

Reconfigurable Computing

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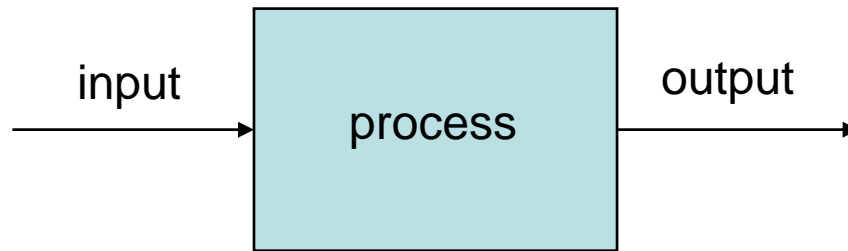
Overview

- Reconfigurable Computing
- Career and Study Paths in ICT
- Study at UNSW Asia

Reconfigurable Computing

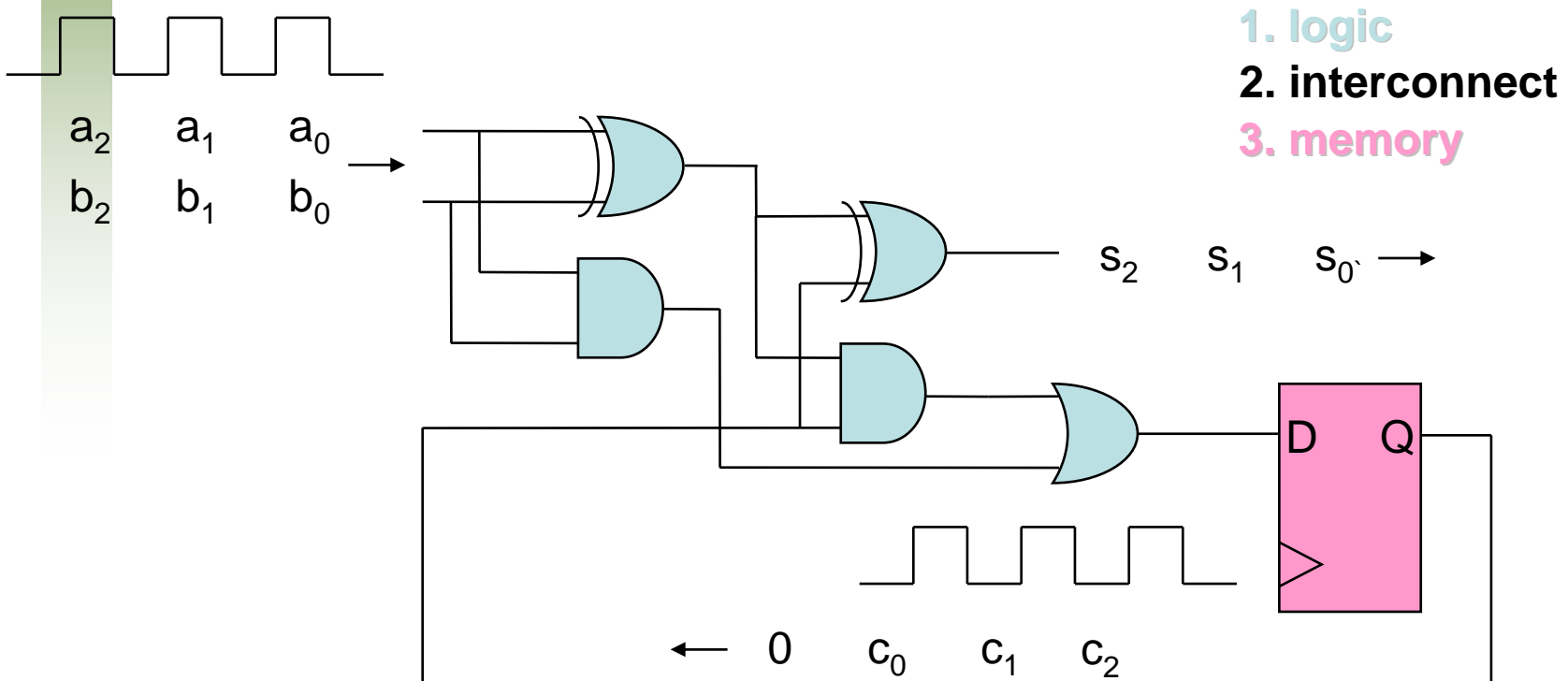


What does it mean to compute?

