2021 Winter CIS200 – Programming Assignment 3
Pointers and Linked Lists

Professor: Jie Shen
Release date: Mar. 6, 2021
Due date: Mar. 27, 2021
Student name: Demetrius Johnson

Contents

Question 1 Unsorted Linked List (30 points)

Source code (USED C++ COMPILER on Microsoft Windows 10)

See CPP and H uploads I made in canvas with this document along with the executables.

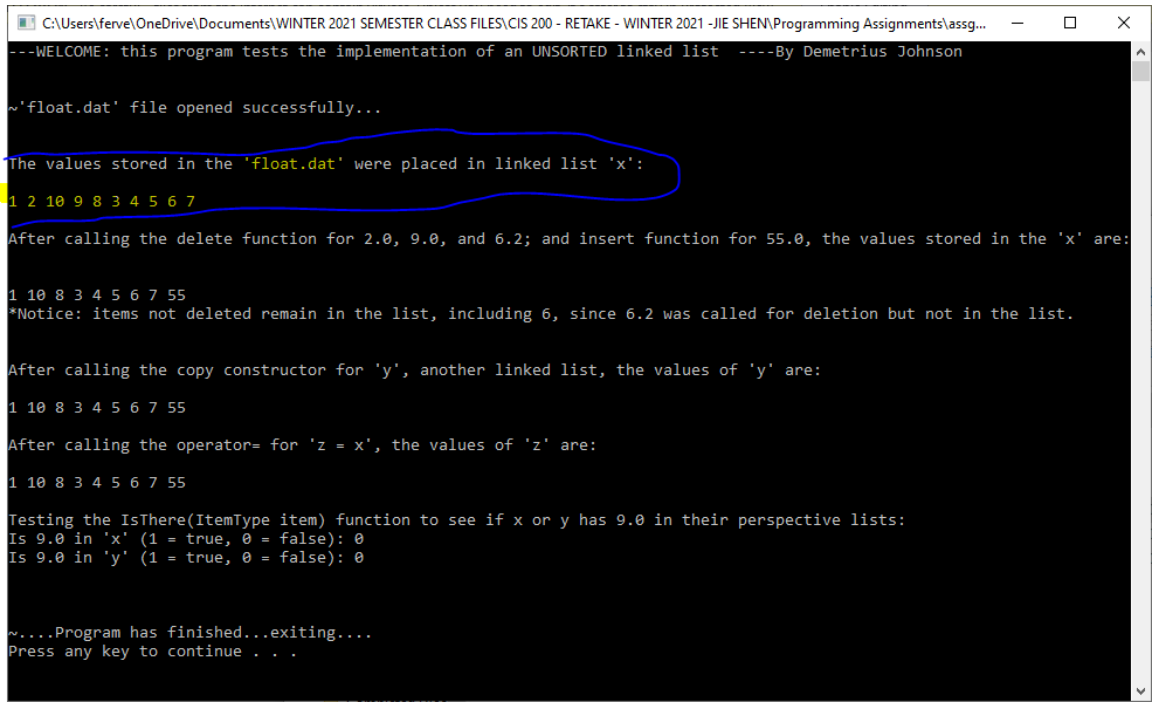
Test data and expected results

Test Table:

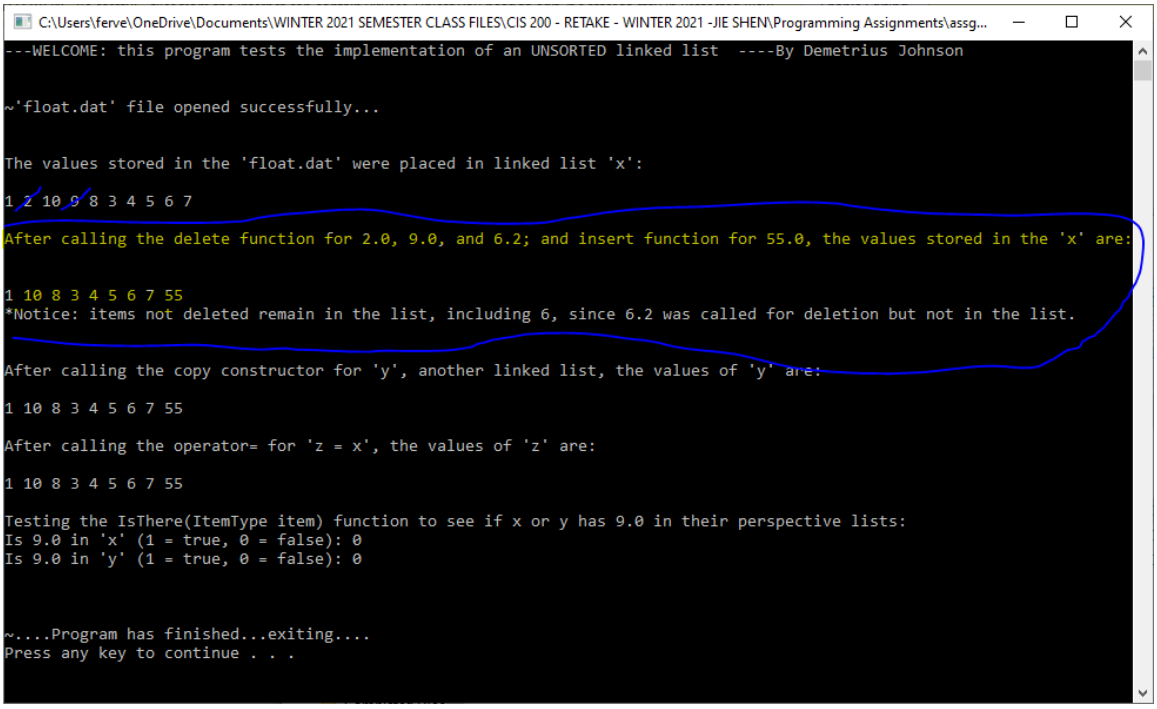
Test #	Valid / Invalid Data	Description of test	Input Value	Expected Output	Actual Output	Test Pass / Fail
1	valid	Task 2	Float.dat	Output contents in a list from float.dat file	See screenshot	pass
2	valid	Task 3: Add code to your driver to test the remaining member functions. Delete 2.0, 9.0, and 6.2 from *x* and print the list to be sure they are gone. Bonus: Insert function tested for 55 Although it was already tested from file input	Delete 2.0, 9.0, and 6.2 from *x* *Insert 55.0 to x*	Output contents of x excluding 2, and 9, and adding 55	See screenshot	pass
3	valid	Task 4: Create another instance, y, through the copy constructor such that the content of *y* is the same as that of *x*, but a deep copy should be done. Print out the all the list elements of *y*.	UList<ItemType> y(x);	Contents of y is same as x	See screenshot	pass
4	valid	Task 5: Declare an instance, z, and assign the content of x to z through the operation "=". Print out the all the list elements of z.	UList<ItemType> z; z = x;	Contents of z is same as x	See screenshot	pass
5	valid	Task 6: Test if 9.0 is in the lists *x* and *y* via the member function: IsThere(ItemType item) and print out the test results.	Isthere 9 for x and y	False for both	See screenshot	pass

Task 7: What is the Big-O notation for the time complexity of IsThere( ) function?
answer: O(N) since I only implemented 1 while loop in my function that searches from the first node to the last node in the linked list.

