**OPTI - MULTI**

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Increasing the clock frequency of a microprocessor was considered smart-work in the IT industry once. But now a days, due to heat dissipation and energy consumption issues, processor developers are switching to a new model where microprocessors contain multiple processing units called cores. All the modern computing devices have several cores to meet the computing requirements.

OPTI-MULTI can deliver better performance with Pthreads ,which is an API for writing multithreaded applications to boost the performance of a computer.This language will do multiplication of two NxN matrices with a parallel application using p\_threads, one can understand the power of the Pthread apps and reduce the complexity of matrix multiplication. The OPTI-MULTI programming language is built for flexible, high-level matrix manipulation. It supports a powerful set of built in operations and functions. A flexible set of tools is included within the language to allow a user to define their own matrix

operations.

OPTI-MULTI is designed to be a translated language, with its target language being Java. The user is able to define a set of operations in the form of a program in a text file.The translator will then output a Java source file that can be edited and compiled into Java byte-code. The OPTI-MULTI translator is equipped with error detection so that OPTI-MULTI syntactical and semantical errors are not passed on to the Java source code. This also allows for error-checking and debugging algorithms to be a relatively smooth process.Since OPTI-MULTI translates directly to Java and uses a Java-implemented translator,

OPTI-MULTI is a highly portable.

***Goals***

OPTI-MULTI is meant to be a syntactically intuitive, high level, portable, flexible language for mathematical manipulations and computations of matrices.

**1)High Level** – Users do not have to worry about internal representation of data and algorithm implementation. The modularity capabilities allow for expansion to complex problem solving routines.

2) **Portable** - Since OPTI-MULTI is translated language with its target language as Java and its translator implemented in Java, all OPTI-MULTI code can be translated,executed, and evaluated on any machine that has a Java Runtime Environment with compiler. Java is a highly portable language, which therefore makes the translator and the OPTI-MULTI code that it translates highly portable as well.

3) **Flexible** - Through OPTI-MULTI’s modularization and implementation of matrix manipulation functions, the user can create more complex routines with these modules as

building blocks. The resulting code is not only very readable, but also flexible.

***Basic Features***

1) **Control Flow** – OPTI-MULTI provides users with basic level programming language control of events using conditionals. The statements for flow control include:

if-then-else, for loops, and while loops.

2) **Flexible Matrix Definitions** – with OPTI-MULTI, matrix definition closely resembles the highly proven format in Matlab and matrices can be constructed relatively effortlessly.

3) **Data types** – two types of data are supported. These data types are real numbers (Number) and matrices (Matrix).

4) **Built-In Functions**- OPTI-MULTI also contains a wide range of built in functions including Gaussian elimination, rank, inversion, transpose, and determinants. However, the user could theoretically implement these operations in the language with the basic constructs.

5) **User-Defined Functions** – OPTI-MULTI allows the user to define their own functions which makes their resulting code more modular, powerful, and reusable