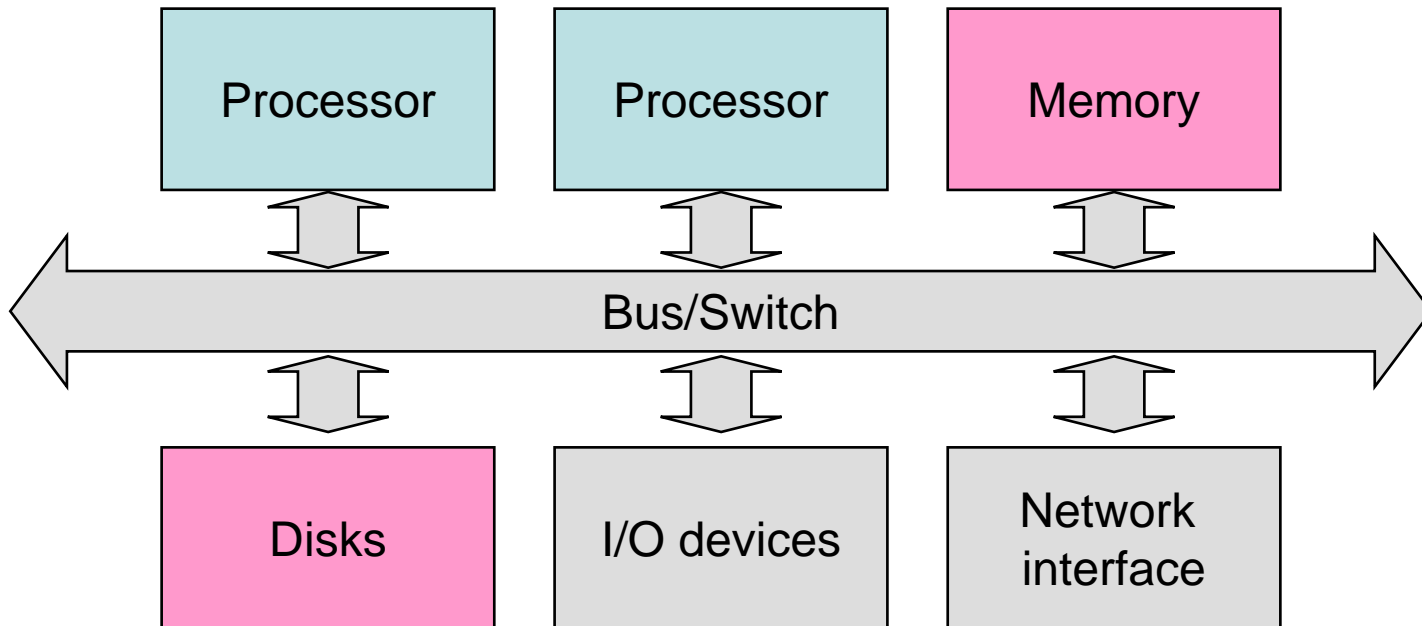


- Transform data into new representations
- Do so at high speed and/or low cost
- Within physical and economic limits

