assignment you will model and implement KSF's store software.

KSF is a new chain store brand, that currently sales computers and computer equipment,

but has serious future plans on expanding its selection of items, so they asked you that take that in account when creating the software.

Like in the last assignment, The methods signature is up to you, but :

1. Use the **const** keyword where possible and needed.
2. Create **getters** and **setters** for all private fields
3. Use the **friend** functions where needed.
4. Use **reference** variables where possible and needed.
5. Use **static** variables and functions where possible and needed.
6. Use **virtual functions** where it is right to do so.
7. Use **Abstract base classes** where it is right to do so.

You need to understand where to use what, but if you'r unsure, feel free to ask me for help.

Your goals are:

- Having the main files, you should provide declaration and implementation while keeping in mind the basic *OOP* concept of *encapsulation*.

  Keep in mind that the included main files are very basic and do not cover all possible scenarios and end cases.

- Take care of correct dynamic memory management. Be aware of both allocating and releasing resources.

  ☒ In this submission, you are **RESTRICTED** from using *STL* library regardless of prior knowledge you have.

  ☑ You **can** assume that the input for the functions you write will be legal.

Branch class

Each of KSF's branches are going to have:

- An Array of Item pointers
  - The array should have the defined size – STORE_SIZE
- Location
  - Represented by a string
- Add item function
  - Adds a new item to the store
  - If the store is full, throw away the oldest item in the store

Item class

Each item has the following attributes:

- price
  - Represented by an int
- manufacturer
  - Represented by a string
- id
  - represented by an int
  - the first id is 1, each item is given the next free id (the last id given +1)
- To string convertion function
  - Should return a string with the item id, manufacturer and price with a comma between them.
  - For example :

id	2
Price	60
Manufacturer	Dell

Should return the string :

```
id 2: Dell, 60$
```

- Destruction
  - When item is destroyed, print the following:

```
Throwing away an item
```

Computer class

Each computer **Is-A** Item and also has the following attributes:

- cpu
  - Represented by a string
- Is a laptob
  - Represented by a bool

PeripheralDevice class

Each PeripheralDevice **Is-A** item and also has the following attributes:

- color
  - Represented by a string
- Is wireless
  - Represented by a bool
- Connect function
  - Takes a computer as argument, and prints :

```
*string of device*: Connecting to
computer : *string of computer*
```

Keyboard class

Each keyboard **Is-A** PeripheralDevice and also has the following attributes:

- number of keys
  - Represented by an int

Mouse class

Each mouse **Is-A** PeripheralDevice and also has the following attributes:

- dpi
  - Represented by an int

For int to string convertion is recommend you use std::to_string fuction that comes with <string>.

Evaluation

Homework exercise provided with the following example program files and corresponding outputs:

1. main.cpp
2. main _output.txt

You should be able to compile your code with “main.cpp” and receive the correct output in “main_output.txt”.

Submission should only include the following files :

Branch.h/.cpp

Item.h/.cpp

Computer.h/.cpp

PeripheralDevice.h/.cpp

Mouse.h/.cpp

Keyboard.h/.cpp

Make sure you keep the C++ syntax convention and submit the files exactly as described in the “Oop – Cpp – Conventions and Requirements” file in Moodle.

GOOD LUCK! ☺