HUST

ĐẠI HỌC BÁCH KHOA HÀ NỘI

HANOI UNIVERSITY OF SCIENCE AND TECHNOLOGY

ONE LOVE. ONE FUTURE.

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Applied Algorithm Lab

Make span schedule

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Make span schedule

- Make a schedule for a project with many tasks.
- A project has n tasks 1,..., n:
  - Task i has duration d(i) to be completed
  - Precedence constraints Q: for each (i,j) in Q, task j cannot be started before the completion of task i.
- **Objective:** Arrange task the project to complete as soon as possible.
- **Input:** n, |Q|, d(1),..., d(n), the set Q
- **Output:** The earliest completion time of the project.

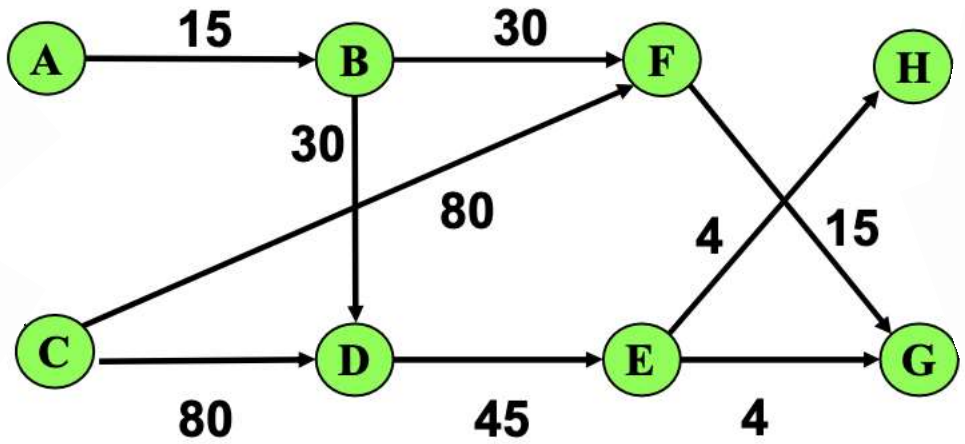
Make span schedule

- Example

Input	Output
8 9 15 30 80 45 4 15 15 19 1 2 2 4 3 4 4 5 2 6 3 6 5 7 6 7 5 8	148

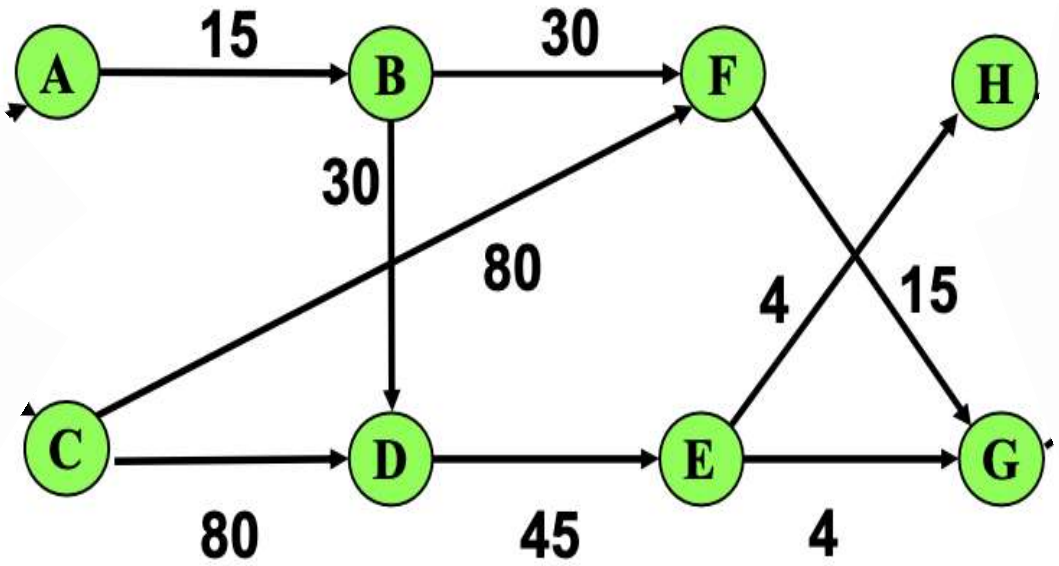
Make span schedule

- Idea to solve: Formulate the problem using directed graph
  - A graph with n nodes as n tasks
  - If (i,j) ∈ Q, we draw an edge (i, j) on graph
    - weight of edge (i,j) is t[i]
  - The node having in-degree 0 : we can perform the corresponding task since t = 0



Make span schedule

- Idea to solve: BFS
  - The node having in-degree 0 -> not affected by any other, but may affect some other nodes
  - We use BFS to traverse, from a node y having in-degree 0
    - Use auxiliary variable dist[x]: the first starting time of x
  - After BFS all node: retrieve the node with maximal dist[]



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THANK YOU !