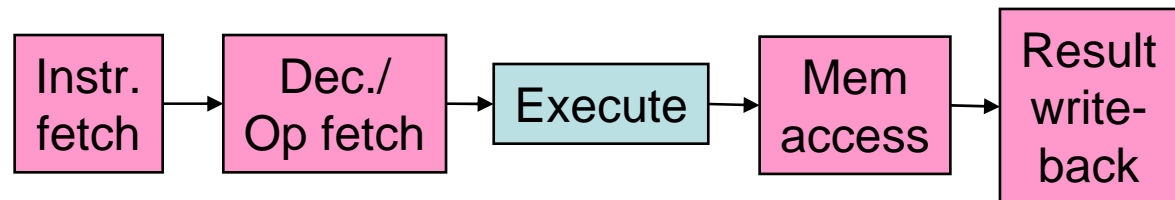
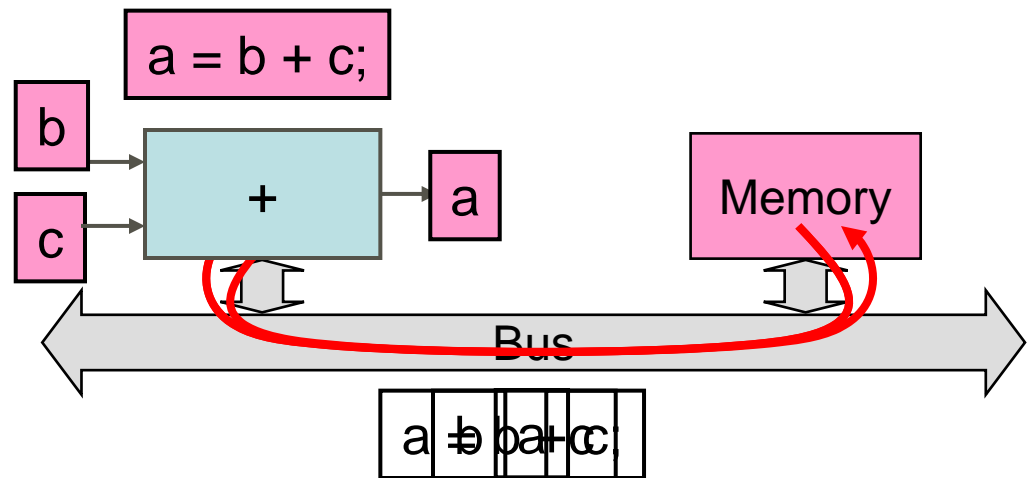
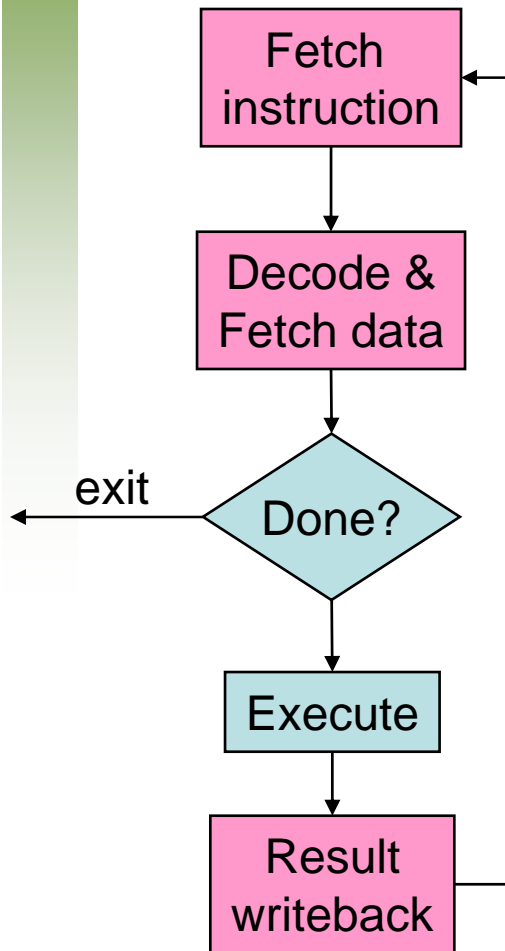
3 fundamental computing resources



