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Project 2

CSCI 301

Design Document – Part 3

Introduction:

Recursion is the process of a function calling itself to solve a problem. This programming method is utilized as an alternative way to perform iterative functions and repetitive computations. In the last portion of the program, the user is prompted to enter a positive integer value. A recursive function that is coupled with a second function, then prints out the prime factorization of the integer that the user enters.

Data Structures:

In this part of the program, the only data structure that is utilized is integers. The recursive function for this part of the program is passed an integer and that integer is used to calculate the sum of the user’s input. The sum is then returned to the main program, where it is outputted to the user.

Functions:

The recursive function of this part of the problem is called primeFact(). This function takes in the user entered integer as a parameter. This function calls the second function to obtain the smallest prime integer of the value that the user entered. If the smallest prime Is equal to the value that the user entered, then that value is outputted as the prime factorization. If this is not the case, then the function calls itself and passes in n/small, where small is the smallest prime that the other function found. After each run the function outputs the factor that it finds and then calls itself until it has found all of the prime factors.

The second function that this part of the project uses is called smallestPrime(). This function runs a loop starting at 2(because 1 divides everything and that would not be beneficial), and returns the first value that it is divisible by. This function is utilized by the recursive function to print out the prime factorization of the number.

The Main Program:

The main program for this part of the project is very straight forward. It prompts the user for an integer value and the calls the recursive function. That is all the main program is used for because the recursive function outs puts the prime factorization for the user inputted value.