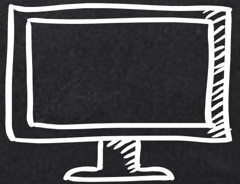

DYNAMIC PROGRAMMING

DP

DESIGN AND ANALYSIS OF ALGORITHMS

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HOMEWORK

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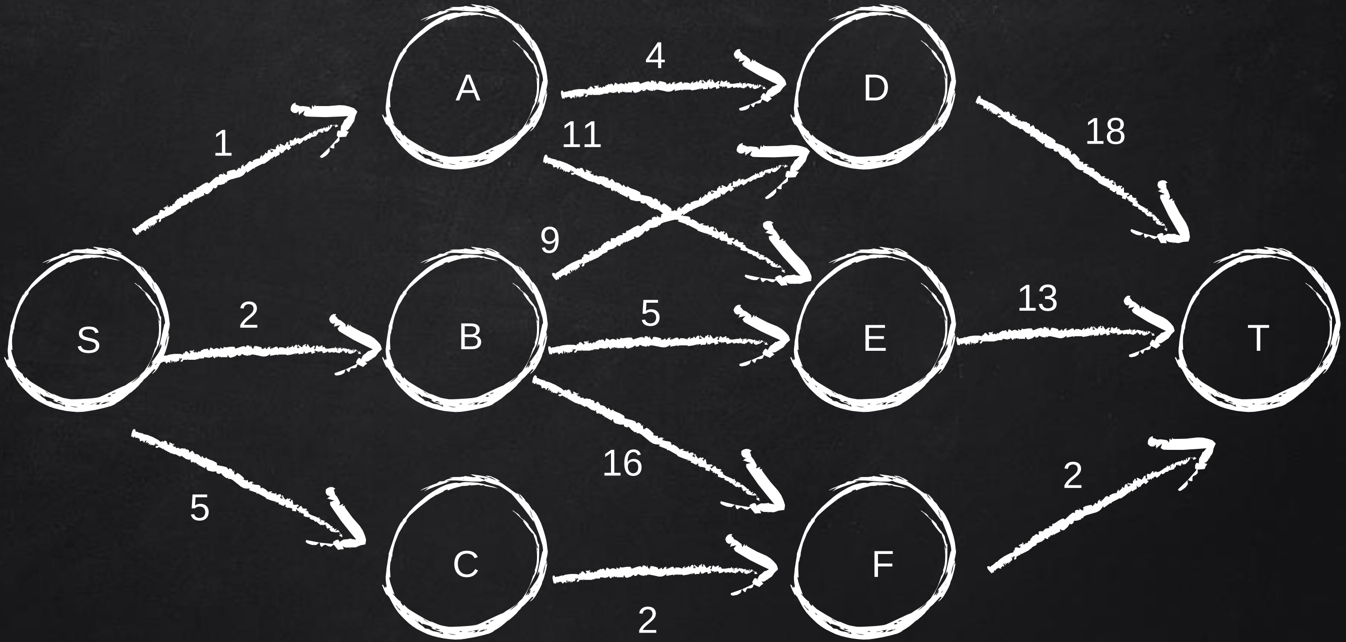
The shortest path



Apply the Dynamic programming, the shortest path from S to T is?

Top-down approach

$d_{min}(S, T) = \min\{d_{min}(S, D); d_{min}(S, E); d_{min}(S, F)\}$

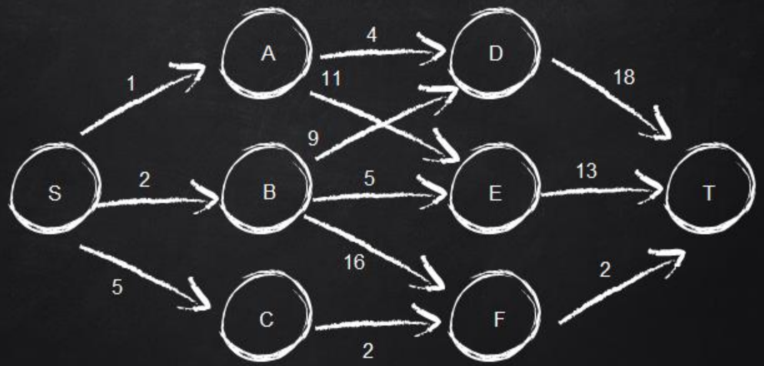
$d_{min}(S, T) = \min\{1+d_{min}(A, T); 2+d_{min}(B, T); 5+d_{min}(C, T)\}$