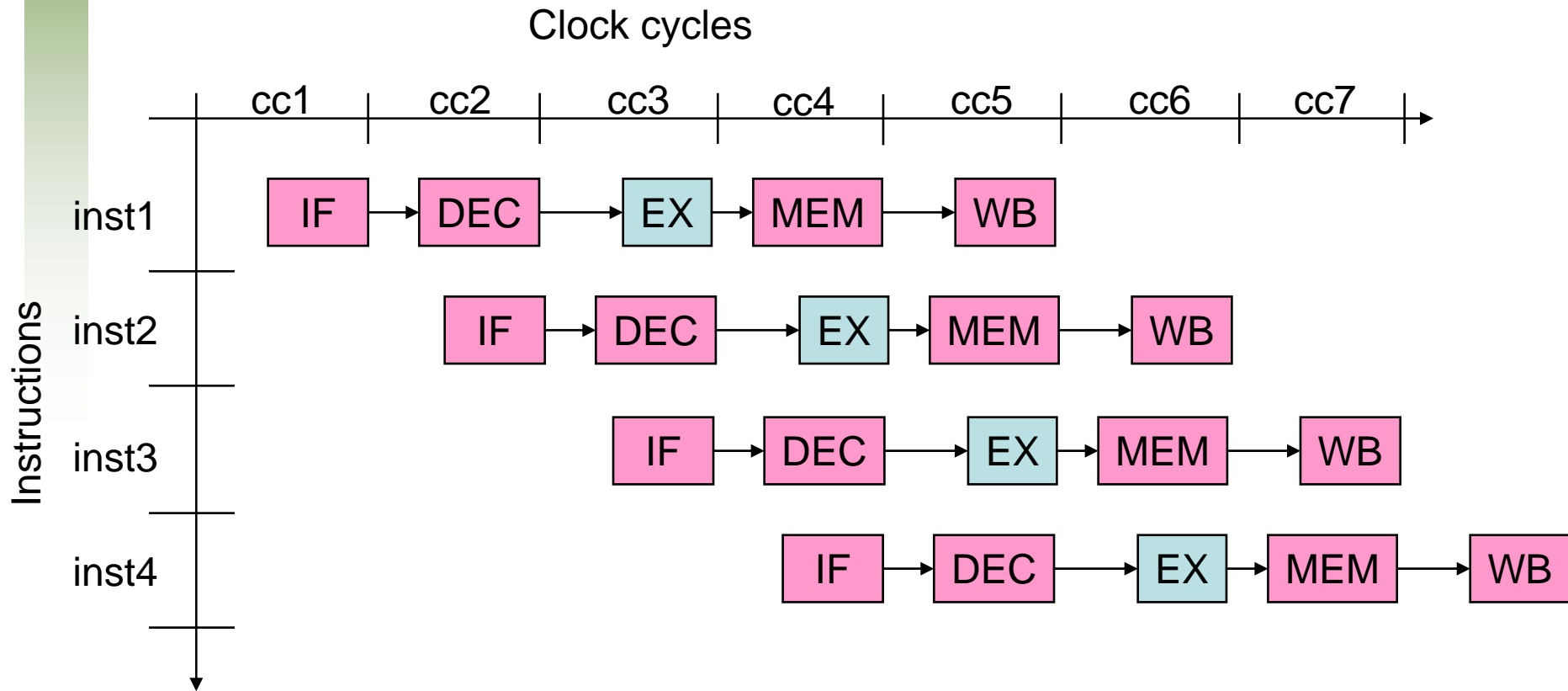
At a higher level of abstraction...



