FleaBay with Polymorphic Inheritance

**Due Time:** 23.59, 5 December 2015 - **can’t be late** **Earnings:** 9% of your final grade

***NOTE: The code in this assignment must be your own work. It must not be code taken from another student or written for you by someone else, even if you give a reference to the person you got it from (attribution); if it is not entirely your own work it will be treated as plagiarism and given a fail mark, or less.***

**Purpose:** You are to write the code for a version of the FleaBay assignment that is a continuation of assignment 2 and implements code reuse through polymorphic inheritance in C++. It allows the user to register with an id and password and enter items of different categories for sale together with their prices. Part of the code (minus the usual headers) is shown on the next page and provided online as a .txt file. You **MUST** use this code **without modification (not a single character changed): no code added or removed, no defines, no macros and no statics**. Your task is to implement, in the .cpp source code files, only the class member functions that are declared and also the global insertion operators. The code in your project is in the 7 files Item.h (also containing subclasses), Account.h, FleaBay.h, Item.cpp (also containing subclass member definitions), Account.cpp, FleaBay.cpp and ass1.cpp. You submit only Item.cpp, Account.cpp and FleaBay.cpp

In this assignment, when the application is running the user can

* Register with an id and password
* Add items and their prices to each account. Items are from three categories: Food and Beverage, Toys and Hobbies, and Deals
* Change the password of an account
* Print all the registered users together with their items
* Print one particular user together with items
* Quit the application and release all existing dynamically allocated memory.

An example of the output of the running application is given at the end. Yours must look the same.

Note the following:

* The FleaBay object has an array of pointers to Account objects. When a new Account is added the array of pointers is increased in size by one and a new Account object instantiated to be pointed to by the new additional pointer at the end. The new Account object holds the id and password of the new account and its items. When a new account is opened, a check is made that the account does not already exist and that the password matches an existing account.
* Each account has Items for sale. An Item has a description and a price. When a new Item is added the array of Item pointers is increased in size by one and a new Item object of one of the three categories is instantiated to be pointed to by the new additional Item pointer at the end. The item categories (Food and Beverage, Toys and Hobbies, and Deals) are concrete subclasses of the abstract base Item class and are held in the array of Item\* without any indication of what category they actually are. When they are called to output their data through their polymorphic Report() function, each category outputs in its own way through polymorphism (it does not use dynamic\_cast in its Report() function or attempt to discover what type it is – polymorphism of Report() takes care of it).
* Where it is necessary to discover what type of Item a particular Item\* points to, use dynamic\_cast (except in Report() where it is done by polymorphism).
* You must use functions like strlen() and strcpy() or similar etc. from the standard C library to handle strings. You cannot use the C++ string class. Each string on the heap is allocated just sufficient memory to hold it and no more.
* Input/output is done with cin and cout.
* You must only use new and delete for dynamic memory management. Constructors instantiate objects and destructors release their resources when they are deleted or go out of scope so there are no resource leaks.
* An ID can only be used once and must be valid, passwords must match etc. - output for failed input of this kind must be informative i.e. the application must “fail gracefully”.
* Overloaded insertion operators are added for output with cout for all classes
* An overloaded indexing operator that takes an ID string is used to select a particular account for output. If the ID is invalid, failure must be graceful.

An example of the output of the running application is given at the end. Yours must look the same (minor formatting differences are OK).

See the Marking Sheet for how you can lose marks, but you will lose 60% if: 1. you change the supplied code in any way at all (not a single character) - no code added or removed, no macros, no defines, no statics and no additional functions, 2. it fails to build in Visual Studio 2012 or 2013, 3. it crashes in normal operation, 4. it doesn’t work like the example. There must be no resource leaks (undeleted heap memory) when your application terminates (30% penalty).

