PROGRAMMING ASSIGNMENT

Spring Semester **CSC 36000** **Date: March 23, 2015**

PROGRAM STATEMENT: You are to write a program that will read an inventory file, print the data, and sort the data three times using different "keys" and three different sorts. The purpose of this program is to provide you with the experience of writing the QUICK SORT and SHELL SORT. You are also to print the data after each sort. Your program MUST be modularized. You may use an array of structures OR an array of classes to complete this assignment. This program is due on **April 6, 2015** **(Monday after Spring Break)**.

INPUT: Input for this program will be a file that contains records according to the following format:

Positions 1- 4	Inventory Number	(4 digit integer)
Positions 6-26	Item Description	(25 characters)
Positions 28-32	Quantity on hand	(integer – 4 digits max)
Positions 34-38	Reorder number	(integer – 4 digits max)
Positions 40-47	Cost of item	(float – 3 digits + 2 DPs)
Positions 49-56	Selling Price	(float – 3 digits + 2 DPs)

The data file name is **data5 (or data5_2008.txt).** A negative value for the inventory number will act as the sentinel signifying the end of the data. You may assume a maximum of 50 records in the data file.

PROCESSING: Processing for this program is in four steps. They are:

1) Read the contents of the file into an array of objects and print the contents of the array.
2) Sort the array into descending order according to the **quantity on hand** using either the **BUBBLE SORT or the EXCHANGE SORT** and print the sorted array.
3) Sort the array a second time into descending order according to the **selling price** using the **SHELL SORT** and print the revised sorted array.
4) Sort the array a third time into ascending order according to the **inventory number** using the **QUICK SORT** and print the new sorted array.

OUTPUT: Output for this program is to consist of the four arrays each on a **separate page** of output. Each array is to be properly identified as to reflect its function (i.e. the outcome of a particular sort). You may use the sample output **to test** your program.

SAMPLE OUTPUT:

Suppose the input data looked like this:

4703 PENCILS #2	**750**	**250**	**0.04**	**0.29**
5881 ERASERS	**600**	**125**	**0.22**	**0.54**
2280 NOTE BOOKS	**130**	**50**	**1.29**	**1.79**
3456 PENS-Red Ink	**545**	**200**	**0.15**	**0.49**
8523 FOLDERS	**280**	**75**	**0.29**	**0.79**

6651	POSTER BOARDS	324	100	0.19	0.38
3458	PENS-Blue Ink	223	200	0.17	0.42
3462	PENS-Black Ink	850	200	0.23	0.59

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Then the output should look like this:

The Original Inventory Array:

Inventory Number	Item Description	Quantity on hand	Reorder Number	Cost of Item	Selling Price
4703	PENCILS #2	750	250	0.04	0.29
5881	ERASERS	600	125	0.22	0.54
2280	NOTE BOOKS	130	50	1.29	1.79
3456	PENS-Red Ink	545	200	0.15	0.49
8523	FOLDERS	280	75	0.29	0.79
6651	POSTER BOARDS	324	100	0.19	0.38
3458	PENS-Blue Ink	223	200	0.17	0.42
3462	PENS-Black Ink	850	200	0.23	0.59

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The Inventory Array sorted in descending order according to the quantity on hand using the Exchange Sort:

Inventory Number	Item Description	Quantity on hand	Reorder Number	Cost of Item	Selling Price
3462	PENS-Black Ink	850	200	0.23	0.59
4703	PENCILS #2	750	250	0.04	0.29
5881	ERASERS	600	125	0.22	0.54
3456	PENS-Red Ink	545	200	0.15	0.49
6651	POSTER BOARDS	324	100	0.19	0.38
8523	FOLDERS	280	75	0.29	0.79
3458	PENS-Blue Ink	223	200	0.17	0.42
2280	NOTE BOOKS	130	50	1.29	1.79

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The Inventory Array sorted in descending order according to the selling price using the Shell Sort:

Inventory Number	Item Description	Quantity on hand	Reorder Number	Cost of Item	Selling Price
2280	NOTE BOOKS	130	50	1.29	1.79
8523	FOLDERS	280	75	0.29	0.79
3462	PENS-Black Ink	850	200	0.23	0.59
5881	ERASERS	600	125	0.22	0.54
3456	PENS-Red Ink	545	200	0.15	0.49
3458	PENS-Blue Ink	223	200	0.17	0.42
6651	POSTER BOARDS	324	100	0.19	0.38
4703	PENCILS #2	750	250	0.04	0.29

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The Inventory Array sorted in ascending order according to the inventory number using the Quick Sort:

Inventory	Item	Quantity	Reorder	Cost of	Selling

Number	Description	on hand	Number	Item	Price
2280	NOTE BOOKS	130	50	1.29	1.79
3456	PENS-Red Ink	545	200	0.15	0.49
3458	PENS-Blue Ink	223	200	0.17	0.42
3462	PENS-Black Ink	850	200	0.23	0.59
4703	PENCILS #2	750	250	0.04	0.29
5881	ERASERS	600	125	0.22	0.54
6651	POSTER BOARDS	324	100	0.19	0.38
8523	FOLDERS	280	75	0.29	0.79

End of Output