

Unit 5 - Week 3

Course outline

How to access the portal

Pre-Requisite Assignment

Week 1

Week 2

Week 3

- Constraint analysis for IPB computation
- Motivational examples for IPB
- General IPB computation
- Sample period calculation
- Parallel architecture
- Odd-even register reuse
- Power consumption
- Pipelining
- Pipelining FIR filter
- Time-invariant systems
- Valid pipelining examples
- Feedforward cutsets
- Balanced pipeline
- Retiming basic concept
- Example and uses of retiming

Quiz : Assignment 3

Week 3 Feedback : Mapping Signal Processing Algorithms to Architectures

Week 4

Week 5

Week 6

Week 7

Week 8

Week 9

Week 10

Week 11

Week 12

DOWNLOAD VIDEOS

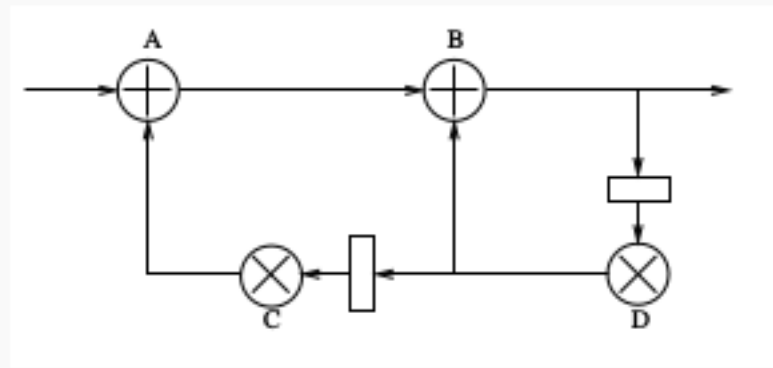
Live Sessions

Assignment 3

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2019-08-21, 23:59 IST.

For the diagram shown, assume input is $x(n)$ and output is $y(n)$. Also assume that each node A, B, C, D are functional units (adders and multipliers as indicated), and that the rectangular blocks are registers.



1) Indicate all the cycles in the graph that you need to consider to compute the iteration period bound

2 points

- A-B-A
- A-B-D-C-A
- A-B-C-D-A
- B-D-B
- D-A-B

No, the answer is incorrect.

Score: 0

Feedback:

Solution: A-B-A, A-B-C-D-A and D-A-B are not valid cycles in the graph

Accepted Answers:

A-B-D-C-A

B-D-B

2) What is the iteration period bound (in ns) for this system, assuming that delay through an adder is 1ns and through a multiplier is 2ns?

No, the answer is incorrect.

Score: 0

Accepted Answers:

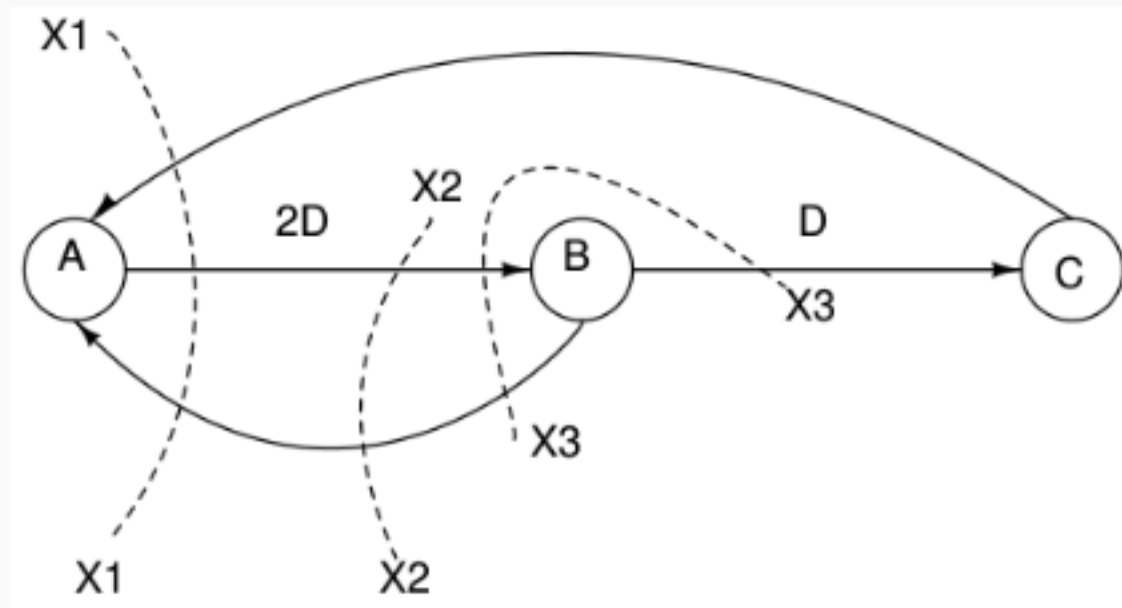
(Type: Numeric) 3

1 point

For the figure below, the nodes A, B, C are performing some computations (ignore the type of computation) and the edges marked with D and 2D have respectively 1 and 2 registers or delay elements on them, as discussed in the context of dataflow graphs.

The dashed lines indicate "cutsets": for example $X1-X1$ is a cutset that includes the edges $A-B$, $C-A$ and $B-A$, while $X2-X2$ includes $A-B$ and $B-A$ only

Answer the following questions:



3) Which of the cutsets is a valid cutset for retiming:

2 points

- $X1 - X1$
- $X2 - X2$
- $X3 - X3$

No, the answer is incorrect.

Score: 0

Feedback:

Solution: A valid cutset for retiming must be a complete cutset: removing the edges should completely separate the graph into two disjoint parts. $X2$ does not satisfy this

Accepted Answers:

$X1 - X1$

$X3 - X3$

For each cutset, indicate whether it is a valid *feedforward* cutset that can be used for pipelining the graph

4) $X1 - X1$?

1 point

- Valid
- Invalid

No, the answer is incorrect.

Score: 0

Accepted Answers:

Invalid

5) $X2 - X2$?

1 point

- Valid
- Invalid

No, the answer is incorrect.

Score: 0

Accepted Answers:

Invalid

6) $X3 - X3$?

1 point

- Valid
- Invalid

No, the answer is incorrect.

Score: 0

Accepted Answers:

Invalid

7) After retiming on cutset $X1 - X1$, what will be the number of registers on edge $C - A$?

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 1

1 point

8) After retiming on cutset $X1 - X1$, what will be the number of registers on edge $A - B$?

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 1

1 point