Part of the code is shown on the next page. You MUST use this code **without modification.** Your task is to add the implementation of the class member functions and the global overloaded insertion operators. Note that each source code file (but not the header files) in general includes both its header and, preceding that, headers of more primitive classes that the compiler needs to know about. Header files do not include other header files except, for example, system header files that may be needed for input/output for inline in inline or global friend functions. Each class(es) has its own header file (.h) for its class(es) definition and its own source code file (.cpp) for the bodies of its member functions, defined with scope resolution.

**What to Submit :** Use Blackboard to submit this assignment as a zip file (**not** RAR) containing only the source code files (Item.cpp (containing all Item subclass function bodies), Account.cpp and FleaBay.cpp). The name of the zipped folder **must** contain your name as a prefix so that I can identify it, for example, for CST8219, using my name the file would be tyleraAss3CST8219.zip. It is also vital that you include the Cover Information (as specified in the Submission Standard) as a file headers in your source code files so they can be identified as yours. Before you submit the code, check that it builds and executes in Visual Studio 2012 or 2013 as you expect - if it doesn’t build for me, for whatever reason, you get a deduction of at least 60%. **Due to exams, this can’t be late.** Don’t send me the file as an email attachment – it will get 0.

***Example code: don’t change it (not even a single character).***

|  |  |  |
| --- | --- | --- |
| // In Item.h  typedef class Item  {  char\* description;  double price;  friend ostream& operator<<(ostream&, Item&);  public:  Item();  Item(Item&);  Item(char\*,double);  virtual~Item();  virtual void Report(void) = 0;  }\*pItem,\*\*ppItem;  struct Date  {  unsigned int day, month, year;  };  class FoodAndBeverages:public Item  {  Date expiryDate;  public:  FoodAndBeverages(Date, char\*, double);  FoodAndBeverages(FoodAndBeverages&);  void Report(void);  };  class ToysAndHobbies:public Item  {  int suitableAge;  public:  ToysAndHobbies(int, char\*, double);  ToysAndHobbies(ToysAndHobbies&);  void Report(void);  };  class Deals:public Item  {  Date closingDate;  public:  Deals(Date, char\*, double);  Deals(Deals&);  void Report(void);  }; | // In Account.h  typedef class Account  {  char\* ID;  char\* PassWord;  unsigned int numItems;  ppItem items;  public:  Account();  Account(Account&);  Account(char\*,char\*);  ~Account();  char\* getID(){return ID;}  char\*& getPassWord();  unsigned int getnumItems(){return numItems;}  void AddItem();  friend ostream& operator<<(ostream&, Account&);  }\*pAccount,\*\*ppAccount; | // In FleaBay.h  typedef class FleaBay  {  unsigned int numAccounts;  ppAccount accounts;  bool AddNewAccount();  public:  FleaBay();  ~FleaBay();  bool Login();  Account operator[](char\*);  friend ostream& operator<<(ostream&,FleaBay&);  }\* pFleaBay; |

|  |
| --- |
| // In ass3.cpp  #include <crtdbg.h>  #include "Item.h"  #include "Account.h"  #include "FleaBay.h"  #include <iostream>  using namespace std;  int main(void)  {  bool bRunning = true;  char id[256];  char response;  FleaBay e;  while(bRunning)  {  cout<<"\nPlease enter your choice"<<endl;  cout<<"1. FleaBay Login"<<endl;  cout<<"2. FleaBay Report"<<endl;  cout<<"3. Report an Account"<<endl;  cout<<"4. Quit"<<endl;  cin>>response;  cin.ignore(256,'\n');  switch(response)  {  case '1':  if(!e.Login())  return 1;  break;  case '2':  cout<<e;  break;  case '3':  cout<<"please enter the account id: ";  cin.getline(id,256,'\n');  cout<<e[id];  break;  case '4':  bRunning=false;  break;  default:  cout<<"invalid choice";  }  }  return 0;  } |