TEST 1:


C:\Users\ferve\OneDrive\Documents\WINTER 2021 SEMESTER CLASS FILES\CIS 200 - RETAKE - WINTER 2021 -JIE SHEN\Programming Assignments\assg...
---WELCOME: this program tests the implementation of an UNSORTED linked list ----By Demetrius Johnson
~'float.dat' file opened successfully...
The values stored in the 'float.dat' were placed in linked list 'x':
1 2 10 9 8 3 4 5 6 7
After calling the delete function for 2.0, 9.0, and 6.2; and insert function for 55.0, the values stored in the 'x' are:
1 10 8 3 4 5 6 7 55
*Notice: items not deleted remain in the list, including 6, since 6.2 was called for deletion but not in the list.
After calling the copy constructor for 'y', another linked list, the values of 'y' are:
1 10 8 3 4 5 6 7 55
After calling the operator= for 'z = x', the values of 'z' are:
1 10 8 3 4 5 6 7 55
Testing the IsThere(ItemType item) function to see if x or y has 9.0 in their perspective lists:
Is 9.0 in 'x' (1 = true, 0 = false): 0
Is 9.0 in 'y' (1 = true, 0 = false): 0
~....Program has finished...exiting....
Press any key to continue . . .

TEST 2: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~'float.dat' file opened successfully...
The values stored in the 'float.dat' were placed in linked list 'x':
1 2 10 9 8 3 4 5 6 7
After calling the delete function for 2.0, 9.0, and 6.2; and insert function for 55.0, the values stored in the 'x' are:
1 10 8 3 4 5 6 7 55
*Notice: items not deleted remain in the list, including 6, since 6.2 was called for deletion but not in the list.
After calling the copy constructor for 'y', another linked list, the values of 'y' are:
1 10 8 3 4 5 6 7 55
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Testing the IsThere(ItemType item) function to see if x or y has 9.0 in their perspective lists:
Is 9.0 in 'x' (1 = true, 0 = false): 0
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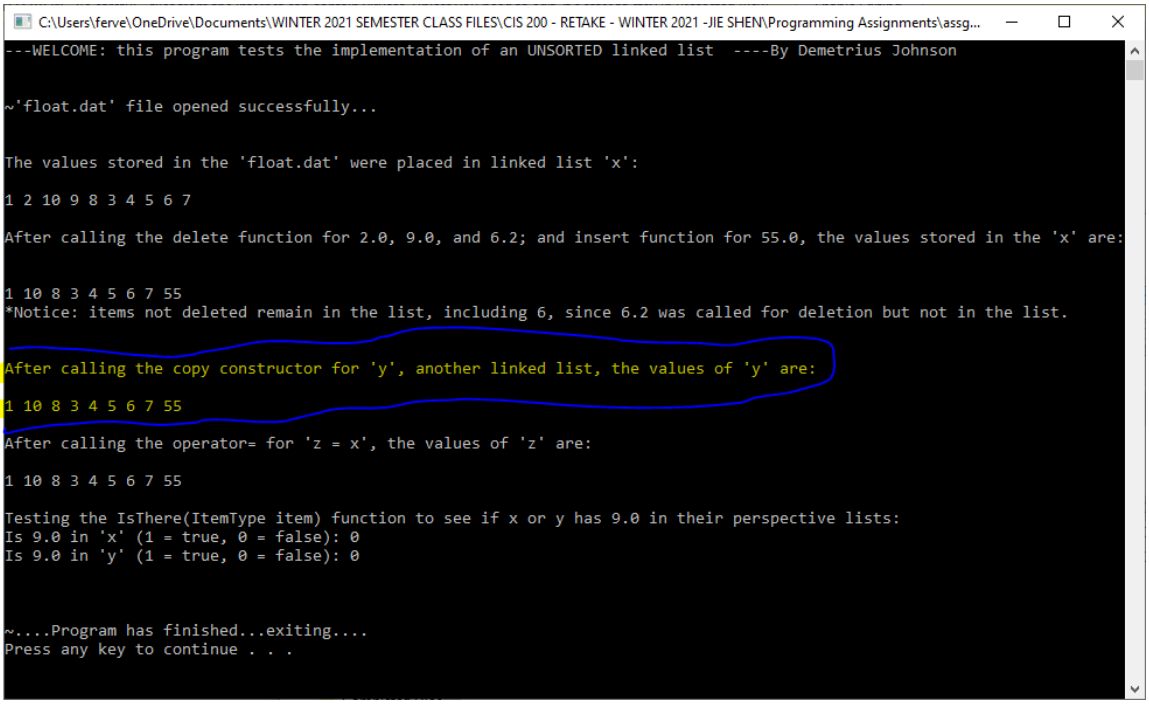
Press any key to continue . . .

