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NPTEL

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Courses » VLSI Design Verification and test

Announcements **Course** Ask a Question Progress Mentor

Unit 3 - Scheduling in High-Level Synthesis

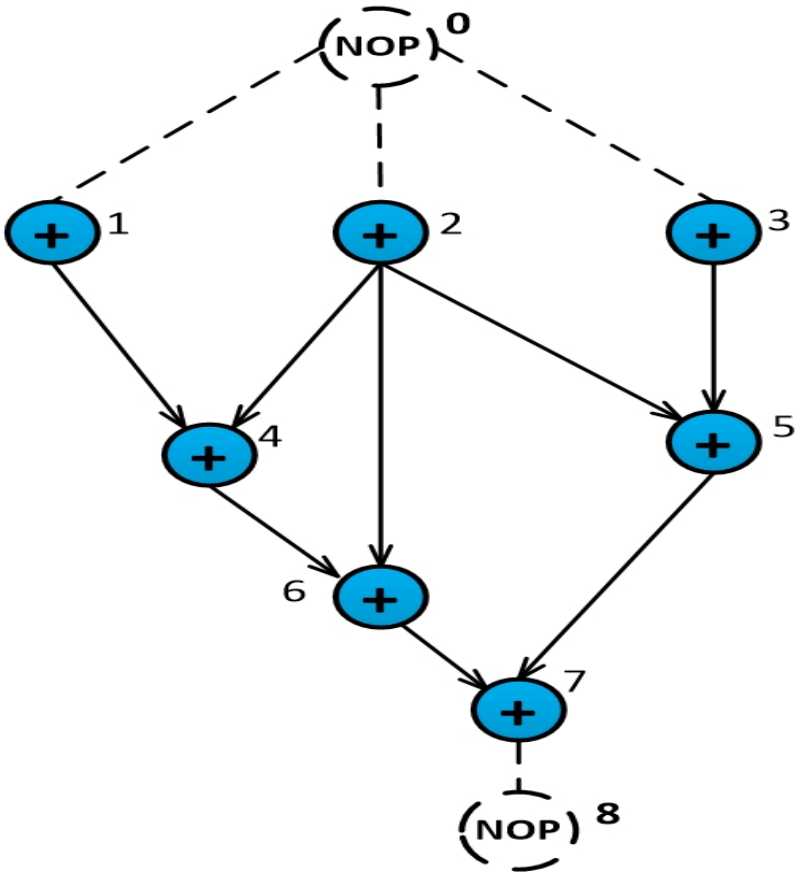
Course outline

- How to access the portal ?
- Introduction and Overview of VLSI Design
- Scheduling in High-Level Synthesis
  - Scheduling in HLS (Part-1)
  - Scheduling in HLS (Part-2)
  - Scheduling in HLS (Part-3)
  - Scheduling in HLS (Part-4)
  - Scheduling in HLS (Part-5)
  - Scheduling in HLS (Part-6)
  - Scheduling in HLS (Part-7)
  - Quiz : WEEK 2 ASSIGNMENT
- Resource Sharing and Binding in HLS
- Logic Synthesis
- Physical Design
- Introduction to Verification Techniques
- Syntax and semantics of CTL, Equivalences

WEEK 2 ASSIGNMENT

The due date for submitting this assignment has passed. **Due on 2016-08-08, 23:58 IST.**

Submitted assignment



Consider the Operation Constraints Graph (OCG) shown in the figure above. Each addition operation takes unit time. The latency bound is 4. There are no resource constraints.

1) The correct ALAP schedule is: *1 point*

- C-step 1: 1, 2. C-step 2: 3, 4. C-step 3: 5, 6. C-step 4: 7
- C-step 1: 1, 2, 3. C-step 2: 4, 5. C-step 3: 6. C-step 4: 7
- C-step 1: 1, 2, 3, 4. C-step 2: 5. C-step 3: 6. C-step 4: 7
- C-step 1: 1. C-step 2: 2, 3, 4. C-step 3: 5, 6. C-step 4: 7

between CTL formulas and Introduction to Model Checking

CTL Model checking Algorithms and Introduction to Binary Decision Diagrams

Binary Decision Diagram and Symbolic model checking

Introduction to Digital Testing

Fault Simulation and Testability Measures

Combinational Circuit Test Pattern Generation

Sequential Circuit Testing and Scan Chains

Built In Self Test (BIST)

No, the answer is incorrect.
Score: 0

Accepted Answers:
C-step 1: 1, 2. C-step 2: 3, 4. C-step 3: 5, 6. C-step 4: 7

2) The mobility for each node (from 1 to 7) in OCG is: ***1 point***

- 0, 1, 0, 0, 0, 1, 0
- 0, 1, 1, 0, 1, 0, 0
- 0, 0, 1, 0, 1, 0, 0
- 0, 0, 1, 0, 1, 1, 0

No, the answer is incorrect.
Score: 0

Accepted Answers:
0, 0, 1, 0, 1, 0, 0

3) A valid list schedule for the OCG assuming only one adder resource is: ***1 point***
(Note: Assume the priority of a operation as (1 / (mobility + 1))).

- 1, 2, 4, 6, 3, 5, 7
- 1, 2, 3, 4, 5, 6, 7
- 1, 2, 4, 3, 6, 5, 7
- 1, 2, 3, 5, 4, 6, 7

No, the answer is incorrect.
Score: 0

Accepted Answers:
1, 2, 4, 6, 3, 5, 7

4) A new addition (+) operation having index-9 has been introduced to the OCG. This newly included operation takes the output of operations 1 and 3 as input and floats its output on operation 7. What will be minimum number of resources (i.e., adders) required to schedule this modified OCG with a latency bound of 4. ***0 points***

- 1
- 2
- 3
- 4

No, the answer is incorrect.
Score: 0

Accepted Answers:
3

5) Consider the modified OCG discussed in Q4. Let binary decision variables of type **x(i,j)** denote the assignment of operation-i at time step-j. **x(i,j)** is 1 if operation-i is scheduled at time step-j. x(i,j) is 0 otherwise. There are two adders and latency bound is 5. Determine the correct inequality representing the resource constraint at time step 2. ***3 points***

- x(3,2) + x(4,2) + x(5,2) + x(9,2) <= 2
- x(1,2) + x(2,2) + x(3,2) + x(4,2) + x(5,2) <= 2
- x(1,2) + x(2,2) + x(3,2) + x(4,2) + x(5,2) + x(9,2) <= 2
- x(1,2) + x(2,2) + x(3,2) + x(4,2) + x(5,2) + x(9,2) + x(6,2) <= 2

No, the answer is incorrect.
Score: 0

Accepted Answers:
x(1,2) + x(2,2) + x(3,2) + x(4,2) + x(5,2) + x(9,2) <= 2

6) Consider the modified OCG discussed in Q4 and Q5. Determine the correct inequality representing the dependency constraint between operations 9 and 3. ***3 points***

- x(9,2) + x(9,3) - x(3,1) - x(3,2) >= 1
- x(9,2) + x(9,3) + x(9,4) - x(3,1) - x(3,2) - 3x(3,3) - 1 >= 0

- 2x(9,2) + 3x(9,3) + 4x(9,4) - x(3,1) - 2x(3,2) - 3x(3,3) >= 0
- 2x(9,2) + 3x(9,3) + 4x(9,4) - x(3,1) - 2x(3,2) - 3x(3,3) >= 1

No, the answer is incorrect.
Score: 0

Accepted Answers:
2x(9,2) + 3x(9,3) + 4x(9,4) - x(3,1) - 2x(3,2) - 3x(3,3) >= 1

Previous Page End