The Critical-Path Algorithm

Lecture 38
Sections 8.5

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Hampden-Sydney College

Wed, Apr 25, 2018

1. The Critical-Path Algorithm
2. Example
3. Assignment

Outline

1. The Critical-Path Algorithm
2. Example
3. Assignment

The Critical-Path Algorithm

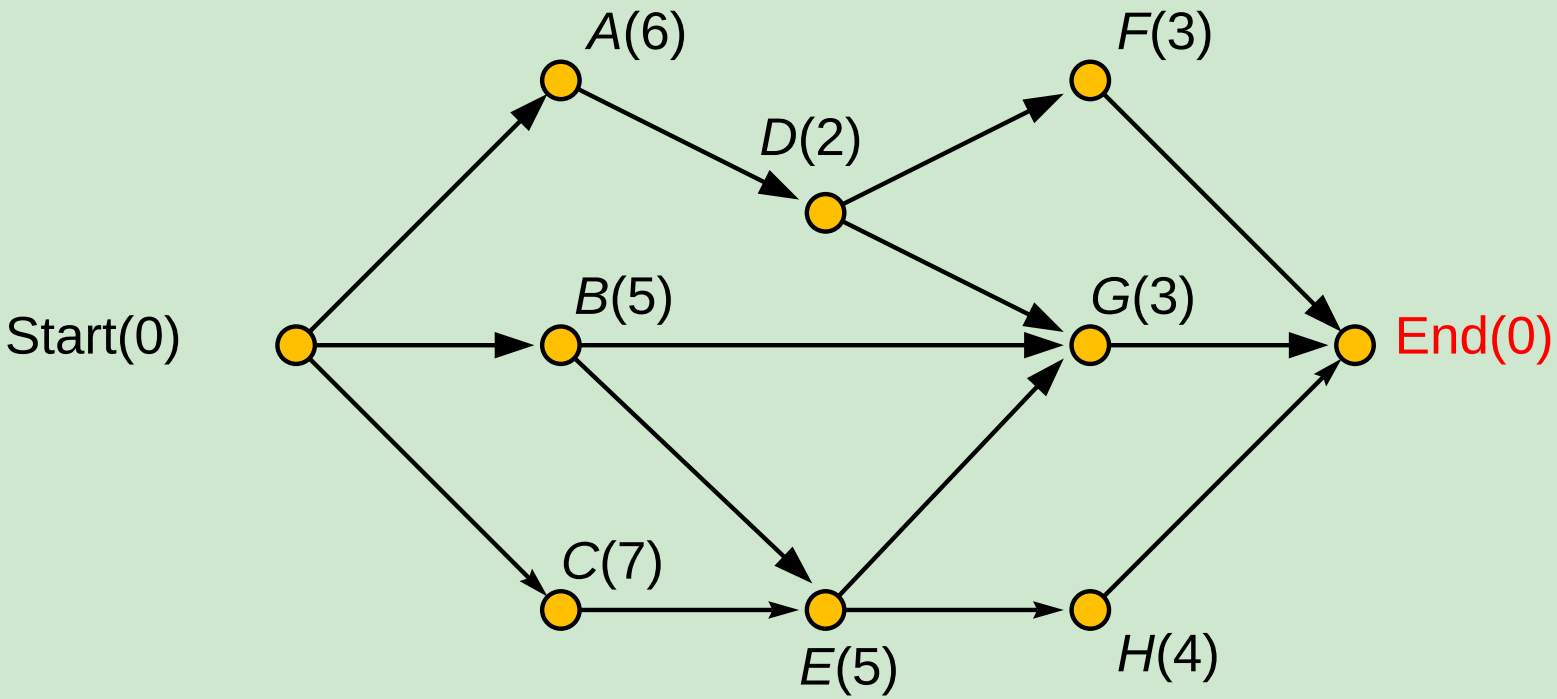
Definition (The Critical-Path Algorithm)

The critical-path algorithm creates a schedule by the following method.

1. Use the backflow algorithm to find the critical time of every task in the project.
2. Create a priority list by arranging the tasks in order of decreasing critical time.
3. Use that priority list to create a schedule.

