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### Program #1 Design Write Up

This programming assignment is focused on data structures rather than on a comprehensive application program. Therefore the first program is going to be about building an Abstract Data Type. The Abstract Data Type will be a data type that handles the information about stores. The store list will be structured with Linear Linked List and each store is going to have the information of the store name, its website, all the items that the store is selling, and a next pointer that connects to the next store. Moreover, all the items for each store will be also structured with Linear Linked List and each item is going to have the information of the name of the item, its category, its price, and a next pointer that connects to the next item. The items for each store will be grouped together by category. For this Abstract Data Type, there is going to be one class and two struct. In class, it will have all the function prototypes in public section and two head pointers for Linear Linked Lists, one for store and one for item in private section. In public section, there should be a constructor, it will construct all the objects by setting everything to NULL, and destructor, it will release all the dynamic memory by deleting and setting everything back to NULL. In addition, there will be all the function prototypes that are necessary for this Abstract Data Type. The possible function prototypes will be adding new store function, adding new item function, removing item function, display all the items by store function, and display all the items by category function. Adding new store function will require two input datas and those are store name, and its website and these will be stored under one store node of the Linear Linked List. Adding new item function is going to require store name and all the information of the new item. Here, all the information of the new item will be a complete node of the item Linear Linked List. Removing item function will require item name and the item that has same name with the passed in item name will be deleted within the item Linear Linked List and the item Linear Linked List will be reconstructed by using temporary pointer. Display all the items by store function is going to need store name and if there is a store that has same store name with the passed in store name, it will display all the items that the store has. Lastly, display all the items by category function will need category name and if there is a match between existing categories and passed in category name, it will display all the items under that category. The whole program will be a combination of structures and classes and the program code will be designed with modular design, separating the .h files from the .cpp files. It is not sure if there is going to be one .h file or two .h files, instead, it will be clear as I

program. Statically allocated arrays will not be used, instead, all memory will be dynamically allocated and kept to a minimum. There is going to be at least two .cpp files and main.cpp file will act like a test program. Moreover, all the input operations will happen from the main.cpp file, which is application program called the client. Because main.cpp file is an application program, all the error messages will never be outputted from Abstract Data Type part. All the error messages will be coming from application program.