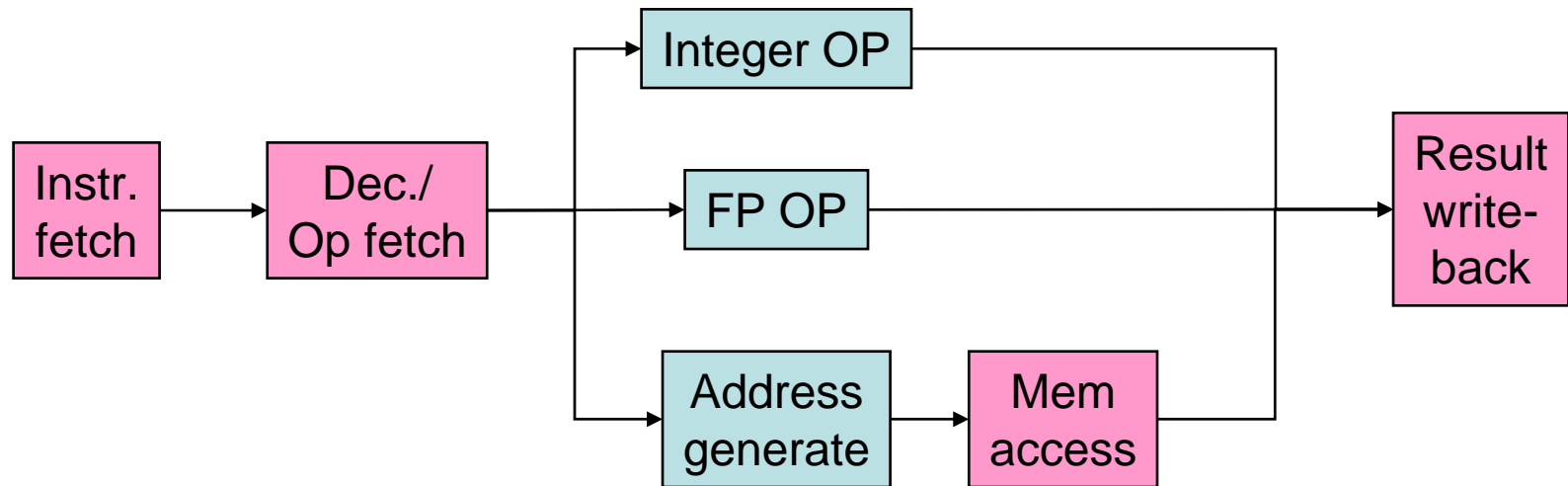
Von Neumann computing



Pipelined execution



Superscalar processor

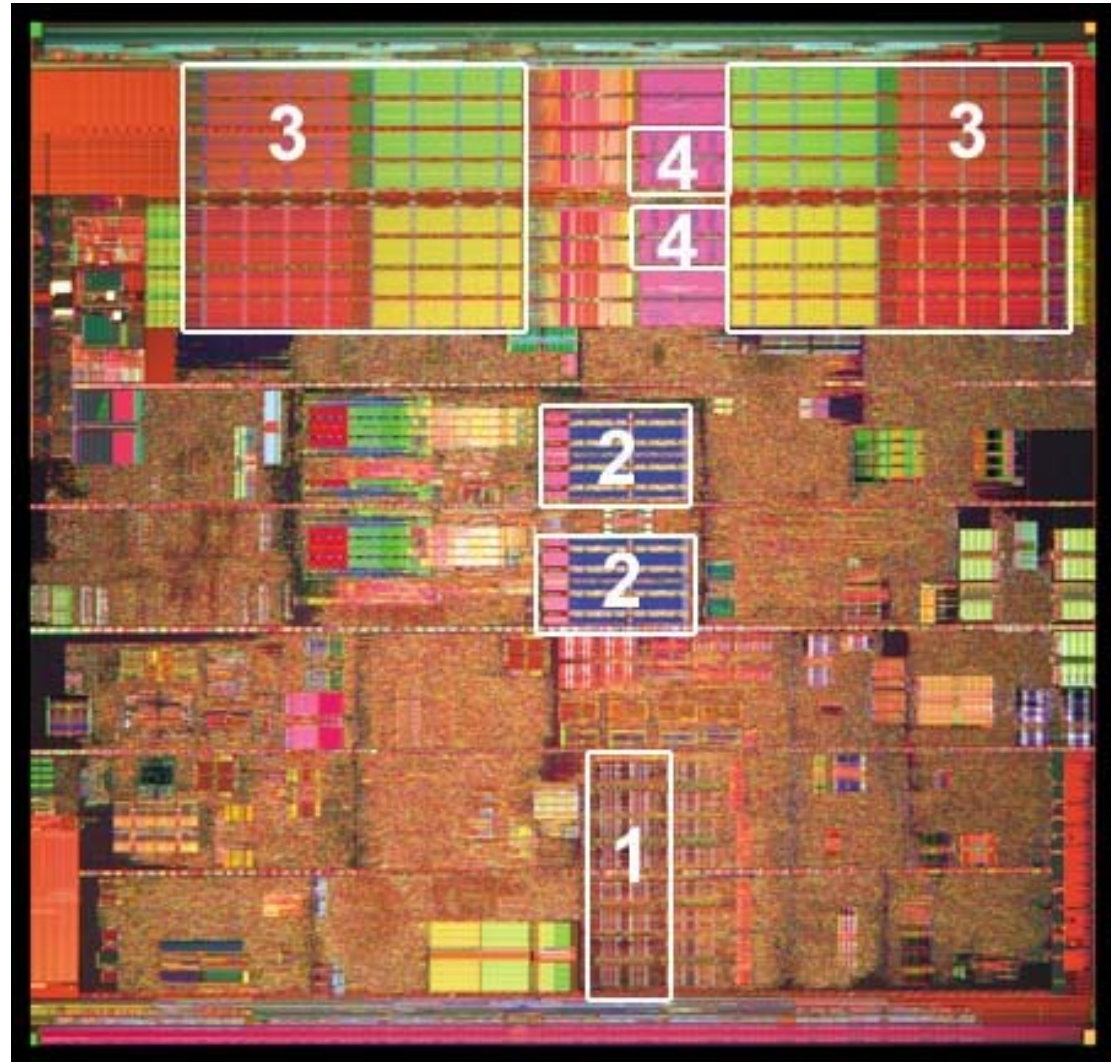


Prescott Pentium4 micrograph

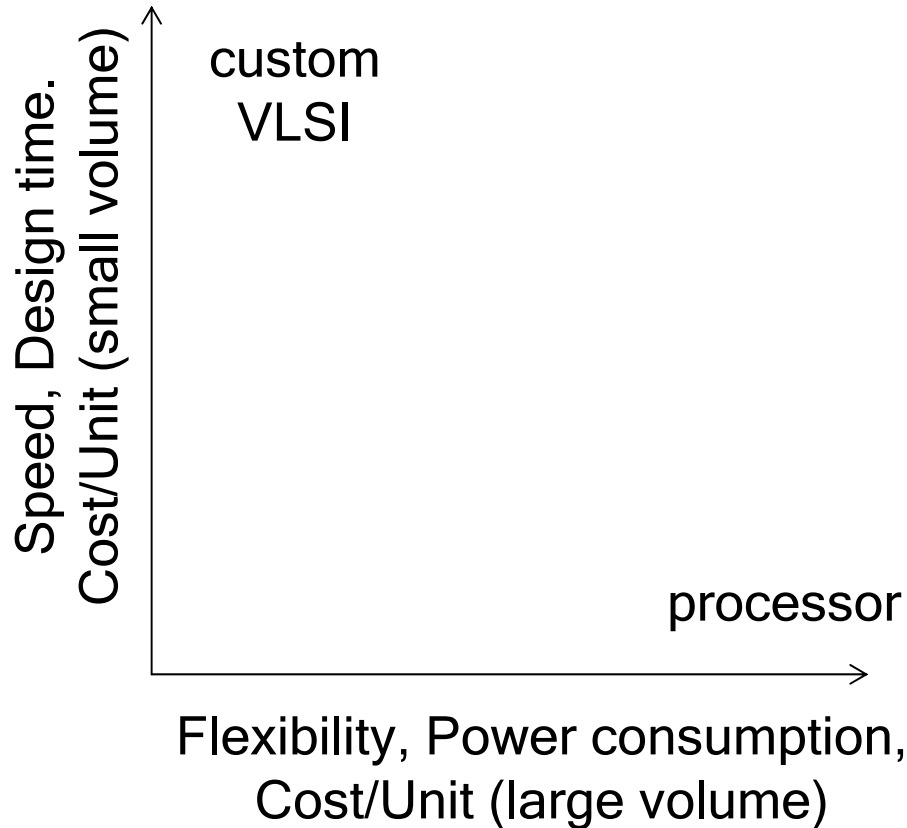
90 nm technology

125 M transistors

112 mm²

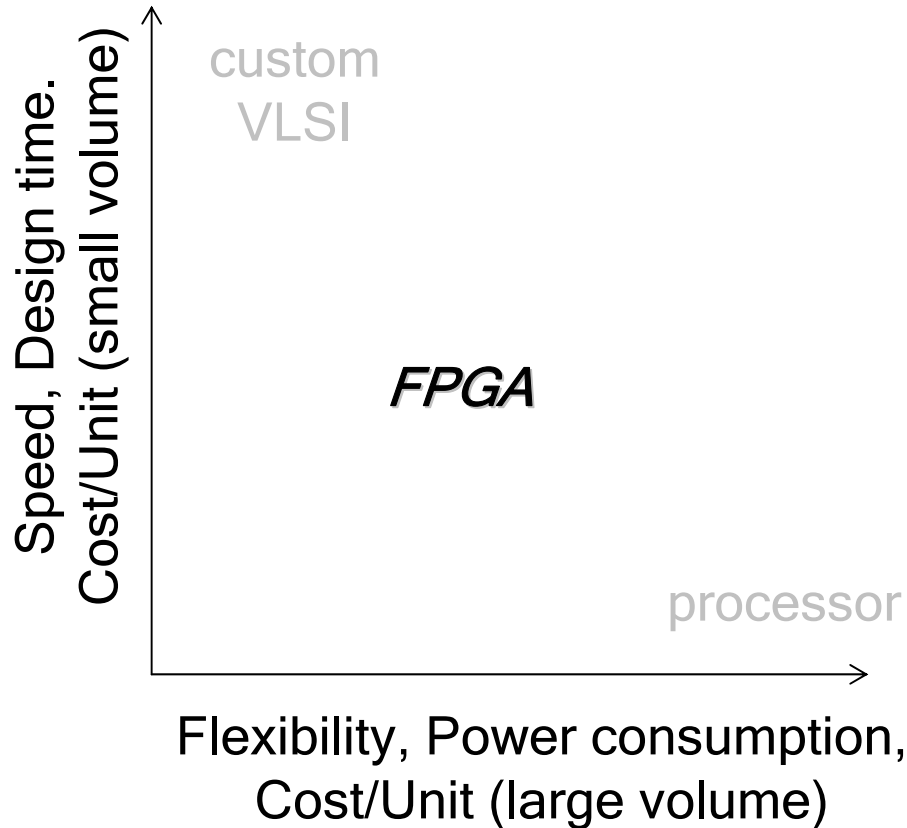


Approaches to Implementing Computing Systems



1. Flexible, general-purpose, programmable Von Neumann model