The Backflow Algorithm

Example (The Backflow Algorithm)



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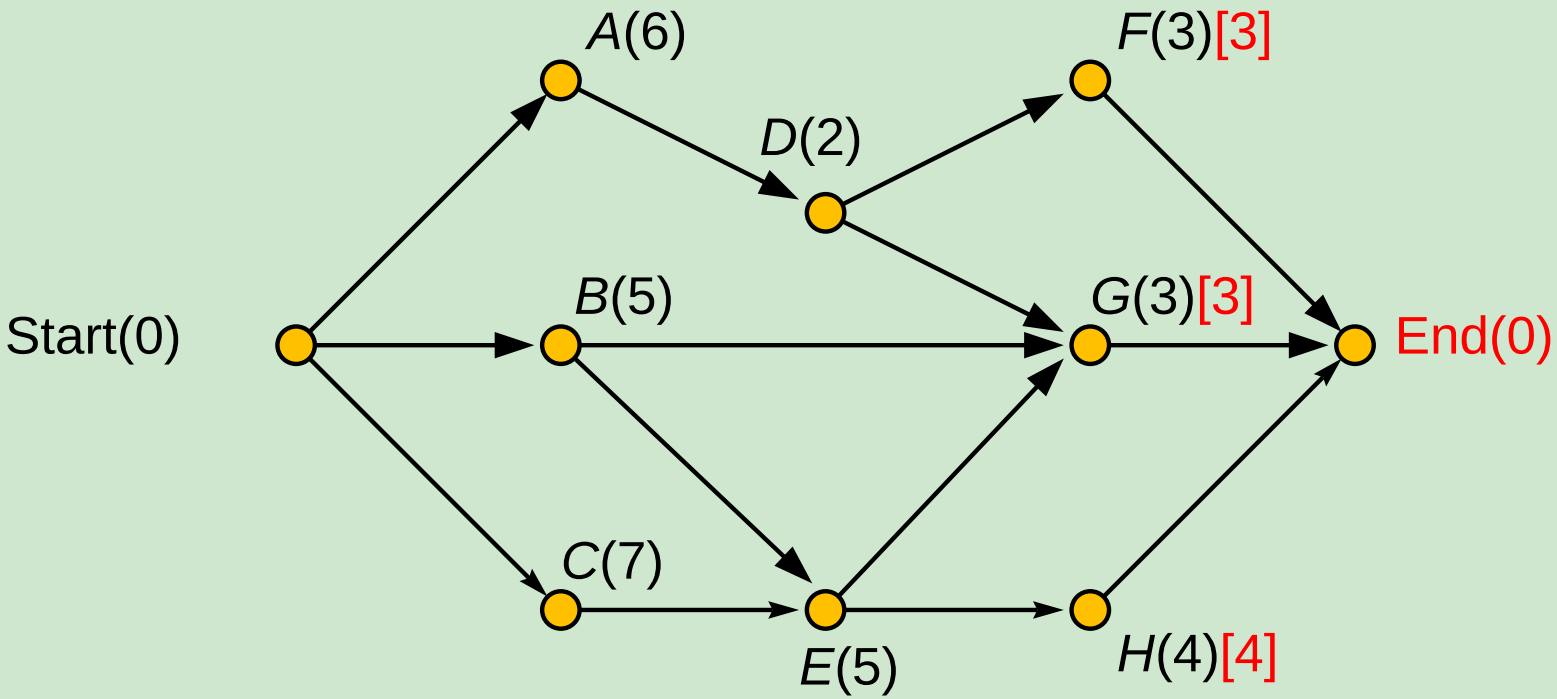

