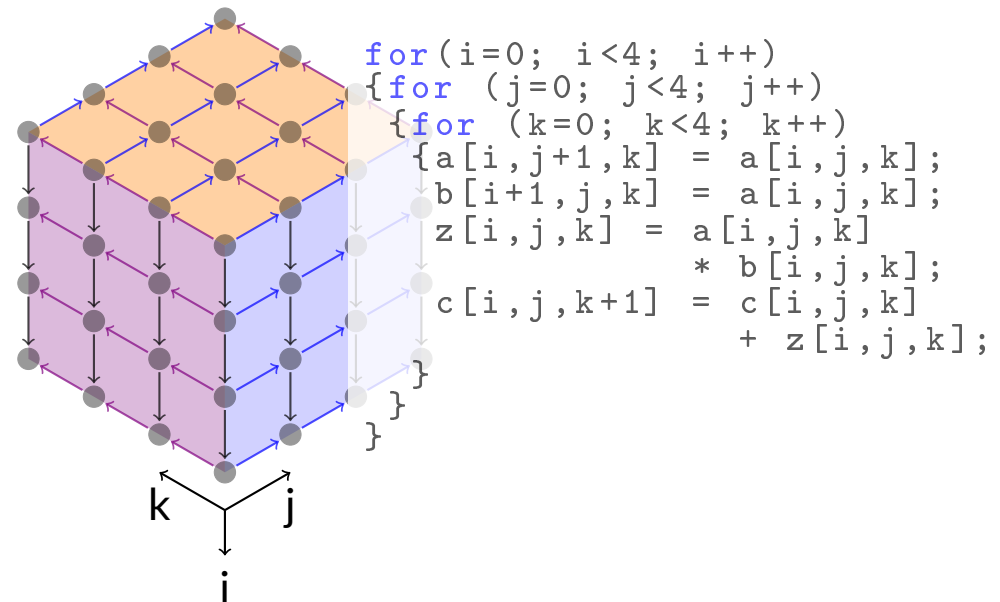


# Benchmarking of Loop Accelerators

Tightly Coupled Processor Arrays (TCPAs) are a class of highly customisable hardware accelerators ideal for accelerating loop applications such as FIR filters, matrix-matrix multiplications (see on the left a loop kernel for the multiplication of two  $4 \times 4$  matrices), and Convolutional Neural Network applications used in machine learning. A TCPA consists of an array of processors, each of which can communicate data directly to its neighbour. This design enables fast and low-power execution of such loop applications.



PolyBench is a benchmark suite with more than 30 loop kernels from different application domains such as linear algebra calculations, image processing, physical simulation, dynamic programming, statistics, etc. This work aims to analyse the operation types and application domains of the PolyBench loop kernels and investigate their corresponding mapping on TCPAs. Furthermore, the resources and execution times on different TCPA architectures for selected loop kernels from PolyBench will be investigated.

Prerequisites: Programming skills in C, C++, and Python

Type of work: Theory (30%), conception (25%), implementation (45%)

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