TEST 3: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After calling the delete function for 2.0, 9.0, and 6.2; and insert function for 55.0, the values stored in the 'x' are:
1 10 8 3 4 5 6 7 55
*Notice: items not deleted remain in the list, including 6, since 6.2 was called for deletion but not in the list.
After calling the copy constructor for 'y', another linked list, the values of 'y' are:
1 10 8 3 4 5 6 7 55
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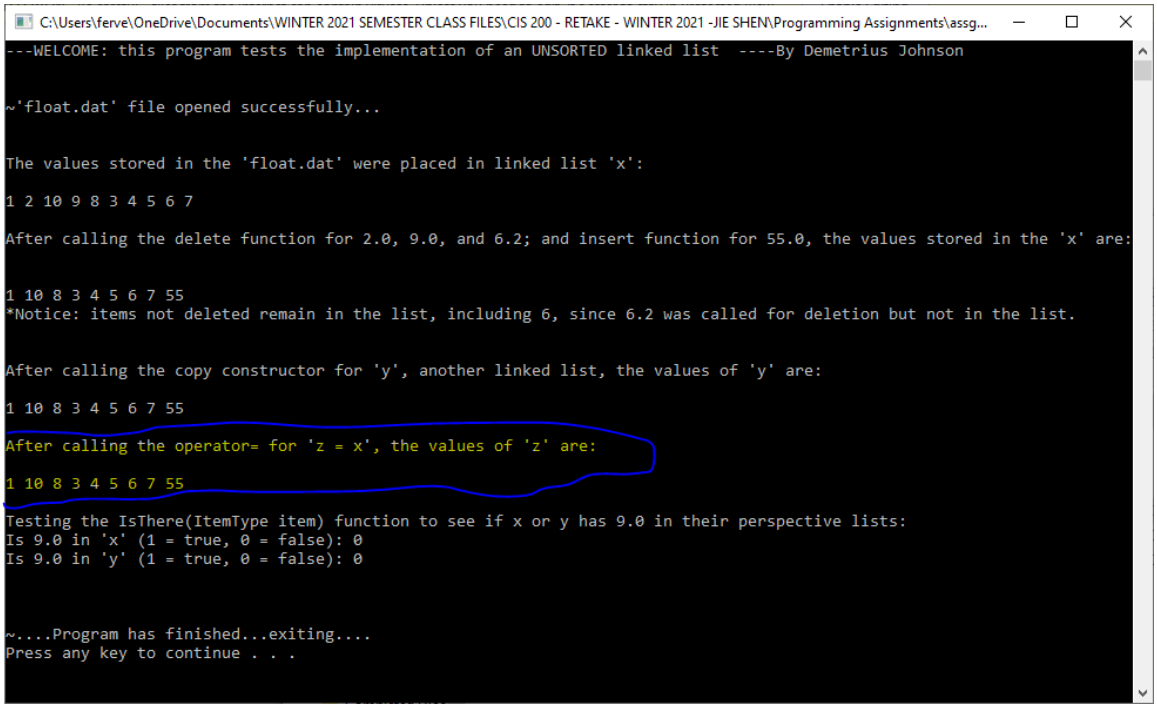
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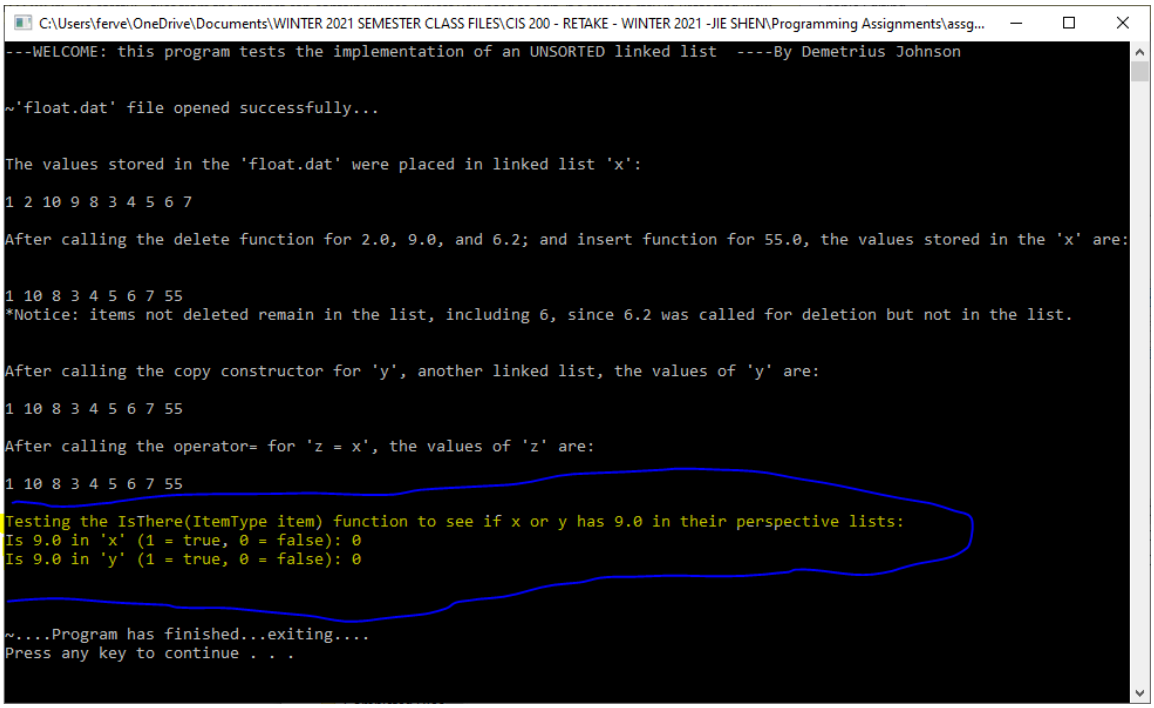
TEST 5: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After calling the copy constructor for 'y', another linked list, the values of 'y' are:
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Question 2 Sorted linked list 30 points)

Source code (USED C++ COMPILER on Microsoft Windows 10)

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Test data and expected results

Test Table:

Test #	Valid / Invalid Data	Description of test	Input Value	Expected Output	Actual Output	Test Pass / Fail
1	valid	Task 2	Float.dat	Output contents in a list from float.dat file in SORTED order	See screenshot	pass
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answer: O(N) since I only implemented 1 while loop in my function that searches from the first node to the last node in the linked list.