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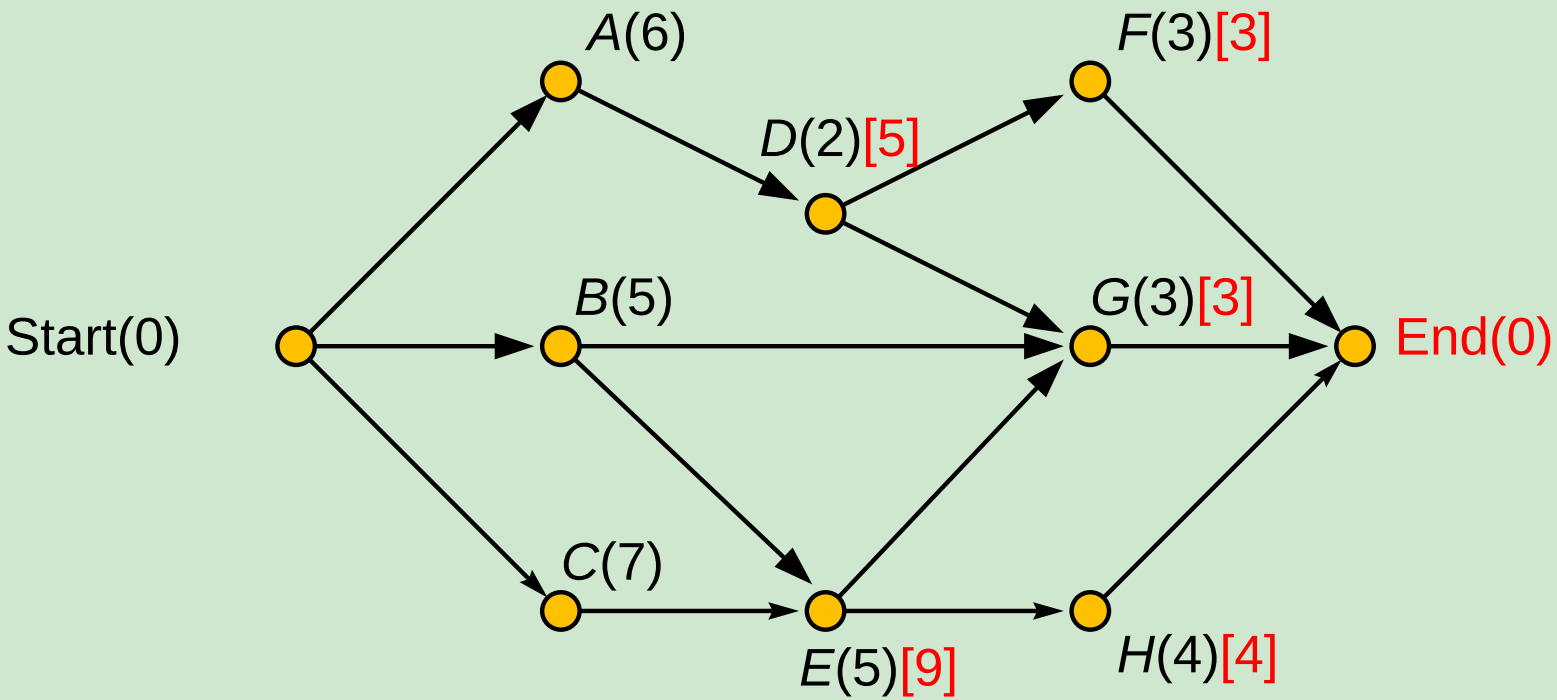