$d_{min}(A, T) = \min\{4+d(D, T); 11+d(E, T)\}$
$= \min\{4+18; 11+13\} = 22.$

$d_{min}(B, T) = \min\{9+d(D, T); 5+d(E, T); 16+d(F, T)\}$
$= \min\{9+18; 5+13; 16+2\} = 18.$

$d_{min}(C, T) = 2+d(F, T)$
$= 2+2 = 4.$

$d_{min}(S, T) = \min\{1+22; 2+18; 5+4\}$
$= 9.$



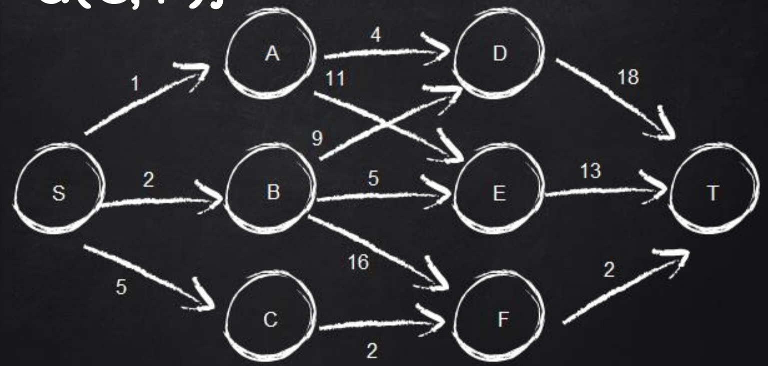
Bottom-up approach

$d(S, A) = 1;$ $d(S, B) = 2;$ $d(S, C) = 5$

$$d_{min}(S, D) = \min\{d(S, A)+d(A, D); d(S, B)+d(B, D)\} = \min\{1+4; 2+9\} = 5.$$

$$d_{min}(S, E) = \min\{d(S, A)+d(A, E); d(S, B)+d(B, E)\} = \min\{1+11; 2+5\} = 7.$$

$$d_{min}(S, F) = \min\{d(S, B)+d(B, F); d(S, C)+d(C, F)\} = \min\{2+16; 5+2\} = 7.$$

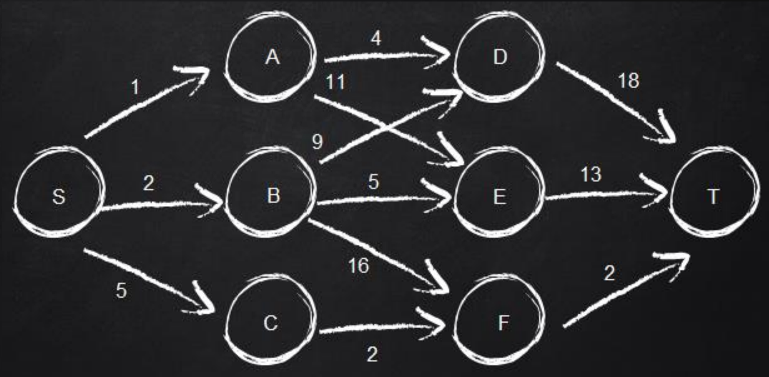


Bottom-up approach

$$d_{min}(S, T) = \min\{d_{min}(S, D)+d(D, T); d_{min}(S, E)+d(E,T); d_{min}(S, F)+d(F, T)\}$$

$$= \min\{5+18;\ 7+13;\ 7+2\}$$

$$= 9.$$



THANKS!

Any questions?

You can review these slides on our team's GitHub