CS2022   Computer Architecture I

Computer Architecture

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CS2022 Exam

- ▶ 4 Questions

- ▶ You must answer 3 questions

CS2022   CS2022- Exam

▶ Questions will seek to establish that you have a good grasp of the following concepts:

  ▶ Microoperations

  ▶ Datapath

  ▶ Busses

  ▶ Alu/shift design

  ▶ Status bit generation and use

  ▶ Control unit design and operation

CS2022 Course Text:

▶ "Introductory VHDL: From Simulation to Synthesis"

▶ "Logic and Computer Design Fundamentals" 2nd Edition updated, Mano (includes Xilinx Student Edition 4.2i software)
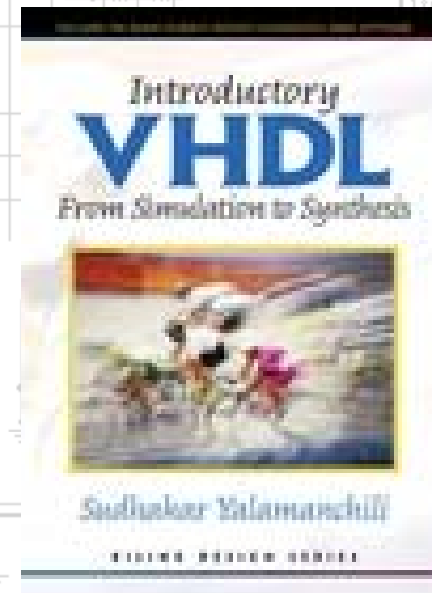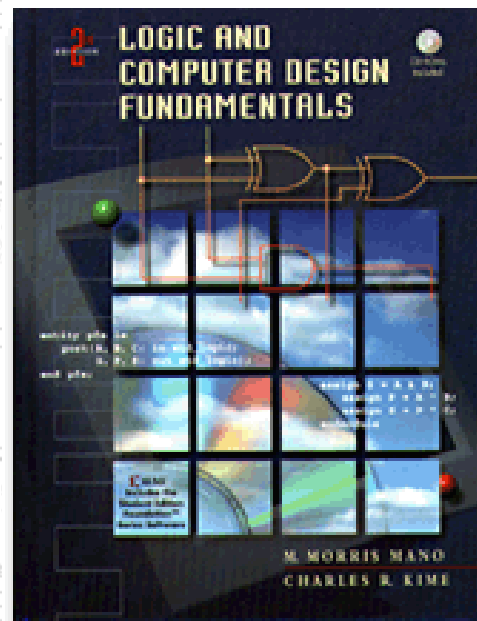
CS2022   Organisation of the Course

▶ Lectures:

- ▶ Relate to chapter 7 and 8 of Mano & Kime textbook
- ▶ Prerequisite:
  - ▶ Chapter 1-6 of Mano & Kime textbook

▶ Tutorials:

- ▶ Will largely be problems from Mano & Kime textbook and the two projects.

▶ Projects:

- ▶ There will be two in which you will be asked to design and simulate key elements of a processor.

CS2022 Assessment

▶ By examination and coursework

▶ Ratio 80% to 20% respectively

CS2022 Course Objective

▶ The aim is to give you a good understanding of the design and operation of an instruction processing unit and the functional subsystems which execute these instructions.
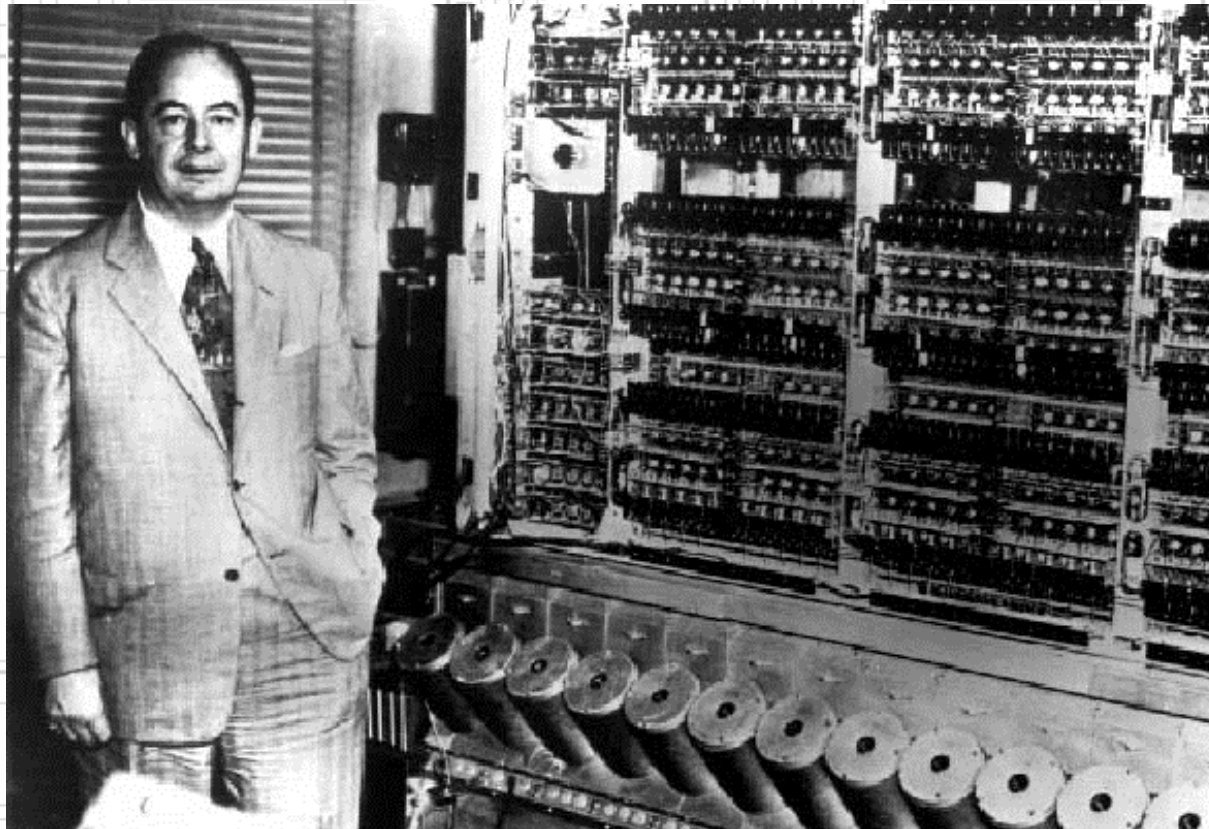
CS2022 Von Neumann Architecture

► This design was first specified by John von Newmann in 1940 and so the resulting architecture is often called the 'von Neumann' architecture.

► Please see the following web page:

  ► **http://www-gap.dcs.st-and.ac.uk/~history/Mathematicians/Von_Neumann.html**

CS2022 John von Neumann

Born: 28 Dec 1903 in Budapest, Hungary

Died: 8 Feb 1957 in Washington D.C., USA

CS2022 Datapath and Control Unit

Determines
Sequence
of Operations

Performs
Data-processing
Operations

Control signals →

Control
inputs →

Control Unit

← Status signals →

Datapath

→ Data
outputs

Control
outputs ↓

Data
inputs ↑