# California State University, Fresno

# DEPARTMENT OF COMPUTER SCIENCE

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| Class: | **Algorithms & Data Structures** | | | Semester: | **Spring 2022** |
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| Laboratory number: | **09 – Dynamic Program\_1** | | |
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**1. Statement of Objectives**

This lab asks for implementation of the solution of the minimizes the number of scalar multiplications by using dynamic programming.

**2. Experimental Procedure**

**Print\_opt\_parens**

Text

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The print\_opt\_parens function prints out the name of the matrixs and add parentheses at the right places.

**m\_stoi**

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M\_stoi transfers a string into numbers and stores it in a vector.

**Matrix\_chain\_order**

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Matrix\_chain\_order function calculates the minimum number of scalar multiplications by multiplies the matrix in all possible orders. Whenever it meets a better result than the previous order, it will store the cost into vector m and the order into vector s. Finally it will print out the optimal cost and the optimal parameterization of the whole matrix.

**3. Analysis**

**Main function**

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The main function asks user to input a list of numbers separate by spaces that represents the size of each matrix. Then it will calculate the minimum number of scalar multiplications. Then it will prompt the user if continues the programming, if not enter ‘n’ to quit.

**Output**

Text

Description automatically generated

**4. Encountered Problems**

To be honest, I did not encounter any problems while doing this lab.

**5. Conclusions**

From this experiment, I went over how to solve problem by using dynamic programming. Dynamic programming is a very important concept in the computer science. Knowing how to and where to use is the skill that we must know as a good computer programmer. I will work harder to learn Dynamic Programming until I can use it proficiently

**6. References**

I did not use any reference in this lab.