

PROGRAMMING ASSIGNMENT # 2 -LINKED LIST

CSC 36000

February 9, 2015

PROGRAM STATEMENT: Mailing lists are frequently kept in a data file sorted alphabetically by customer name. The mailing list must be kept current by continually adding or deleting names from the list as required or processing a record in the list to make a "change of name or address" modification. You are to write a program to maintain such a mailing list.

PROGRAM SPECIFICATIONS: Your program is to employ a **LINKED LIST** to maintain a mailing list. You may use classes or a simple structure to create nodes for this assignment. However, starting with assignment #3 you will be required to use classes. The program is due on **February 23, 2015.**

INPUT: There will be an unknown number of records in the data file. Since we are dealing with ADTs there is no need to specify the maximum number of records. The name of the data file is **data2V6.txt (or data2 2008.txt)**. Each line in the data file will begin with a letter code followed by any information required to perform that operation. A code of **Q** will signify the end of input data. Each record in the data will have a different format depending on the operation to be performed. The format of the data for each code will be (*Note for 2008/2010/2012 users the data will appear on separate lines and the file name is data2 2008.txt*):

A <First Name> <Last Name> <Street Address> <City> <State> <Zip Code>

D <First Name> <Last Name>

C <First Name> <Last Name> <field number> <new value>

P

The field number in the **C** format indicates the field to be changed. For instance, a value of 2 would indicate that the persons LAST NAME needs to be changed while a value of 5 indicates a change to the STATE of residence. The field numbers and their meanings are

	Field Number	
First Name (12 characters long)	1	
Last Name (12 characters long)	2	(Remember to add one
Street Address (20 characters long)	3	element to each array
City (12 characters long)	4	to accommodate the
State (2 characters long)	5	NULL character.)
Zip Code (5 characters long)	6	

If the data is not of the specified field length, blanks will be used to fill in the field. However there are no extra blanks between the fields. This means that if a field takes up its entire length the next field will start immediately at the next position. The transaction codes and their meanings are:

<u>CODE</u>	<u>ACTION</u>
A	Add the record to the list.
D	Delete the record from the list AND add it to a linked list of deleted item.
C	Change the information in the indicated field.
P	Print the list in alphabetical order (A-Z) by last name.

When a transaction code of **A** is encountered you are to add the node to your linked list keeping the list in alphabetical order (A-Z) according to a **person's last name**. If the transaction code is a **D** you are to remove that node from the list and add it to a "deleted items list". If the code is a **C** you must find the node and make the appropriate change (remember if the last name is changed, you may have to remove it from the list and re-insert it to keep the nodes in alphabetic order). When a code of **P** is read, you are to print an alphabetized (A-Z) listing of all nodes according to the customer's last name.

Each person is unique. However two or more people may have the same last name OR the same first name BUT NOT both. If they have the same last name, use the first name to determine order in the list.

You may assume that all data is valid. However, you must guard against adding a duplicate record, deleting a record that does not exist and/or making a change to a nonexistent record.

REMEMBER TO INCLUDE YOUR OUTPUT HEADING AND FOOTING! ALSO REMEMBER TO DOCUMENT YOUR CODE !!!!!!!!!!!!!!!

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LINKED LIST

PROCESSING: The program is to read an unknown number of records of the form described above. It is to process each record as indicated by the transaction code. (NB: The variable you use to keep track of print lines can be a GLOBAL variable.)

OUTPUT: Output for this program will only be generated by the **P** transaction code contained in the data file or a message indicating an attempt to perform one of the illegal actions described in the INPUT Section. Each time the **P** code is encountered a table, as shown in the example below, is to be printed showing the contents of each node in the mailing list. A new heading is to be included every time the list is printed. The heading is to include a report title such as "MAILING LIST" and each column is to have its own label heading indicating the type of information in that column such as City, State, etc. The names are to be printed in alphabetic order (A-Z) by Last Name and the Last Name is to be printed first as shown in the sample output.

