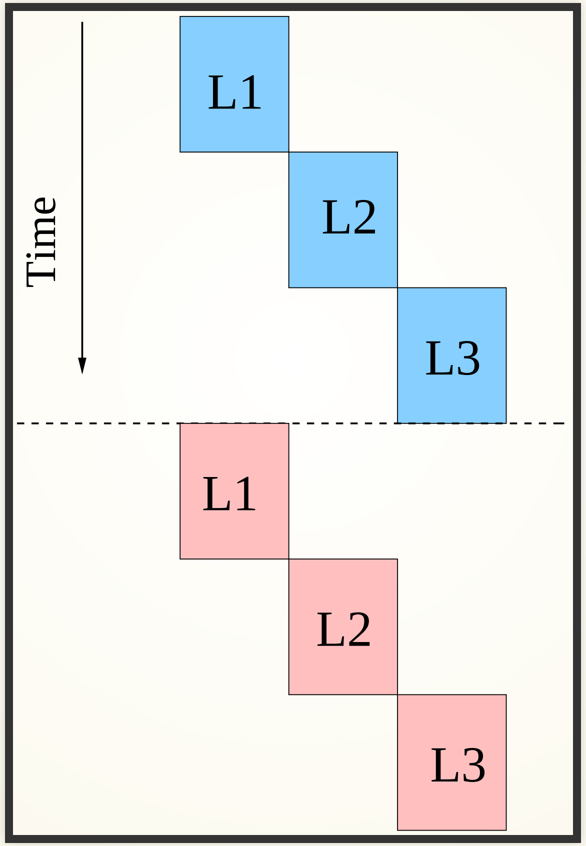
ACCELERATOR DESIGN WITH OPENCL

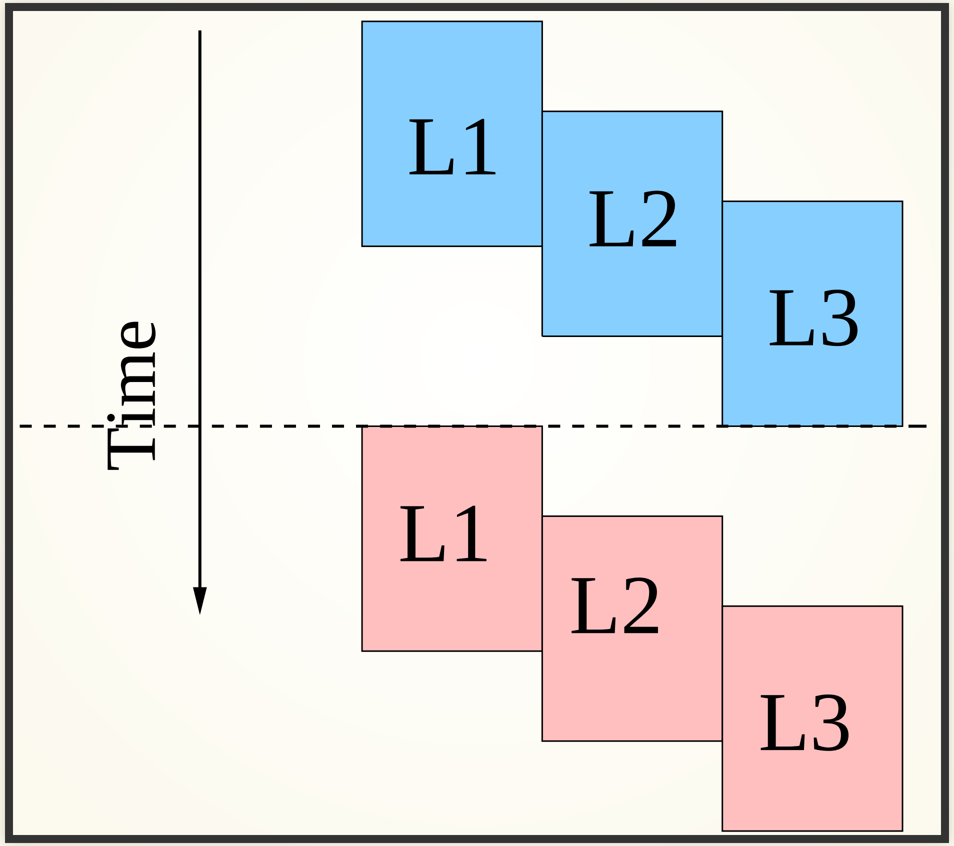
(ATHENS WEEK 19-24 MARCH, 2018)