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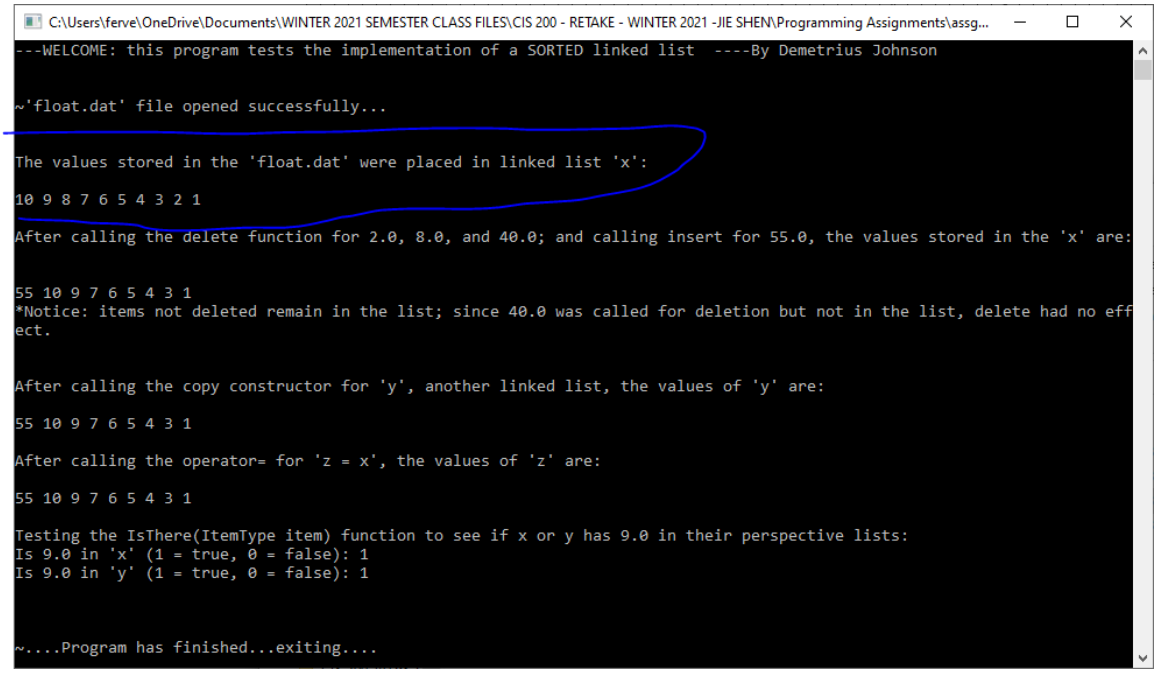
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~'float.dat' file opened successfully...
The values stored in the 'float.dat' were placed in linked list 'x':
10 9 8 7 6 5 4 3 2 1
After calling the delete function for 2.0, 8.0, and 40.0; and calling insert for 55.0, the values stored in the 'x' are:
55 10 9 7 6 5 4 3 1
*Notice: items not deleted remain in the list; since 40.0 was called for deletion but not in the list, delete had no effect.
After calling the copy constructor for 'y', another linked list, the values of 'y' are:
55 10 9 7 6 5 4 3 1
After calling the operator= for 'z = x', the values of 'z' are:
55 10 9 7 6 5 4 3 1
Testing the IsThere(ItemType item) function to see if x or y has 9.0 in their perspective lists:
Is 9.0 in 'x' (1 = true, 0 = false): 1
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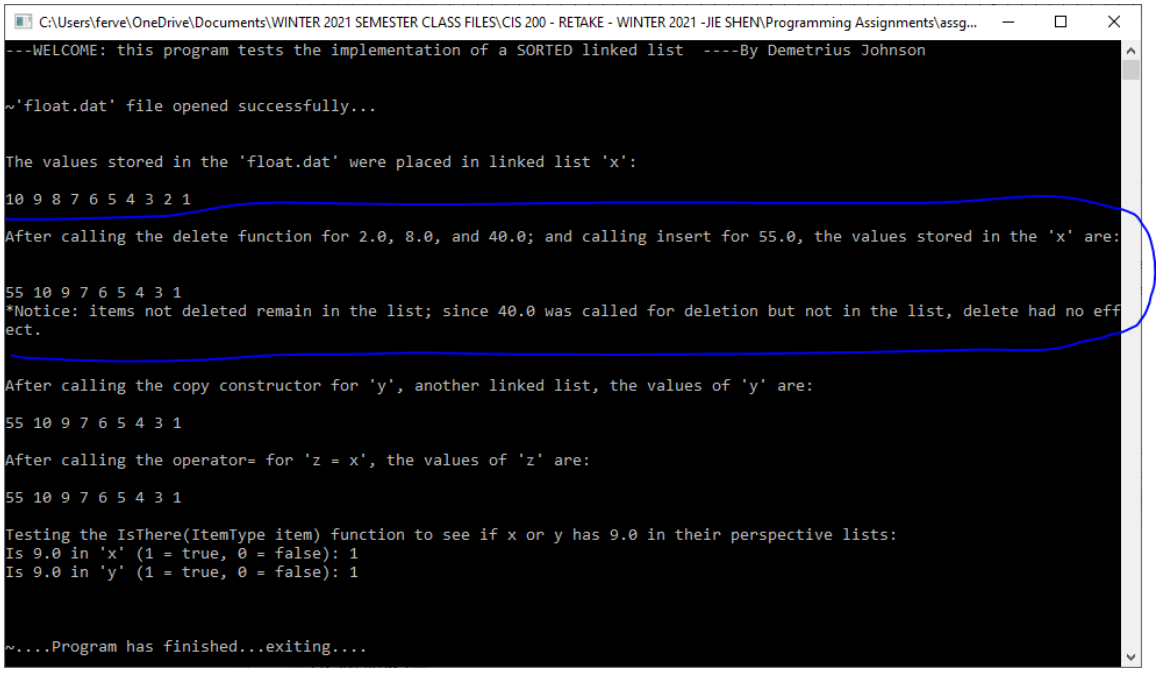
TEST 2: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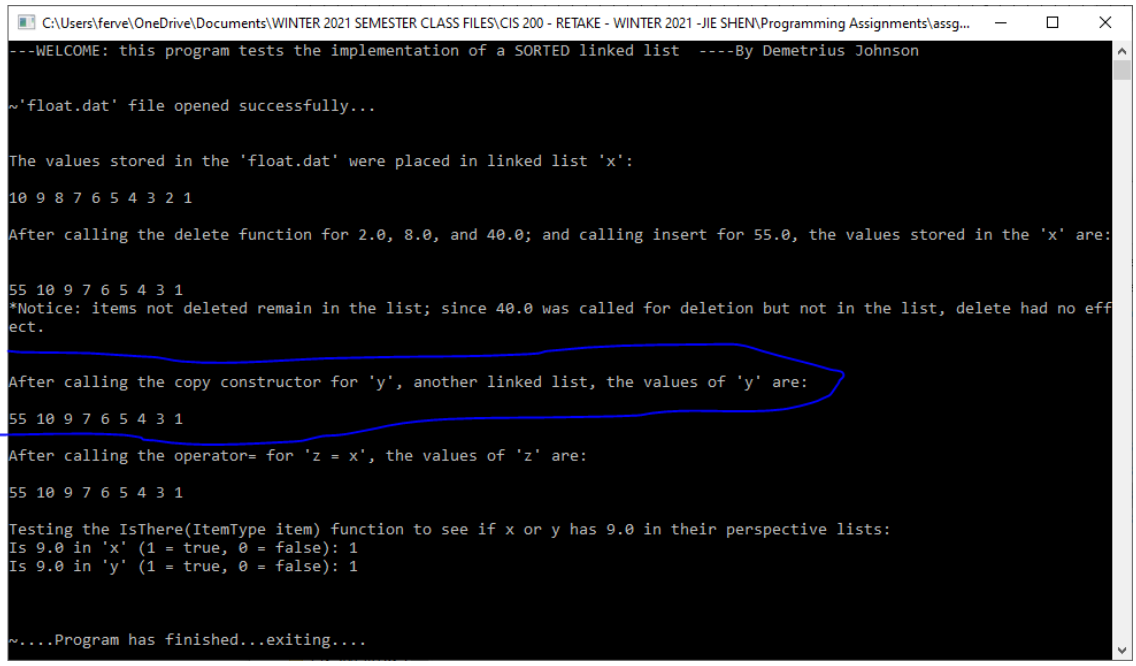
TEST 3:


