Data Structures & Algorithms LAB
(BSCS-F18 Morning & Afternoon)
Lab # 5

Task # 1

Design an inventory class that stores the following members:

serialNum: An integer that holds a product's serial number.
manufactDate: A member that holds the date the product was manufactured.
Price: An integer that holds the price of product.

a. The class should have appropriate member functions for storing data into, and retrieving data from, these members.

b. Next, design a stack class that can hold objects of the class described above.

c. Last, design a program that uses the stack class described above. The program should have a loop that asks the user if he or she wishes to add a part to inventory, or take a part from inventory. The loop should repeat until the user is finished.

d. If the user wishes to add a part to inventory, the program should ask for the serial number, date of manufacture, and price. The data should be stored in an inventory object, and pushed onto the stack.

e. If the user wishes to take a part from inventory, the program should pop the top-most part from the stack and display the contents of its member variables.

f. When the user finishes the program, it should display the contents of the member values of all the objects that remain on the stack.

Task # 2

Write a program to convert a number from decimal notation to a number expressed in a number system whose base is a number between 2 and 9. The conversion is performed by repetitious division by the base to which a number is being converted and then taking the remainders of division in the reverse order. For example, in converting to binary, number 6 requires three such divisions: 6/2 = 3 remainder 0, 3/2 = 1 remainder 1, and finally, 1/2 = 0 remainder 1. The remainders 0, 1, and 1 are put in reverse order so that the binary equivalent of 6 is equal to 110.

Task # 3

Write a program that read in a string of characters and determine whether it forms a palindrome. A palindrome is a sequence of characters that reads the same both forward and backward for example: ABLE WAS I ERE I SAW ELBA. The character '.' ends the string. Write a message indicating whether string is palindrome. You may assume that data are correct and the maximum number of character is 80. You have to use stack to solve it. You may use one or more stacks.

Task # 4

In a box different flavors of eclair candy are placed (Assume box consists of containers and a container only holds a single candy) in random order. You younger brother likes only green ones. So he painstakingly takes out all the candies one by one eats green ones and keeps the other in order, so that he return them in container in exactly the same order as before minus the green candies. Write the algorithm to simulate this process.

Task # 5

Show that the following operations can be supported in constant time simultaneously: push, pop, and f indMin. Implement deleteMin functionality (Hint: Maintain two stacks-one to store items and the other to store minimums as they occur).

Task # 6

Write a document that explains the logic of each above given task in five to ten lines using bullets.