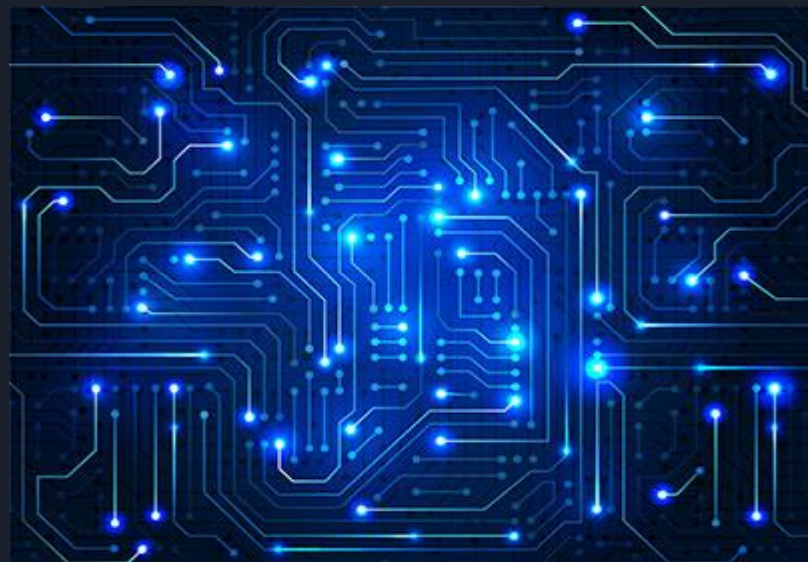# Scheduling Pipelined Circuits

By Ravindu Athukorala

# Motivation!
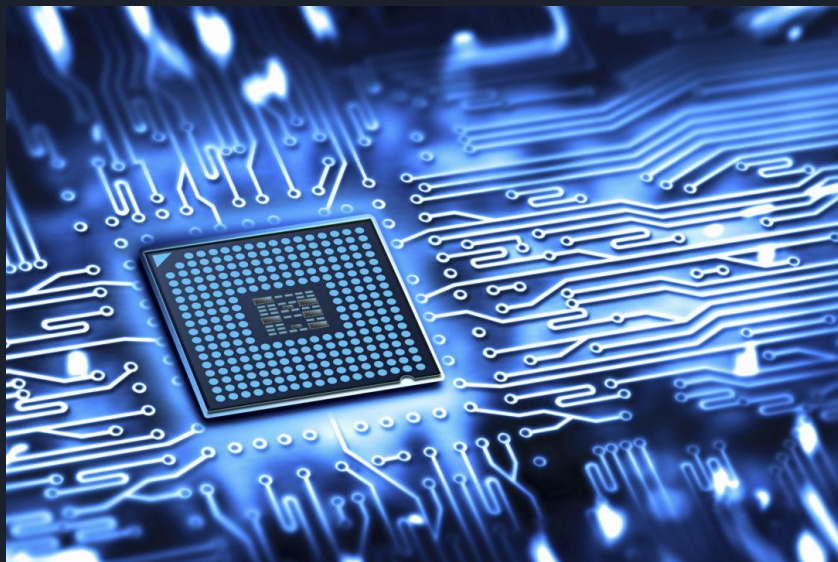


[1]



[2]