C:\Users\ferve\OneDrive\Documents\WINTER 2021 SEMESTER CLASS FILES\CIS 200 - RETAKE - WINTER 2021 -JIE SHEN\Programming Assignments\assg...
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~'float.dat' file opened successfully...
The values stored in the 'float.dat' were placed in linked list 'x':
10 9 8 7 6 5 4 3 2 1
After calling the delete function for 2.0, 8.0, and 40.0; and calling insert for 55.0, the values stored in the 'x' are:
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After calling the copy constructor for 'y', another linked list, the values of 'y' are:
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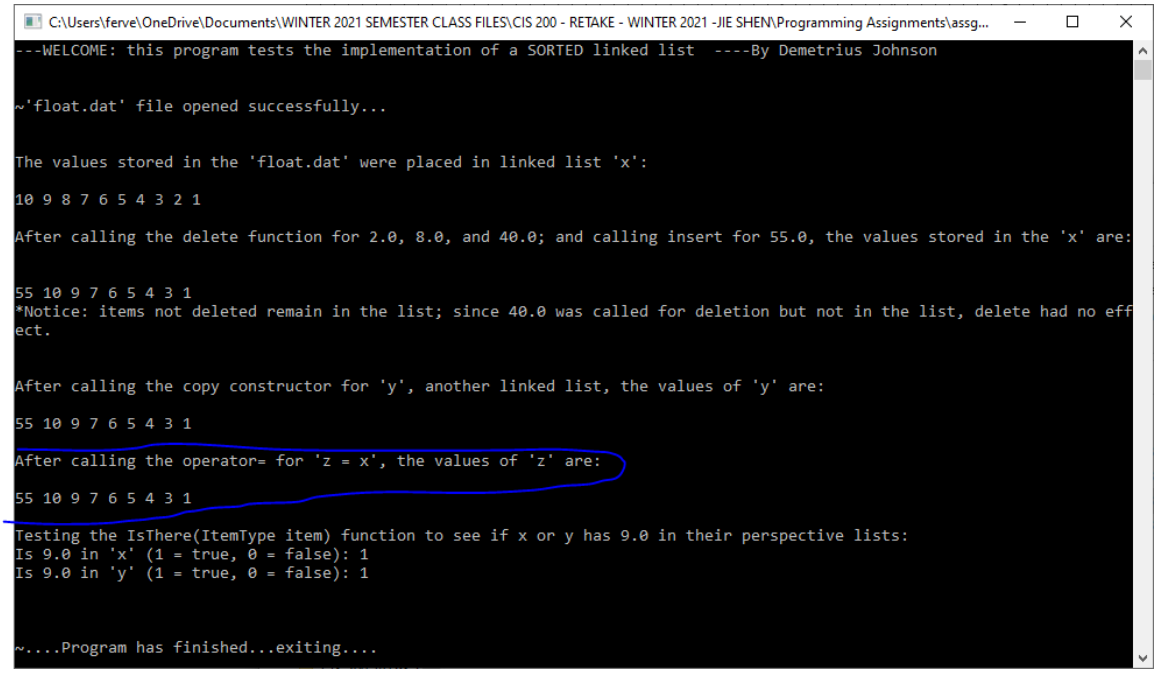
After calling the operator= for 'z = x', the values of 'z' are:
55 10 9 7 6 5 4 3 1
Testing the IsThere(ItemType item) function to see if x or y has 9.0 in their perspective lists:
Is 9.0 in 'x' (1 = true, 0 = false): 1
Is 9.0 in 'y' (1 = true, 0 = false): 1
~....Program has finished...exiting....

TEST 4: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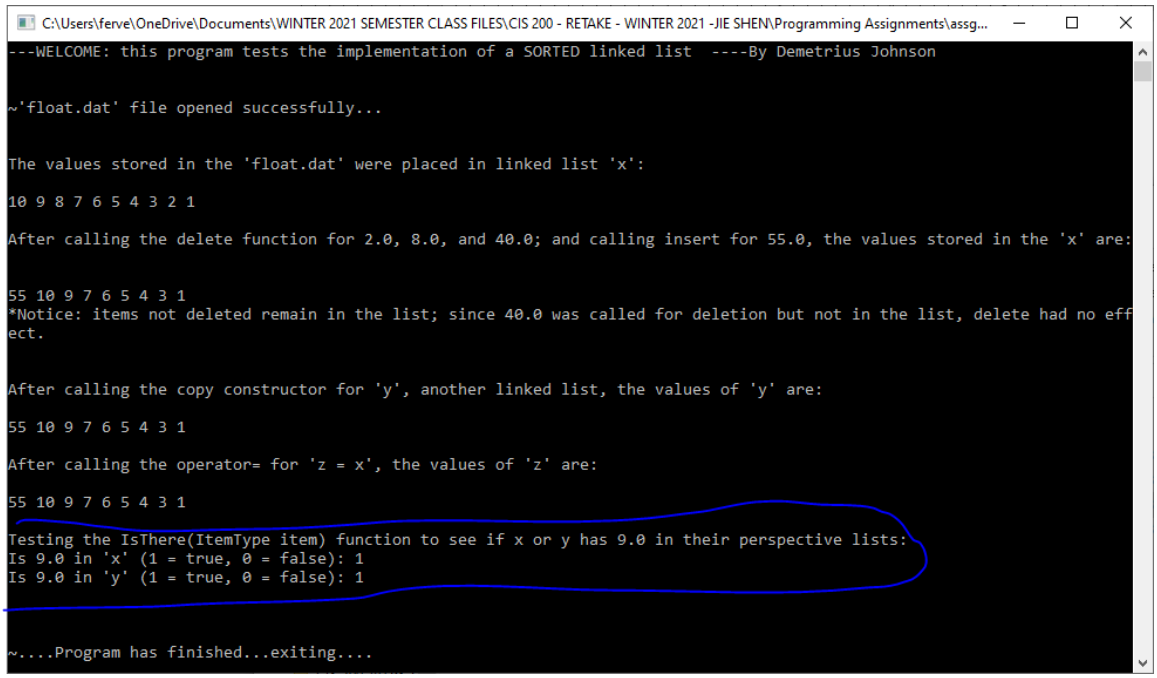
TEST 5: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Testing the IsThere(ItemType item) function to see if x or y has 9.0 in their perspective lists:
Is 9.0 in 'x' (1 = true, 0 = false): 1
Is 9.0 in 'y' (1 = true, 0 = false): 1
~....Program has finished...exiting....

