List of Christmas Gifts

Data Structures Assignment 2
Linked List

2018.4.09

NTHU CS & EE

https://acm.cs.nthu.edu.tw/problem/11876/

- 禁止互相參考作業或直接取用他人的程式

新增 ➡

- 禁止請同學幫忙產生測資
- 禁止直接從網路上取用現成的程式片段
- 禁止上傳非自己獨力完成的程式到OJ或LMS
  - 包括幫忙debug、幫忙測試、不小心傳錯...都禁止
- 如發現非自己獨力完成(雷同)的作業程式，該次作業會得到零分(包括被別人抄襲、或參考網路資源)或甚至這科不及格(抄襲別人)
- 保管好自己的程式，不要放在其他人能取得的地方，造成自己的成績損失
  - 如果是在公用 Linux 環境寫作業，務必將家目錄權限設成 700，避免有他人能讀取你的程式

```
cd ~/..
chmod 700 YourHomeDir
```

換成你的帳號

- 不得直接 #include<list> 或類似的現成library
- 建議學 C++ string 讀取字串
  - Google "C++ string" 可以找到很多資料
    - 例如https://openhome.cc/Gossip/CppGossip/string2.html
- Link list可以使用array來模擬，但速度會比較慢，也許會有部分測資因此超過時限。
- Quiz 2是這題的簡化版

Objective

- Implement a linked list to store Christmas gifts
  - Each node stores a gift and its corresponding price
  - Price ranges from 0 to 999
  - Two duplicate prices do not exist in the list at the same time

- Examples
  - (hat, 150) -> (candy, 250) -> (book, 300)
  - (hat, 150) -> (candy, 150) -> (book, 300) Cannot happen

Requirements

- Implement 4 functions below
  - InsertBack(gift, price)
  - InsertAfter(gift, price, priceToInsertAfter)
  - Delete(price)
  - Reverse()

Requirements

- InsertBack(gift, price)
  - Insert a gift to the end of the linked list
  - Example:
    - Original list: (Candy,50)->(book,350)
    - After InsertBack(Toy, 120)
    - Updated list (Candy,50)->(book,350)->(Toy,120)
- InsertAfter(gift, price, priceToInsertAfter)
  - Insert the gift after priceToInsertAfter
  - If priceToInsertAfter does not exist in the linked list, do nothing
  - Example1:
    - Original list: (Candy,50)->(book,350)
    - After InsertAfter(Toy, 120, 50)
    - Updated list (Candy,50)->(Toy,120)->(book,350)
  - Example2:
    - Original list: (Candy, 50)->(book,350)
    - After InsertAfter(Toy, 120, 70)
    - Updated list (Candy, 50)->(book,350)

Requirements

- Delete (price)
  - Remove the gift matched the input price from the linked list
  - If this price does not exist in the linked list, do nothing
  - Example1:
    - Original list: (Candy,50)->(book,350)
    - After Delete(50)
    - Updated list (book,350)
  - Example2:
    - Original list: (Candy,50)->(book,350)
    - After Delete(20)
    - Updated list (Candy,50)->(book,350)
- Reverse ()
  - Reverse the linked list
  - Example:
    - Original list: (Candy,50)->(book,350)
    - After Reverse()
    - Updated list (book,350)->(Candy,50)

Sample Input

```
InsertBack dog 15↵
InsertBack paper 25↵
InsertBack pen 45↵
InsertBack book 350↵
InsertAfter mug 250 45↵
Delete 25↵
Reverse↵
InsertBack paper 50↵
InsertAfter comb 350 25↵
InsertAfter comb 270 45↵
Reverse↵
End↵
```

Sample Output

- Print
  - ***Empty*** or ***List***
  - If not empty, list the gifts and their corresponding prices
    - Connect with symbols “->”
    - No space in between

```
List↵
(paper,50)->(dog,15)->(comb,270)->(pen,45)->(mug,250)->(book,350)↵
```