UNIVERSITY OF ENGINEERING AND TECHNOLOGY, TAXILA

FACULTY OF TELECOMMUNICATION AND INFORMATION ENGINEERING

COMPUTER/SOFTWARE ENGINEERING DEPARTMENT

PARALLEL PROCESSING

2K5-CP,SE

INSTRUCTOR: ENGR.WAJAHAT ABBAS

Lecture-I (Intro)

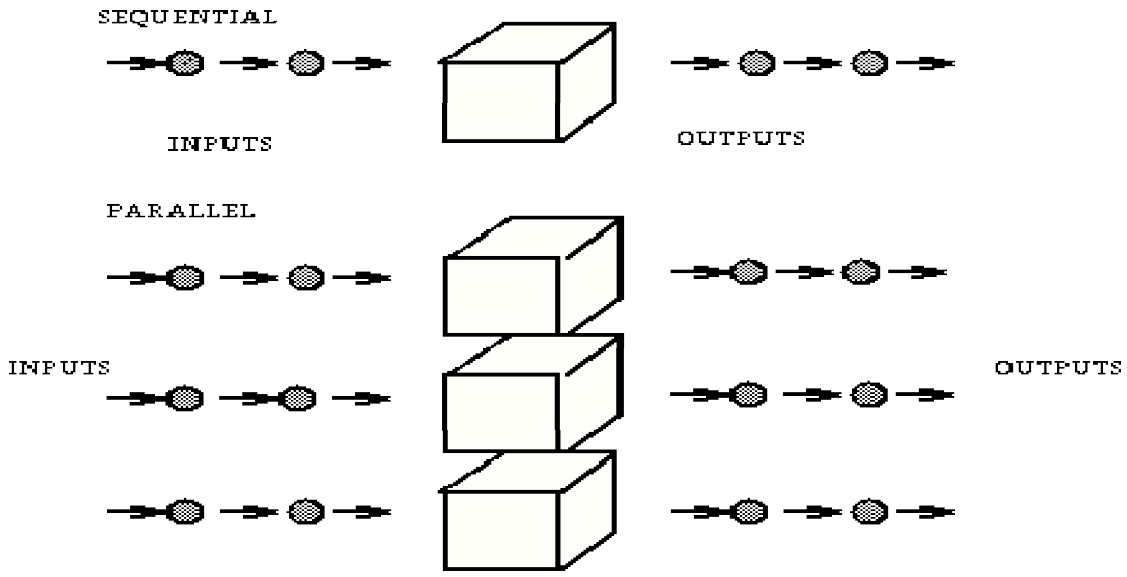
Active Research in Parallel Processing has resulted in advances in all aspects of the computing technologies, including processing technology, computer networking technology and software technology. Advances in processing technology have resulted in faster, more powerful processors with increased functionality. Advances in Computer networking technology have introduced reliable high speed networks capable of providing high transfer rates. Advances in Software technology have introduced Easy-to-use tools and environment for the development of Parallel applications.

This course mainly covers the following areas

- Current Parallel Computer Architectures
- Parallel Programming
- Cluster and Grid Computing

Introduction to Parallel Processing

- The terms 'Parallel Processing', 'parallelization' or 'distributed programming' all refer to the system where a complex task is broken up into many subtasks that are to be run in parallel.
- Each subtask is then assigned to a CPU on the network and the results are combined.



Applications of Parallel Processing

- Scientific computing
  - Grand Challenge problems by HPCC (10 problems)
    - atmosphere, semiconductor, bio-informatics, weather forecasting, aerodynamics, artificial intelligence etc
- General purpose computing
  - video, database, graphics

Course Contents

- The need for High Performance Computing
- Current Technology Trends
- Parallel Machines
- Inter processor Communication Fundamentals
- Shared Memory and Message Passing
- Interconnection Networks
- Introduction to Cluster Computing
- Cluster Software
- Grid Computing
- SMP: Cache & Memory Consistency
- SMP: Synchronization & BUS
- DSM: NUMA,COMA

Books

- Advanced Computer Architecture and Parallel Processing

  Publisher Wiley
  Author(s)
  Hesham El-Rewini
  Mostafa Abd-El-Barr
  ISBN
  0-471-46740-5

- Parallel Computer Architecture: A Hardware/Software Approach

  Author(s)
  D.E.Culler
  J.P.Singh
  A.Gupta
  Morgan Kaufmann

- Grid Computing: A Practical Guide to Technology and Applications

  Author
  Ahmar Abbas
  ISBN
  1584502762

- High Performance Linux Clusters with OSCAR, Rocks, OpenMosix and MPI

  Author
  Joseph D. Sloan
  ISBN
  0-596-00570-9

- Distributed and Parallel Systems: From Cluster to Grid Computing

  Author
  Peter Kacsuk
  Thomas Fahringer
  Zsolt Nemeth
  ISBN
  0-387-69857-4

- Grid Computing,The New frontier of High Performance Computing:Advances in Parallel Computing

  Author
  Gerhard R.Joubert
  ISBN
  0-444-51999-8

- Tools and Environments for Parallel and Distributed Computing

  Author
  Manish Parashar
  Salim Hariri
  ISBN
  0-471-33288-7

Sessionals Distribution

- Class & Lab Quizzes
- Class & Lab Assignments
- Presentations
- Sessional Viva