Question 3 Sorted list using Dynamic Array (30 points)

Source code (USED C++ COMPILER on Microsoft Windows 10)

See CPP and H uploads I made in canvas with this document along with the executables

Test data and expected results

Test Table:

Test #	Valid / Invalid Data	Description of test	Input Value	Expected Output	Actual Output	Test Pass / Fail
1	valid	Task 2; also test Length()	Float.dat	Output contents in a list from float.dat file in SORTED order	See screenshot	pass
2	valid	Task 3: Add code to your driver to test the remaining member functions. Delete 2.0, 8.0, and 40 from *x* and print the list to be sure they are gone. Bonus: Insert function tested for 55 Although it was already tested from file input	Delete 2.0, 8.0, and 40.0 from *x* *Insert 55.0 to x*	Output contents of x excluding 2, and 8, and adding 55	See screenshot	pass
3	valid	Task 4: Create another instance, y, through the copy constructor such that the content of *y* is the same as that of *x*, but a deep copy should be done. Print out the all the list elements of *y*.	UList<ItemType> y(x);	Contents of y is same as x	See screenshot	pass
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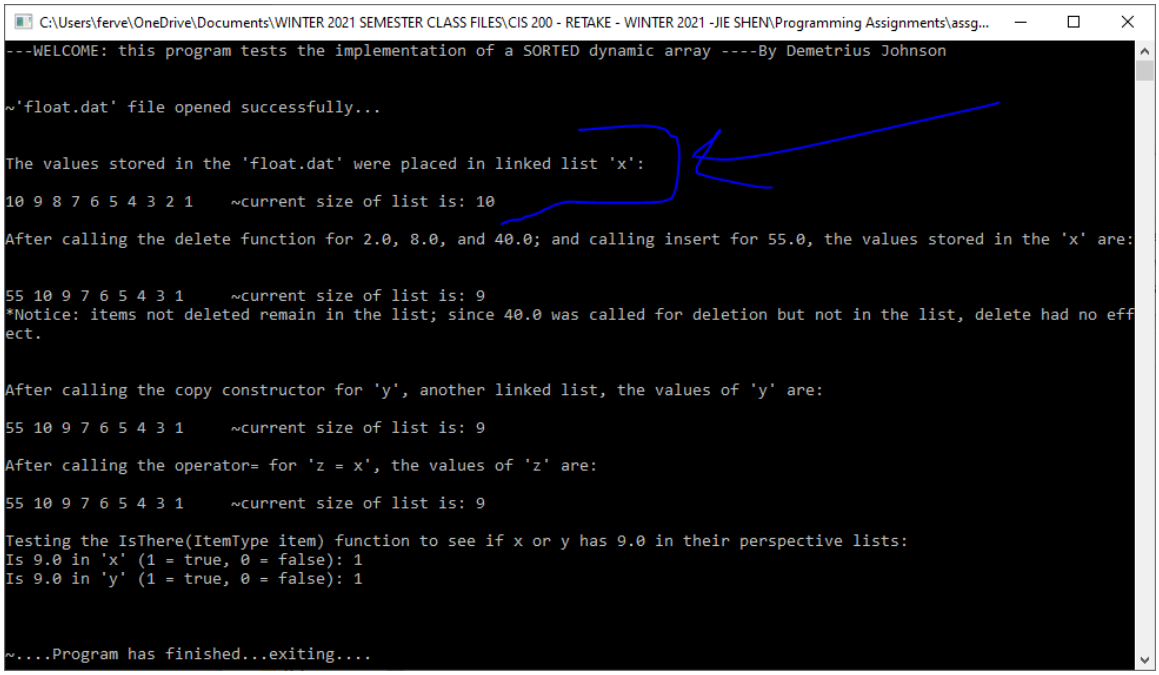
5	valid	Task 6: Test if 9.0 is in the lists *x* and *y* via the member function: IsThere(ItemType item) and print out the test results.	Isthere 9 for x and y	TRUE for both	See screenshot	pass

Task 7: What is the Big-O notation for the time complexity of IsThere( ) function?
answer: O(N^2) since in the while loop, every element has to be shifted down as well depending on N in another loop; total loops = 2; N^2 time complexity.

TEST 1: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---WELCOME: this program tests the implementation of a SORTED dynamic array ----By Demetrius Johnson
~'float.dat' file opened successfully...
The values stored in the 'float.dat' were placed in linked list 'x':
10 9 8 7 6 5 4 3 2 1 ~current size of list is: 10
After calling the delete function for 2.0, 8.0, and 40.0; and calling insert for 55.0, the values stored in the 'x' are:
55 10 9 7 6 5 4 3 1 ~current size of list is: 9
*Notice: items not deleted remain in the list; since 40.0 was called for deletion but not in the list, delete had no eff
ect.
After calling the copy constructor for 'y', another linked list, the values of 'y' are:
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Testing the IsThere(ItemType item) function to see if x or y has 9.0 in their perspective lists:
Is 9.0 in 'x' (1 = true, 0 = false): 1
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~....Program has finished...exiting....

