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**Computer Science 2**

**Project 6: Prime Factorization Using a Linked-List-Based Stack**

**Introduction**

Stack are ADTs that grant us quick access to the most recently added items. This program uses stacks to store the prime factors of a user input and print them in ascending order in the terminal.

**Data Structures**

There are 3 data structures in this program:

* An integer type “x”: In the main program, this is used to hold the user input.
* A bool type “flag”: In the main program, this is used to stop the loop when the user input is 0.
* Int type “divisor”: In the primefact() function, this is used to hold the prime factors of the input and to be pushed into the stack.

**Functions**

This program uses 6 functions:

* Void push(): This function is used to add new items to the stack, and increases the size of the stack.
* Item pop(): This function is used to return the most recently added item in the list, and decrease the size of the stack.
* Int sizE(): returns the size of the list.
* Bool empty(): returns whether the list is empty or not.
* Void primefact(): This function is used to get the prime factor of the number then push these prime factors into the stack.

**The main program**

In the main program the program starts a loop with its condition to stop is that the user enters ‘0’ , the program asks the user to enter a number. Then the program checks if the input is less than zero, and then checks if the input is equal to zero, if the input is neither of those two then the program calls the function “primefact()” , then prints the prime factors.