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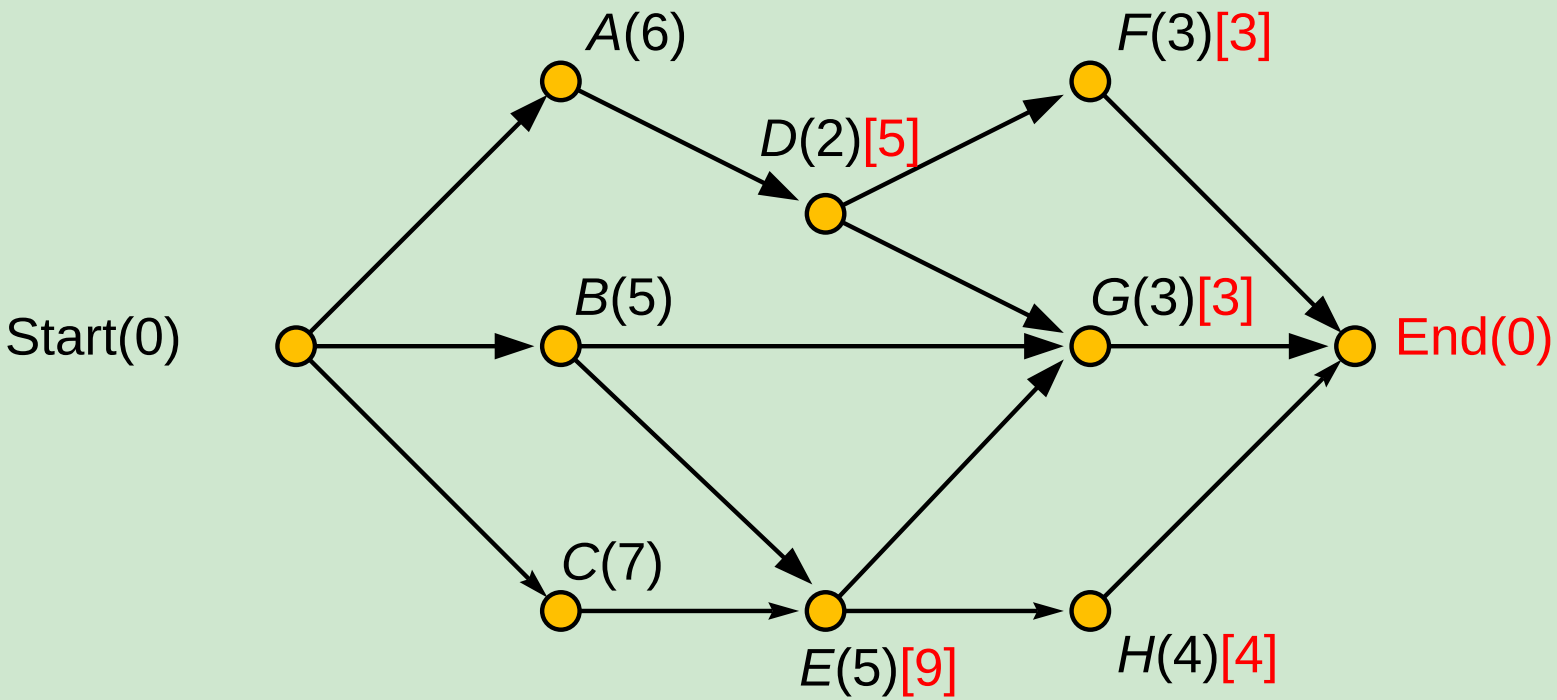