 - Limited to performing a small number of operations in parallel
2. Fixed, special-purpose circuit
 - Main limitation is design complexity and inflexibility
 - Note that even processors are examples of fixed circuits
 - Other examples include HDTV decoders, network routers,

Approaches to Implementing Computing Systems



3. Builds computer systems out of “flexible circuits” implemented in Field-Programmable Gate Arrays

- The “programmer” designs circuits specifically suited to each application
- Running a new application amounts to loading the corresponding circuit into an FPGA and feeding it the data that is to be processed

Reconfigurable Computing

No single universally satisfactory organisation

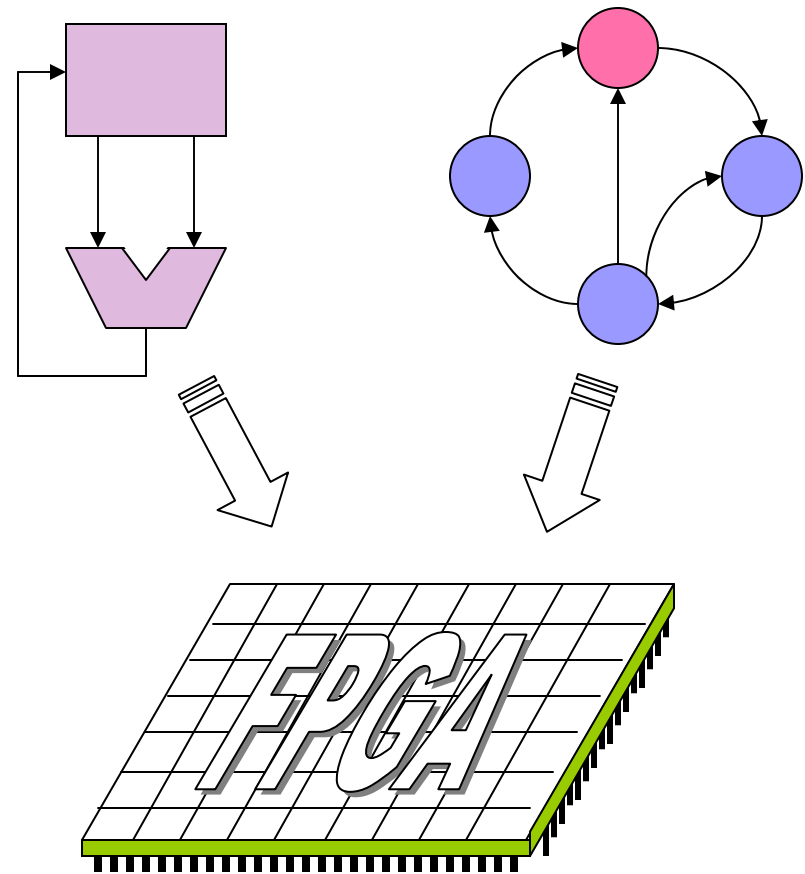
Use off-the-shelf, yet customisable components