*Example Output*

Please enter your choice

1. FleaBay Login

2. FleaBay Report

3. Report an Account

4. Quit

1

\*\*NO ACCOUNTS\*\*

1. Add a new Account

2. Open an existing Account

3. Return to Main Menu

1

please enter your account ID: Andrew Tyler

please enter your account password: at 100

Please enter your choice

1. FleaBay Login

2. FleaBay Report

3. Report an Account

4. Quit

1

1. Add a new Account

2. Open an existing Account

3. Return to Main Menu

2

please enter your account ID: Andrew Tyler

please enter your password: at 100

No items in your account

Do you wish to change a password? (yes = 'P')

Do you wish to add another Item (yes = 'Y')

Want to quit this menu?(yes = 'Q')

Y

Enter the new Item Description:

Red Car

Please enter the new item price: 100000

What category of item is it? ('F' = FoodAndBeverages, 'T' =ToysAndHobbies, 'D'

= Deals)

T

Please enter the appropriate age group ( e.g. 6): 21

Do you wish to change a password? (yes = 'P')

Do you wish to add another Item (yes = 'Y')

Want to quit this menu?(yes = 'Q')

Y

Enter the new Item Description:

Box of Chocolates

Please enter the new item price: 100.00

What category of item is it? ('F' = FoodAndBeverages, 'T' =ToysAndHobbies, 'D'

= Deals)

F

please enter the expiry date as: day month year 30 12 2015

Do you wish to change a password? (yes = 'P')

Do you wish to add another Item (yes = 'Y')

Want to quit this menu?(yes = 'Q')

Q

Please enter your choice

1. FleaBay Login

2. FleaBay Report

3. Report an Account

4. Quit

2

Account ID: Andrew Tyler

Item 0: Toys and Hobbies Report

Suitable Age: 21 years

Red Car, cost = $100000.00

Item 1: Food and Beverage Report

Expiry Date: 30 12 2015

Box of Chocolates, cost = $100.00

Please enter your choice

1. FleaBay Login

2. FleaBay Report

3. Report an Account

4. Quit

1

1. Add a new Account

2. Open an existing Account

3. Return to Main Menu

1

please enter your account ID: Mary Jones

please enter your account password: mj 100

Please enter your choice

1. FleaBay Login

2. FleaBay Report

3. Report an Account

4. Quit

1

1. Add a new Account

2. Open an existing Account

3. Return to Main Menu

2

please enter your account ID: X

X is invalid ID

Please enter your choice

1. FleaBay Login

2. FleaBay Report

3. Report an Account

4. Quit

1

1. Add a new Account

2. Open an existing Account

3. Return to Main Menu

2

please enter your account ID: Mary Jones

please enter your password: mj 100

No items in your account

Do you wish to change a password? (yes = 'P')

Do you wish to add another Item (yes = 'Y')

Want to quit this menu?(yes = 'Q')

Y

Enter the new Item Description:

Digital camera

Please enter the new item price: 1000.00

What category of item is it? ('F' = FoodAndBeverages, 'T' =ToysAndHobbies, 'D'

= Deals)

D

Please enter the date the deal expires as: day month year 12 12 2016

Do you wish to change a password? (yes = 'P')

Do you wish to add another Item (yes = 'Y')

Want to quit this menu?(yes = 'Q')

Q

Please enter your choice

1. FleaBay Login

2. FleaBay Report

3. Report an Account

4. Quit

2

Account ID: Andrew Tyler

Item 0: Toys and Hobbies Report

Suitable Age: 21 years

Red Car, cost = $100000.00

Item 1: Food and Beverage Report

Expiry Date: 30 12 2015

Box of Chocolates, cost = $100.00

Account ID: Mary Jones

Item 0: Deals Report

Closing Date: 12 12 2016

Digital camera, cost = $1000.00

Please enter your choice

1. FleaBay Login

2. FleaBay Report

3. Report an Account

4. Quit

3

please enter the account id: Z

Z is invalid ID

Account ID: FailedID

Please enter your choice

1. FleaBay Login

2. FleaBay Report

3. Report an Account

4. Quit