# Introduction

- Concept
- Benefit in circuit design
- Importance of efficient Scheduling

# Overview Of Pipelining

- Pipelining and its purpose
- Breaking complex tasks into smaller stages
- Advantages of pipelining
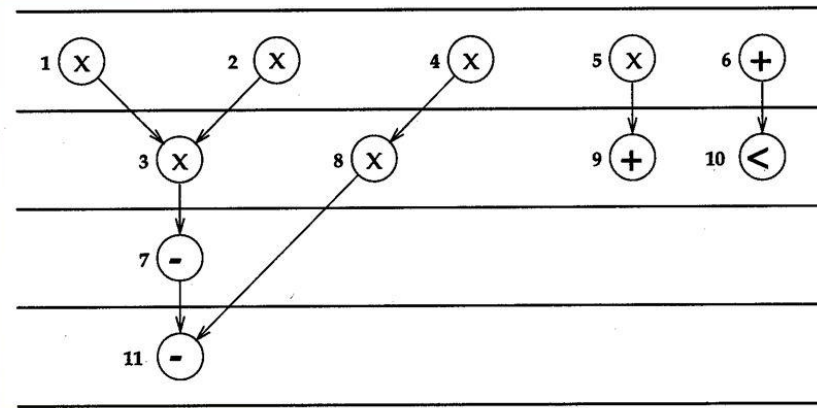
# Various Scheduling Techniques

- ASAP Scheduling
- ALAP Scheduling
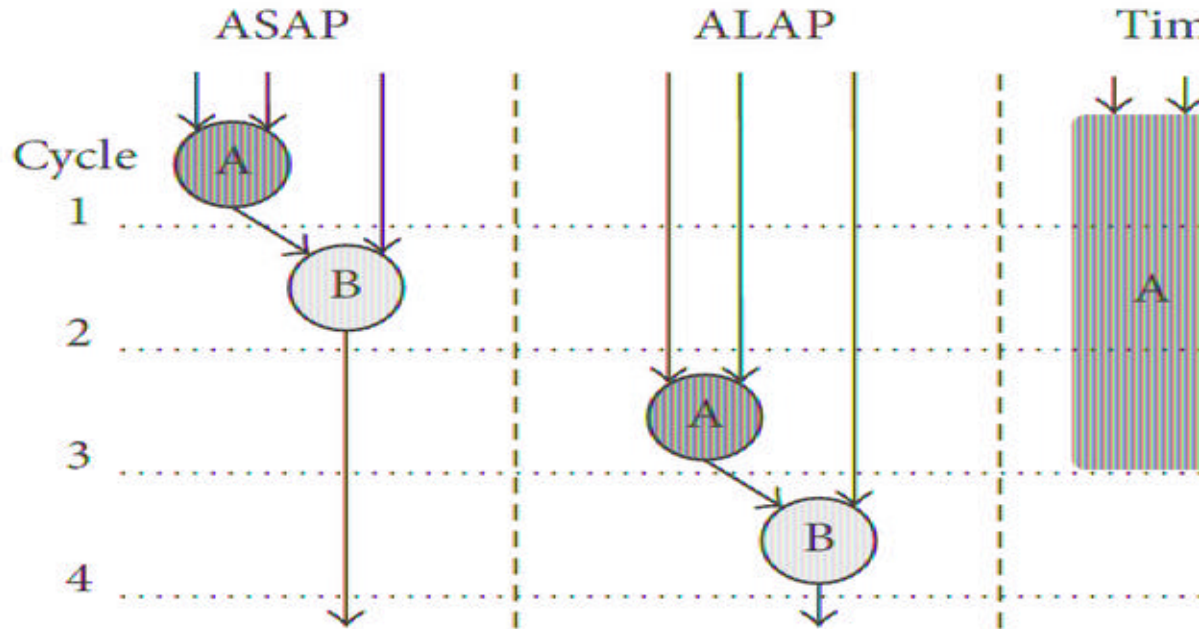- List Scheduling with ILP

# ASAP Scheduling



[3]

# ALAP Scheduling



[4]

# Scheduling Trade Offs

- Performance vs resource utilization
- Schedule length vs latency
- Complexity and optimality