If an illegal operation was attempted, the program is to print out a message to the user indicating that an illegal operation was attempted and must indicate both the nature of the illegal operation and the FULL NAME of the Person. The require messages are:

For duplicate records (A code): <First Name> <Last Name> is already in the list. Attempt to add duplicate record failed!

For non-existent record (D code): Record of <First Name> <Last Name> not found. Attempt to delete record failed!

For non-existent record (C code): Record of <First Name> <Last Name> not found. Attempt to change record failed!

You may also include any additional information you desire such as suggested corrective actions and/or detail information on the record in question but it is not necessary.

Your OUTPUT PREAMBLE is to appear at the top on each page of output. Your "End of Output" message is to appear after all data has been processed.

Each output of the **entire list** is to start on a separate page. Error messages may appear on the same page as the list or start on a separate page. Consecutive error messages may appear on the same page.

EXAMPLE: Suppose the input file looked like this:

AJoel	Woodward	3414 Sollars Pt Rd	Dundalk	MD21222
ADonnie	Smith	69 Sunset Terrace	Bowie	NJ10238
ASarah	Black	489 Butler Dr	Centerville	TX76302
AScott	Smith	2412 Rockhill Rd	Wichita	KS45229
ADonnie	Hallford	106 Gemini Circle	Valdosta	GA31606
P				
AMary	Longer	7 Lion Lane	Sacramento	CA91922
DJoel	Woodward			
CSarah	Black	676311		
DLorrie	Marsh			
ASarah	Black	2412 Rockhill Rd	Wichita	KS45229
P				
DMary	Longer			
AAmber	Ballew	92 Solar Court	Flagstaff	AZ82221
CScott	Smith	4Dallas		
P				
CSanta	Claus	1Kris		
CDonnie	Hallford	5MD		
DAmber	Ballew			
ADonald	Zapski	5533 Cedar Lane	Seattle	WA99922
P				
Q				

Then the output should look like this:

```

                                MAILING LIST
Last Name      First Name  Address                City            State   Zip Code
=====
Black          Sarah      489 Butler Dr         Centerville    TX      76302
Hallford      Donnie    106 Gemini Circle      Valdosta       GA      31606
Smith          Donnie    69 Sunset Terrace     Bowie          NJ      10238
Smith          Scott     2412 Rockhill Rd      Wichita        KS      45229
Woodward       Joel      3414 Sollars Pt Rd    Dundalk        MD      21222
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Record of Lorrie Marsh not found. Attempt to delete record failed!

Sarah Black is already in the list. Attempt to add duplicate record failed!

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                                MAILING LIST
Last Name      First Name  Address                City            State   Zip Code
=====
Black          Sarah      489 Butler Dr.        Centerville    TX      76311
Hallford      Donnie    106 Gemini Circle      Valdosta       GA      31606
Longer         Mary      7 Lion Lane           Sacramento     CA      91922
Smith          Donnie    69 Sunset Terrace     Bowie          NJ      10238
Smith          Scott     2412 Rockhill Rd      Wichita        KS      45229
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                                MAILING LIST
Last Name      First Name  Address                City            State   Zip Code
=====
Ballew         Amber      92 Solar Court        Flagstaff      AZ      82221
Black          Sarah      489 Butler Dr.        Centerville    TX      76311
Hallford      Donnie    106 Gemini Circle      Valdosta       GA      31606
Smith          Donnie    69 Sunset Terrace     Bowie          NJ      10238
Smith          Scott     2412 Rockhill Rd      Dallas         KS      45229
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Record of Santa Claus not found. Attempt to change record failed!

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                                MAILING LIST
Last Name      First Name  Address                City            State   Zip Code
=====
Black          Sarah      489 Butler Dr.        Centerville    TX      76311
Hallford      Donnie    106 Gemini Circle      Valdosta       MD      31606
Smith          Donnie    69 Sunset Terrace     Bowie          NJ      10238
Smith          Scott     2412 Rockhill Rd      Dallas         KS      76203
Zapski         Donald     5533 Cedar Lane       Seattle        WA      99922
```

END OF PROGRAM OUTPUT