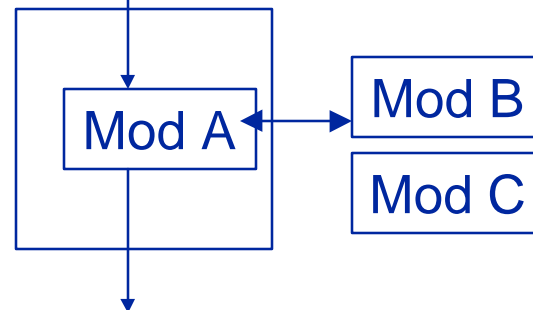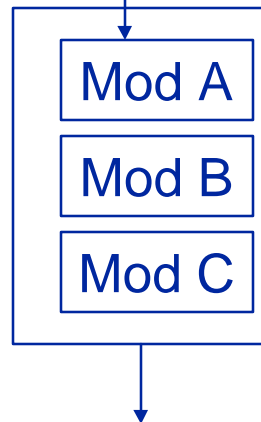# Stream-Based Processing

- Partition data flow oriented process
  - → Common interface
  - → Partitioning: Spatial and temporal
  - → Programming: Application level and device level
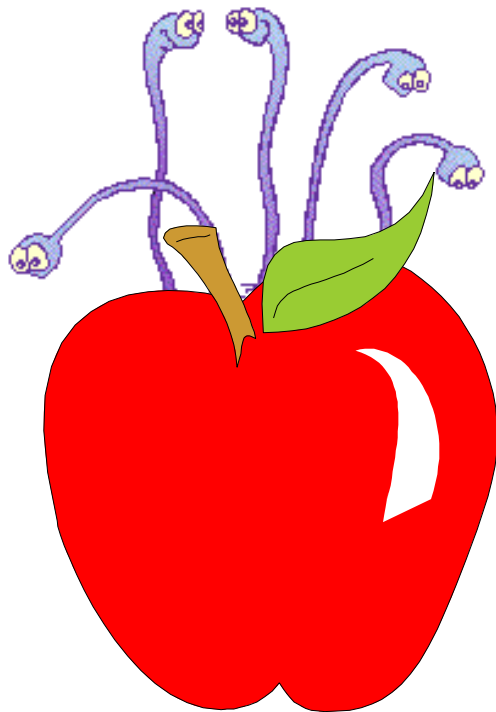- Examples of Stream-Based Processing

CONFIGURABLE COMPUTING
COLT / STALLION
VISC

Static
Interconnection

| Mod A |
| Mod B |
| Mod C |

| Mod A | | Mod B |
| | | Mod C |

Dynamic
Interconnection

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Reconfigurable Computing

Essence:

Independent (potentially self-steering) streams of programming information and operand data that interact within the architecture to perform the computational problem at hand.

Wormhole RTR Stream Format

Stream Format

Program/Flow Header
Data

Configuration information
- ➡ Routing information
- ➡ Variable size
- ➡ Possibly removed as stream routs

Application data stream
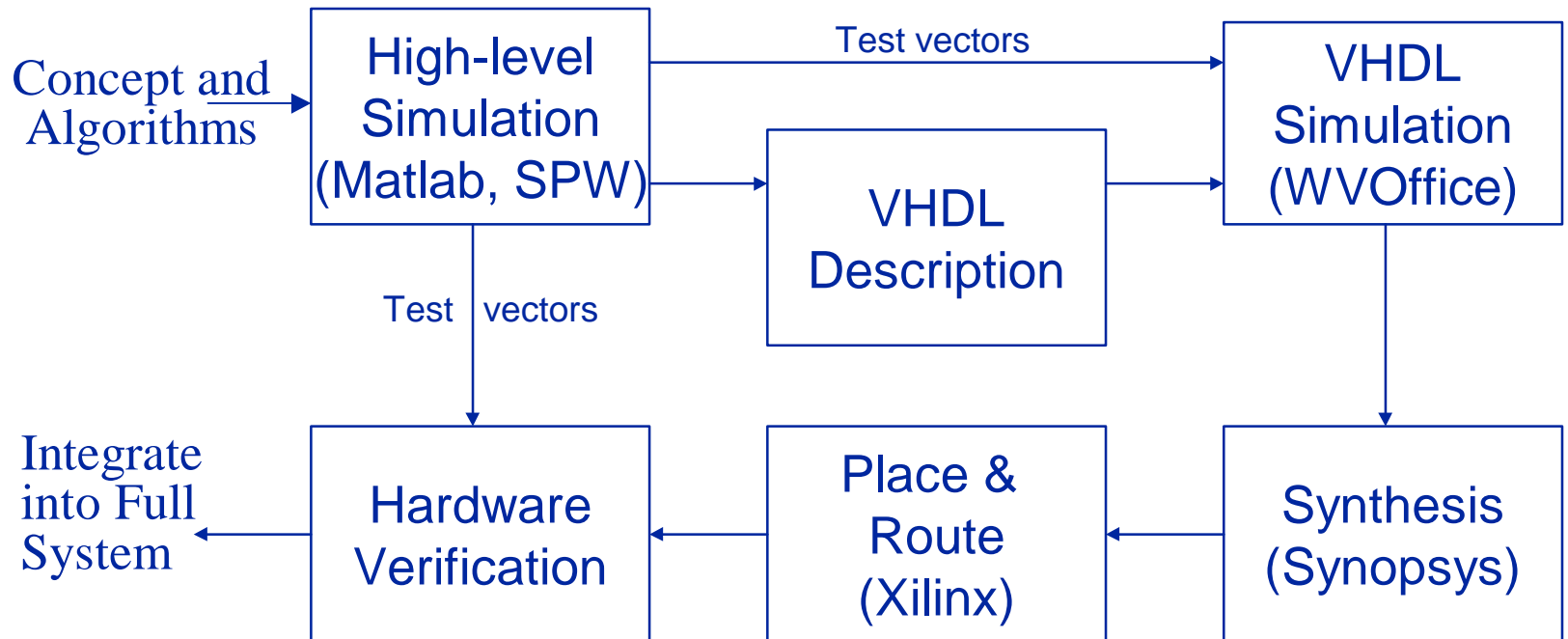- ➡ Possibly chained
- ➡ Variable size

Modular Stream-Based Design

- ## Modular design
  - → Interchangeable and simplifies design process
  - → Global complexity traded for local complexity
    - Increases size of each module

- ## All modules contain:
  - → State machine
  - → Configuration registers
  - → Processing pipeline
  - → Bypass pipeline

Module Design Process

High-level Simulation (Matlab, SPW)

Concept and Algorithms →

Test vectors →

VHDL Simulation (WVOffice)

VHDL Description

Test vectors

Integrate into Full System ←

Hardware Verification

← Place & Route (Xilinx)

← Synthesis (Synopsys)

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Generic Stream Module

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