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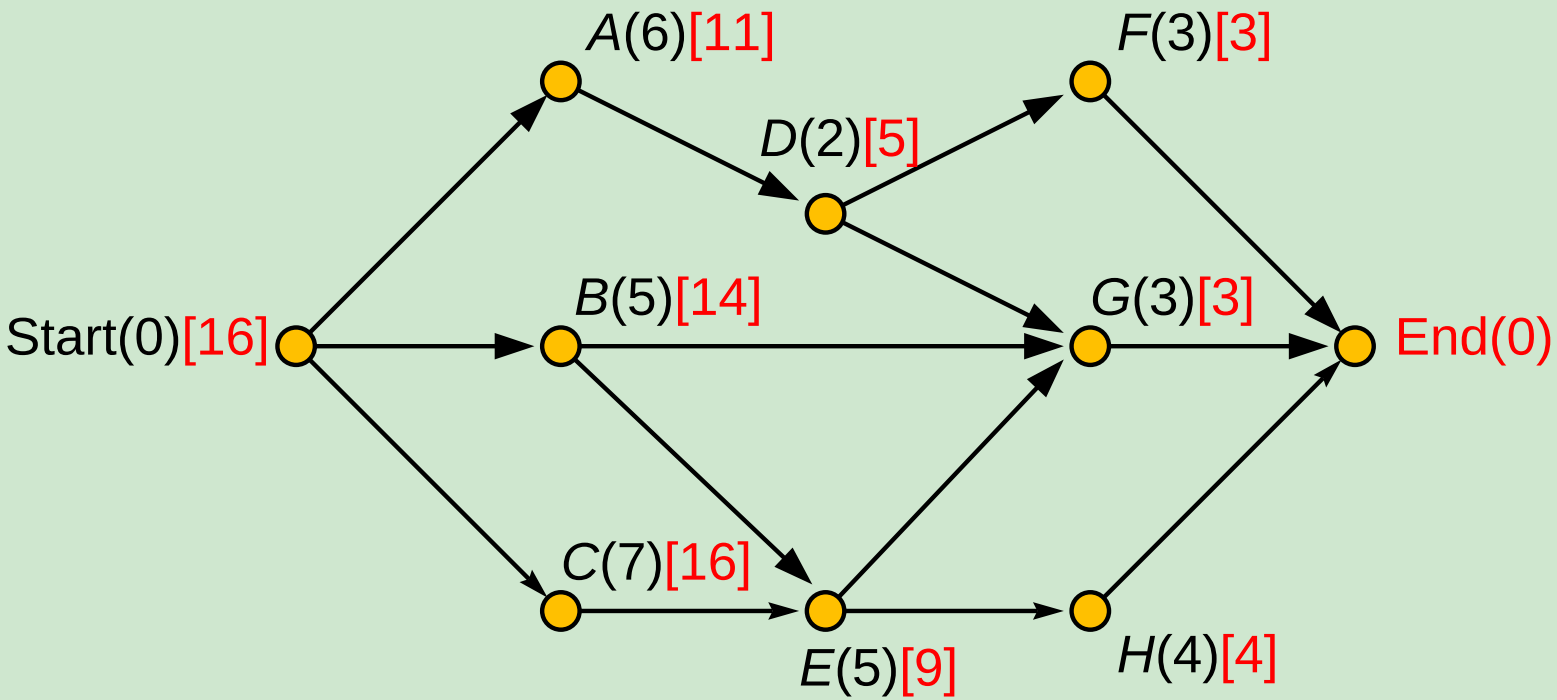

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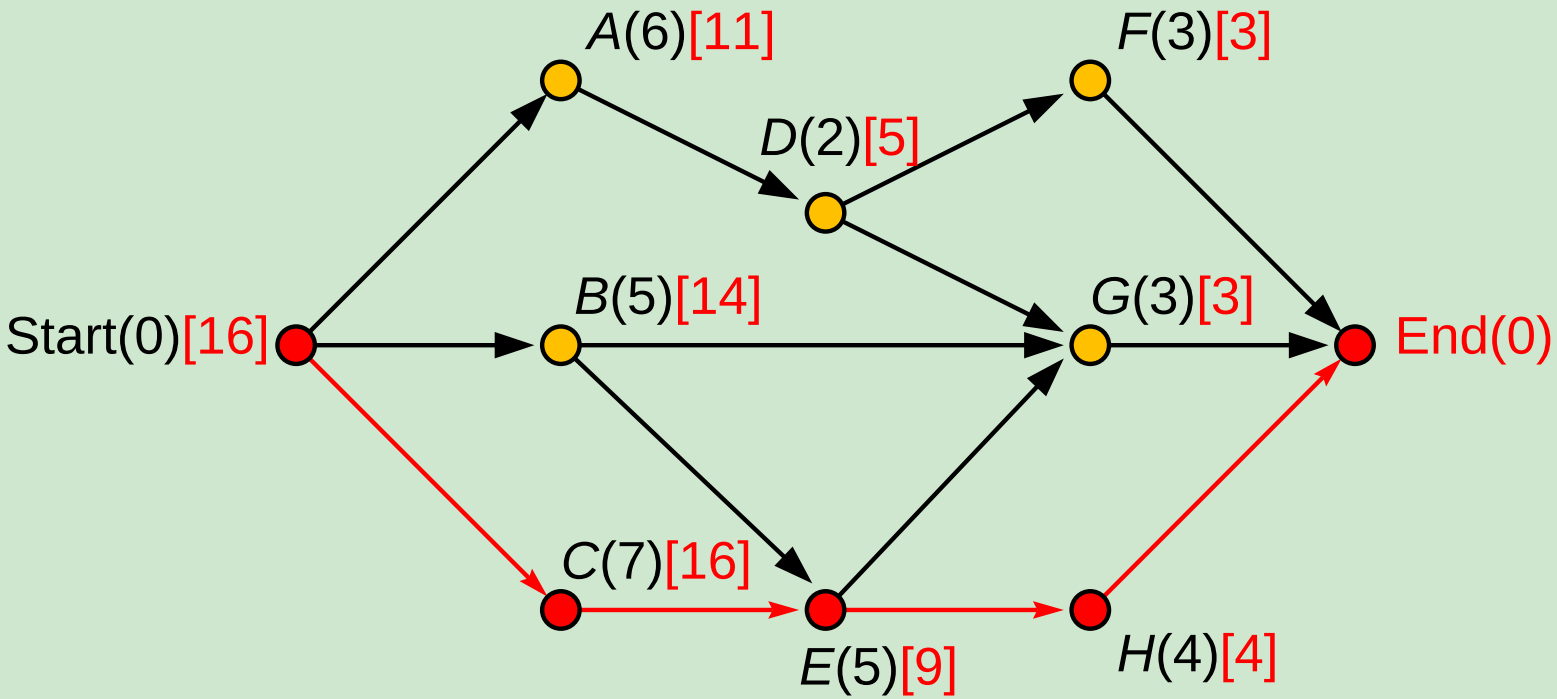