# Tools/Software Support/Applications

- Popular Scheduling Tools
- Applications - Digital Signal Processing

    Microprocessors

    High Performance Computing

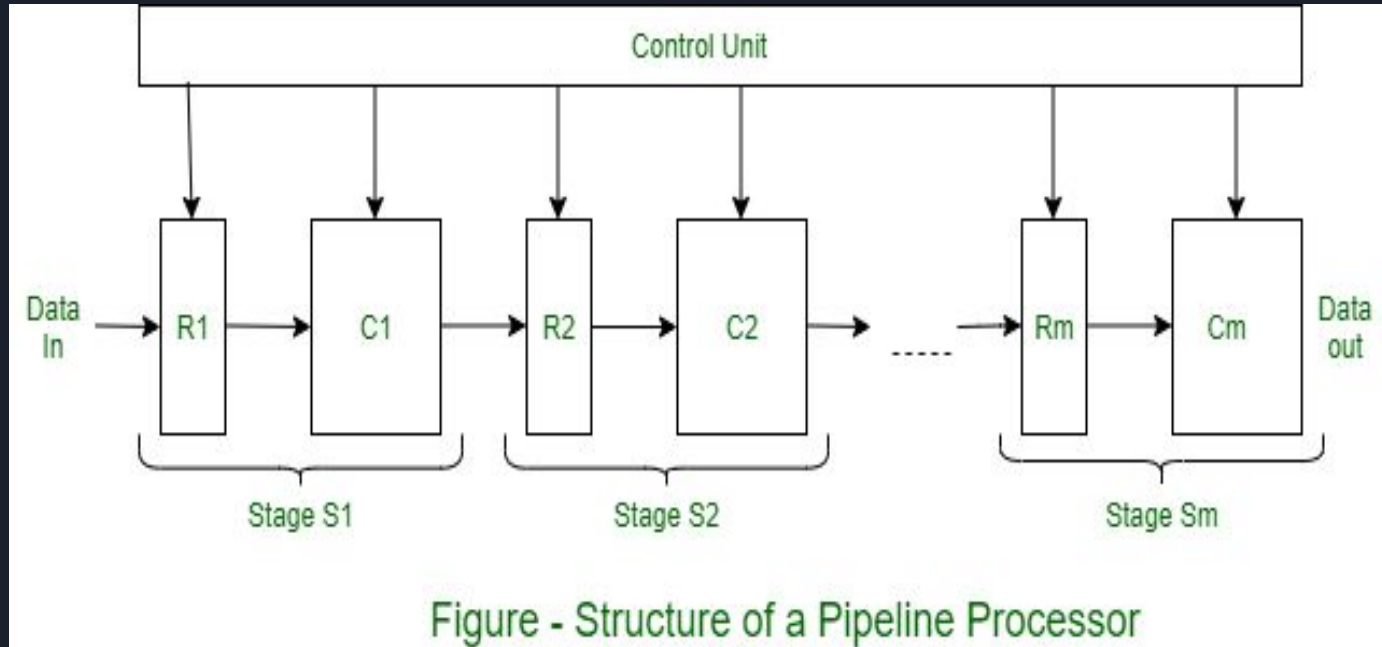    Network And Communication Systems

# Conclusion



Figure - Structure of a Pipeline Processor

[5]

# References

1. TechinPost, T. (2020) *[guide] how do Analog & digital circuits shape the electronics industry?*, *TechinPost*. Available at: https://www.techinpost.com/how-analog-digital-circuits-shape-electronics-industry/ (Accessed: 02 July 2023).
2. Zhao, H. (2021) *A comprehensive guide to building digital circuits*, *WellPCB*. Available at: https://www.wellpcb.com/digital-circuits.html (Accessed: 02 July 2023).
3. *Scheduling for synthesis of embedded hardware - PPT video online download* (no date) *SlidePlayer*. Available at: https://slideplayer.com/slide/5334946/ (Accessed: 02 July 2023).
4. Hindawi (no date) *Figure 2: A high-level synthesis scheduling and binding heuristic for FPGA fault tolerance*, *Figure 2 | A High-Level Synthesis Scheduling and Binding Heuristic for FPGA Fault Tolerance*. Available at: https://www.hindawi.com/journals/ijrc/2017/5419767/fig2/ (Accessed: 02 July 2023).
5. *Pipelined architecture with its diagram* (2020) *GeeksforGeeks*. Available at: https://www.geeksforgeeks.org/pipelined-architecture-with-its-diagram/.