PARALLELIZING CODES: TECHNIQUES

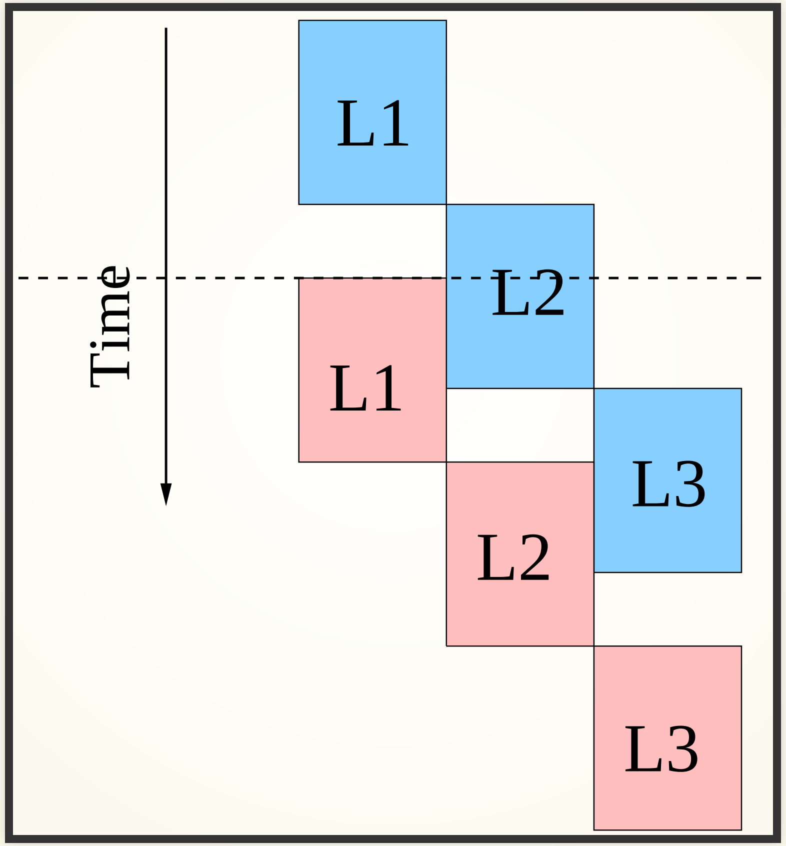
LOOPS: SEQUENTIAL



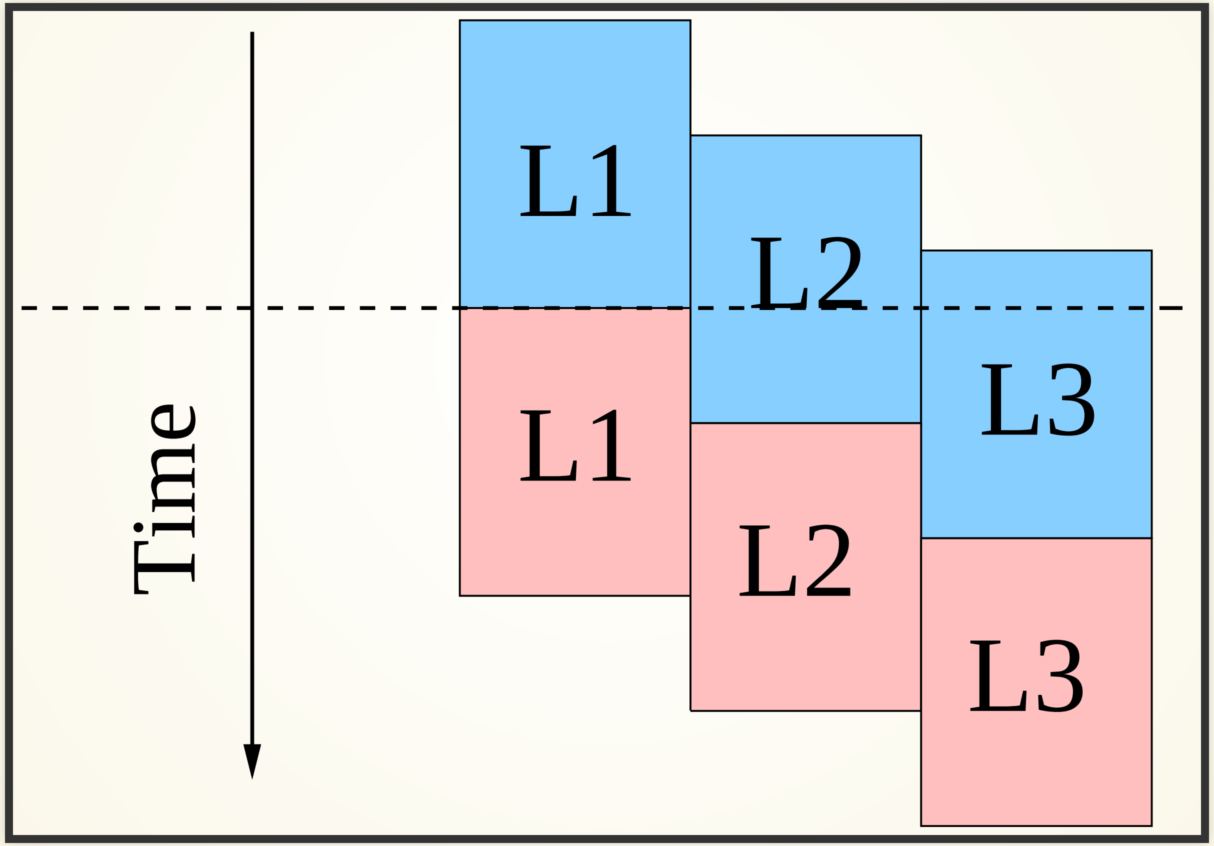
LOOPS: INTRA TASK PARALLELISM



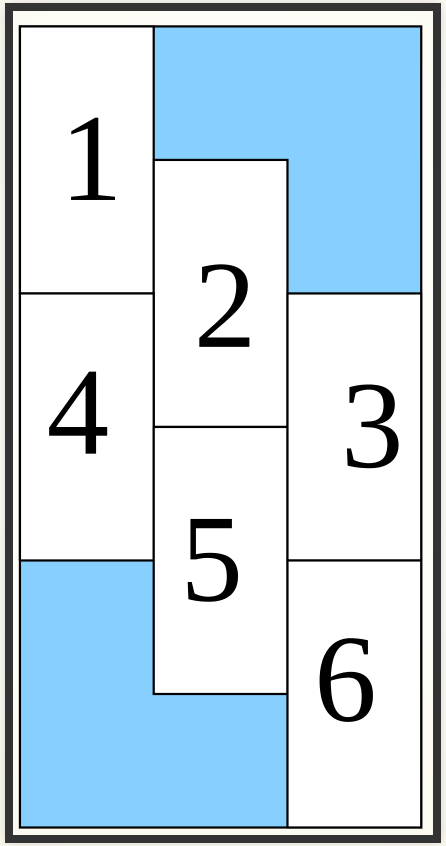
LOOPS: INTER TASK PARALLELISM



LOOPS: INTRA & INTER TASK PARALLELISM



LOOPS: INTER ITERATION PARALLELISM



LOOPS: INTER INSTRUCTION PARALLELISM

- Taken care of by Compilers

PARALLELIZING CODES: LIBRARIES

- Distributed Shared Memory (NUMA) & Clusters
  - MPI
- Shared memory multiprocessors
  - OpenMP
- Heterogeneous Multi-Processors
  - OpenCL
- Can be used in combination

SYNCHRONIZATION: OPENCL EVENTS

- CL_EVENT
  - CL_QUEUED
  - CL_SUBMITED
  - CL_RUNNING
  - CL_COMPLETE
  - ERROR_CODE
- Useful Functions:
  - clWaitForEvents

SYNCHRONIZATION: OPENCL COMMAND BARRIERS

- Command Barrier
  - cl_int clEnqueueBarrier (cl_command_queue command_queue)
  - all queued commands in command_queue before barrier must finish before starting the commands after barrier.