Hardware is fixed

Architecture is configured to provide an effective platform for system & application software

No need to retrieve and decode instructions once circuit loaded

Can exploit inherent parallelism



Challenges of Reconfigurable Computing

- How to build commercially viable computers from programmable logic, conventional processors and memory – what is the right arrangement and mix of components?
- Designing good digital circuits is more difficult and challenging than programming computers
 - Training programmers with the right skills mix
 - Providing tools to help programmers map computational problems into reconfigurable systems and achieving good performance
 - Moving VLSI design techniques into the fast-paced environment of applications development
- Is it feasible to design computers that *adapt themselves* so as to most efficiently process the problems they are currently computing?

Career and Study Paths in ICT



Careers in ICT

- Technical

- Analysis
- Design
- Development
- Support

- Web
- Database
- Applications

- Managerial

- Projects
- Organisational

- Sales

- Marketing

- Consulting

- Sectors

- Enterprise
 - Embedded systems
 - Vehicles
 - Consumer Electronics
 - Services
 - Media
 - Entertainment
 - Finance
 - Logistics

- Government
 - Education
 - Health
 - Defence

- Activities

- R&D
- MIS

Study Paths in ICT

- Technical training required
- Wide spectrum of entry points into careers in ICT

Discipline based

Mathematics/Science
Computer Science
Engineering (Computer, ...)
Information Systems
Business/Commerce

Institutional

Universities
Polytechnics
Private Colleges

Study at UNSW Asia



UNSW Asia

- Established by invitation of the Singaporean Government
- Singapore's FIRST *Comprehensive, International Teaching and Research University*
- The 4th fully-fledged university in Singapore
 - Status of “Institution of Higher Learning” (IHL)

Tanglin Campus



The University of New South Wales (UNSW)

Our parent university

Australia's leading international university

- No 1 Accounting School in Asia and Australia
(Review of Quantitative Finance & Accounting – 2005)**
- Amongst top Engineering Schools in Australia
(Times Higher Ed rank 1 (2005), 2 (2006))**
- In the Top 100 Global Universities, ranked 41st
(Times Higher Ed Supplement, 2006)**
- Home to the prestigious AGSM, No 1 Business School in Asia
and Australia (Forbes Magazine)**

Benefits of studying at UNSW Asia

- **Research Intensive → Better Teaching**
- **International Community**
- **Degrees of UNSW – International Recognition**
- **Privilege of an IHL**
- **Tropical Garden Campus**

Tropical garden campus at Changi in 2009



An iconic campus for the 21st century



The Library - water to see, feel, hear or silence



The young bamboo-shoot, growing tall and bolder





The library is open, transparent, accessible, connected





Space that allows students to manage the social dimensions of learning



Engineering, Science and Technology programs commencing 2007

Bachelor of Science (Advanced)

Bachelor of Engineering

BSc programs commencing 2007

Bachelor of Science (Advanced)

- **Computer Science**
- **Mathematics**

Engineering programs commencing 2007

Bachelor of Engineering

- **Computer Engineering**
- **Electrical Engineering & Telecommunications**
- **Mechanical and Mechatronics Engineering**
- **Chemical Engineering**

Intake in 2007

There will be two intakes in 2007

Session 1 starts in March

Session 2 starts in August

Admissions are now open

Pathway for admission

Undergraduate programs

Completion of GCE A Levels	Entry Points
Bachelor of Engineering	12
- Computer Engineering	
Bachelor of Commerce	12
Bachelor of International Studies	10
Bachelor of Engineering	8
- Chemical; Electrical;	
- Mechanical; Telecommunications	
Bachelor of Science (Advanced)	8

Contact Us

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Thank you