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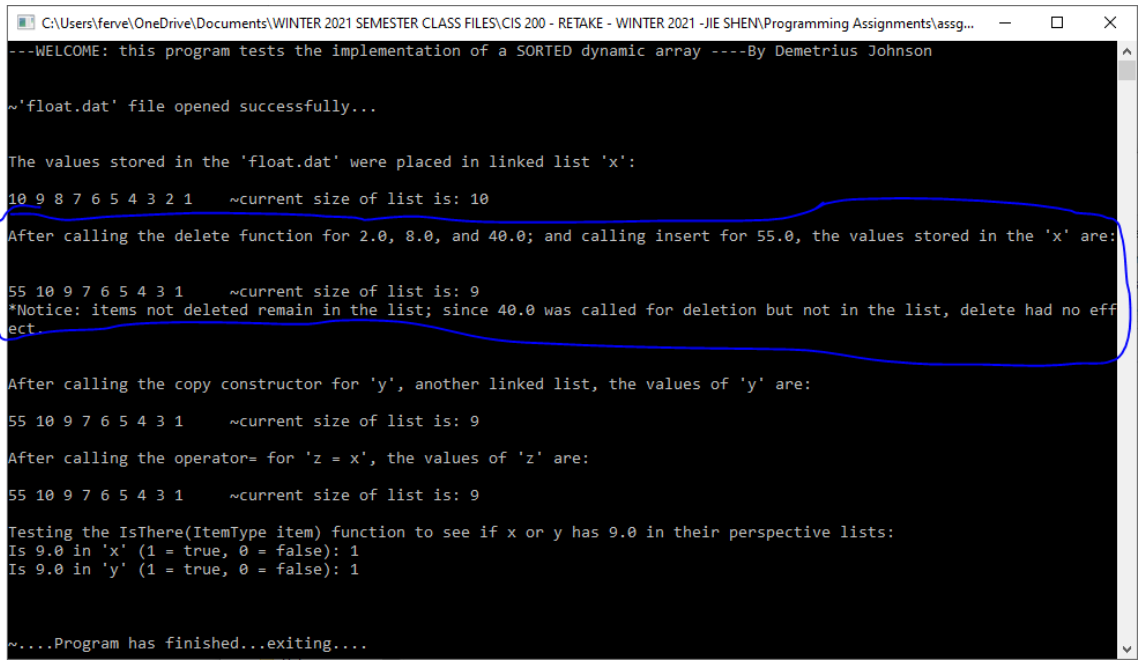
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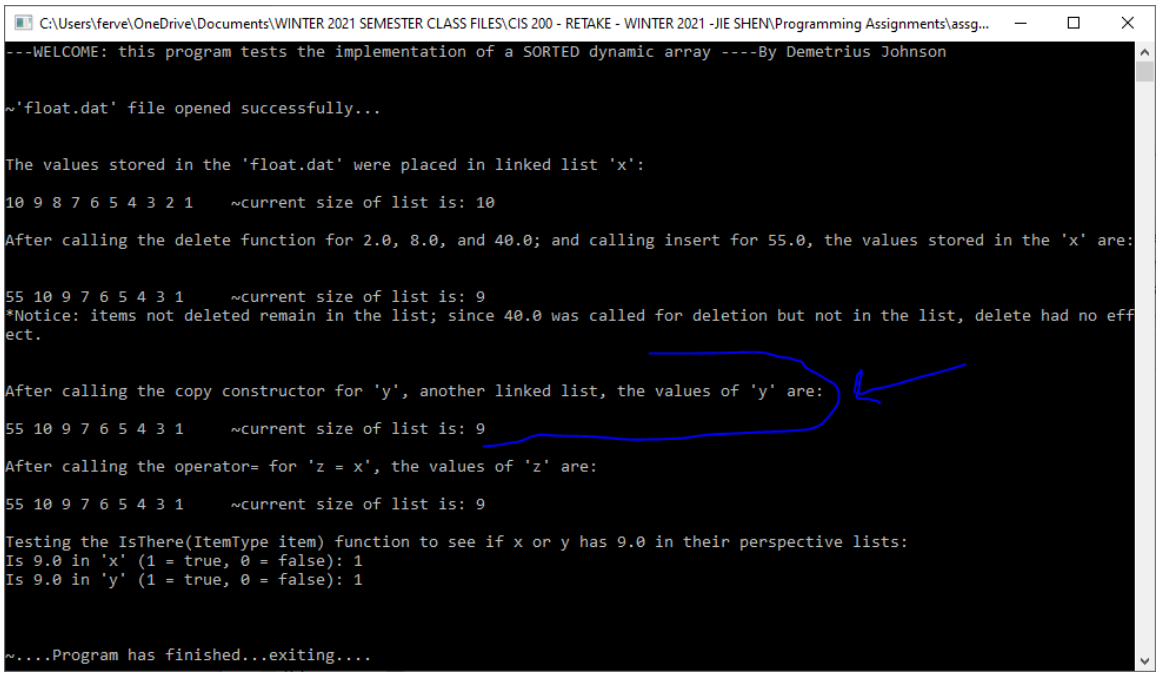
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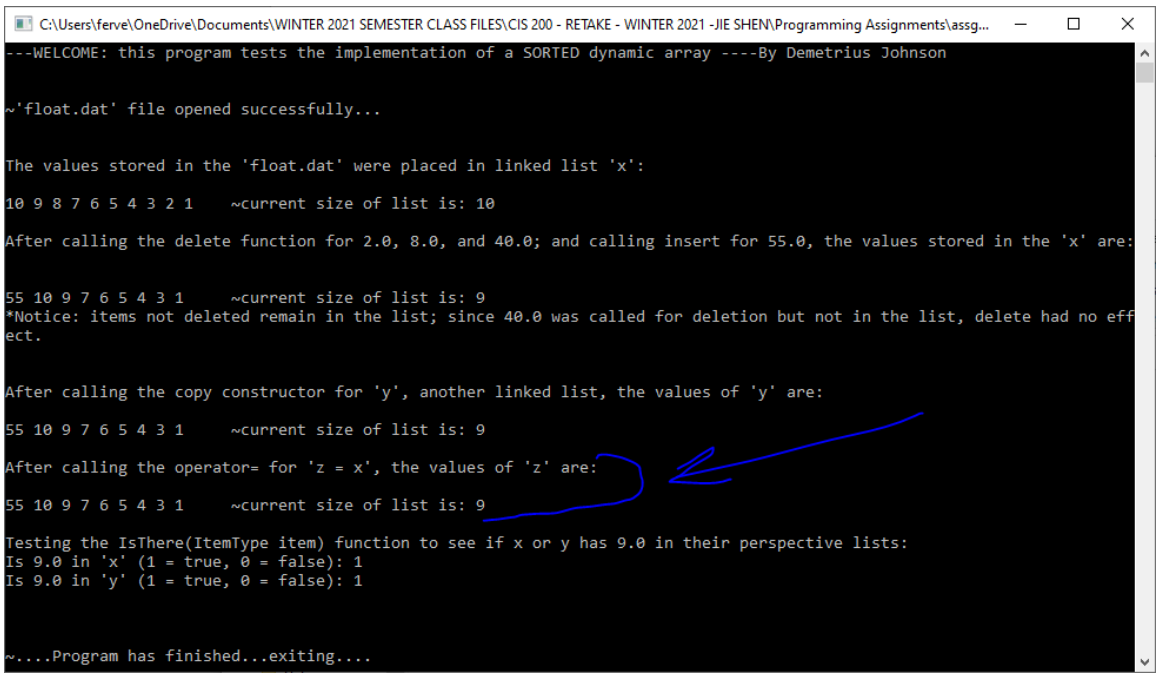
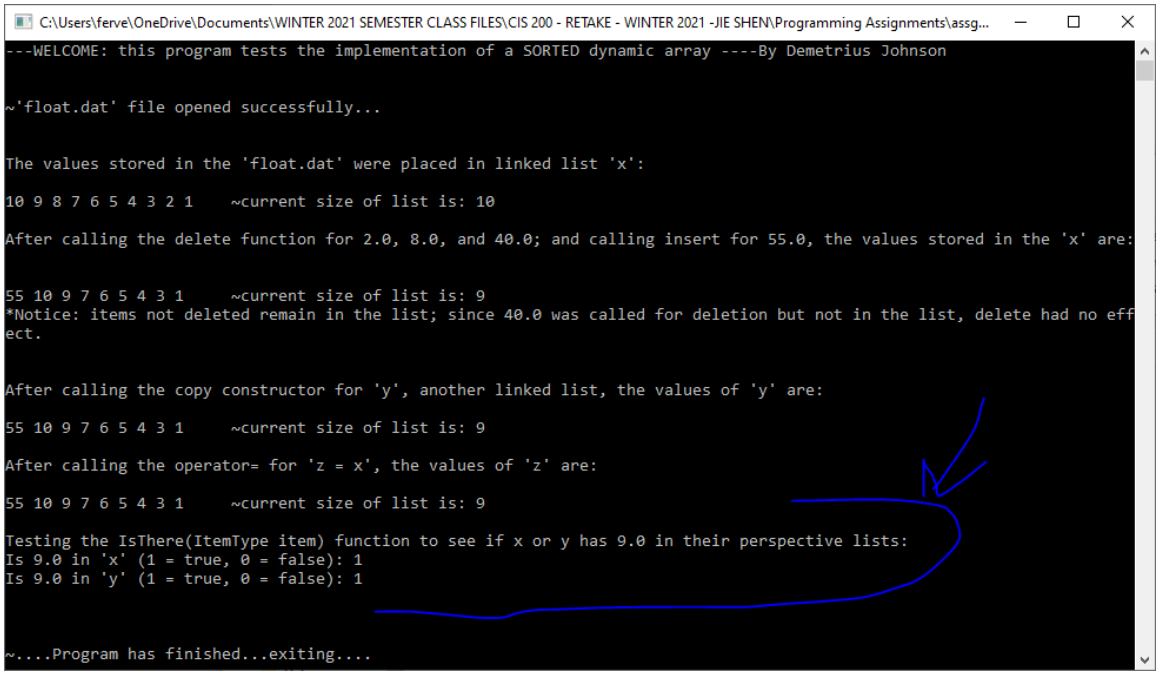
After calling the copy constructor for 'y', another linked list, the values of 'y' are:
55 10 9 7 6 5 4 3 1 ~current size of list is: 9
After calling the operator= for 'z = x', the values of 'z' are:
55 10 9 7 6 5 4 3 1 ~current size of list is: 9
Testing the IsThere(ItemType item) function to see if x or y has 9.0 in their perspective lists:
Is 9.0 in 'x' (1 = true, 0 = false): 1
Is 9.0 in 'y' (1 = true, 0 = false): 1
~....Program has finished...exiting....

