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CSCI 301-Section 1

#cs301175

Project 7

**Design Document**

**Introduction**

Stacks are data structures that hold items one over the other. This program uses a Stack ADT implemented in sequential method using array. This program determines all the prime factors of a given integer using stack data structure and recursion technology.

**Data Structures**

The program uses two data structures:

* One stack object called “s1” to store in it the prime factors of a given positive integer.
* One integer variable called “choice” holds the user input of the positive integer the user wants to know its prime factors.

**Functions**

The program uses five functions:

* primeFactor(): The user input for the integer is passed to this function as a parameter ,the function performs calculation through recursion to determine the prime factors of the given integer and it pushes them into the stack.
* push(): It adds items to the stack. Every call of the function pushes a new item over the past items in the stack.
* pop(): It returns the first item on the top of the stack.
* size(): Returns the number of items in the stack.
* empty(): Checks if the stack is empty.

**The main program**

The program creates a stack object then creates an integer variable and asks the user to input the integer the user want to know its prime factors, then it passes the value entered by the user as a parameter to the function which will perform the calculation then prints out all the prime factors of the integer found by the function and stored in the stack. This process keeps repeating until the user ends the program.