TEST 4:


C:\Users\ferve\OneDrive\Documents\WINTER 2021 SEMESTER CLASS FILES\CIS 200 - RETAKE - WINTER 2021 -JIE SHEN\Programming Assignments\assg...
---WELCOME: this program tests the implementation of a SORTED dynamic array ----By Demetrius Johnson
~'float.dat' file opened successfully...
The values stored in the 'float.dat' were placed in linked list 'x':
10 9 8 7 6 5 4 3 2 1 ~current size of list is: 10
After calling the delete function for 2.0, 8.0, and 40.0; and calling insert for 55.0, the values stored in the 'x' are:
55 10 9 7 6 5 4 3 1 ~current size of list is: 9
*Notice: items not deleted remain in the list; since 40.0 was called for deletion but not in the list, delete had no effect.
After calling the copy constructor for 'y', another linked list, the values of 'y' are:
55 10 9 7 6 5 4 3 1 ~current size of list is: 9
After calling the operator= for 'z = x', the values of 'z' are:
55 10 9 7 6 5 4 3 1 ~current size of list is: 9
Testing the IsThere(ItemType item) function to see if x or y has 9.0 in their perspective lists:
Is 9.0 in 'x' (1 = true, 0 = false): 1
Is 9.0 in 'y' (1 = true, 0 = false): 1
~....Program has finished...exiting....

TEST 5:


C:\Users\ferve\OneDrive\Documents\WINTER 2021 SEMESTER CLASS FILES\CIS 200 - RETAKE - WINTER 2021 -JIE SHEN\Programming Assignments\assg...
---WELCOME: this program tests the implementation of a SORTED dynamic array ----By Demetrius Johnson
~'float.dat' file opened successfully...
The values stored in the 'float.dat' were placed in linked list 'x':
10 9 8 7 6 5 4 3 2 1 ~current size of list is: 10
After calling the delete function for 2.0, 8.0, and 40.0; and calling insert for 55.0, the values stored in the 'x' are:
55 10 9 7 6 5 4 3 1 ~current size of list is: 9
*Notice: items not deleted remain in the list; since 40.0 was called for deletion but not in the list, delete had no eff
ect.
After calling the copy constructor for 'y', another linked list, the values of 'y' are:
55 10 9 7 6 5 4 3 1 ~current size of list is: 9
After calling the operator= for 'z = x', the values of 'z' are:
55 10 9 7 6 5 4 3 1 ~current size of list is: 9
Testing the IsThere(ItemType item) function to see if x or y has 9.0 in their perspective lists:
Is 9.0 in 'x' (1 = true, 0 = false): 1
Is 9.0 in 'y' (1 = true, 0 = false): 1
~....Program has finished...exiting....