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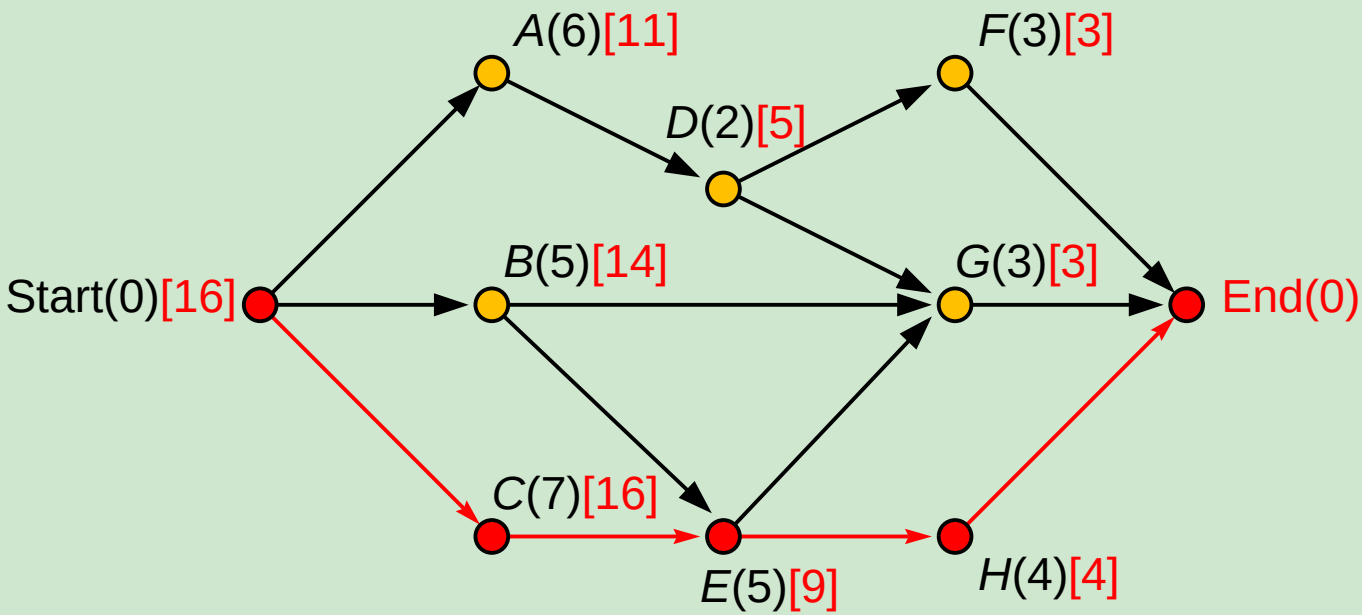

- The priority list is C, B, A, E, D, H, F, G.

Example

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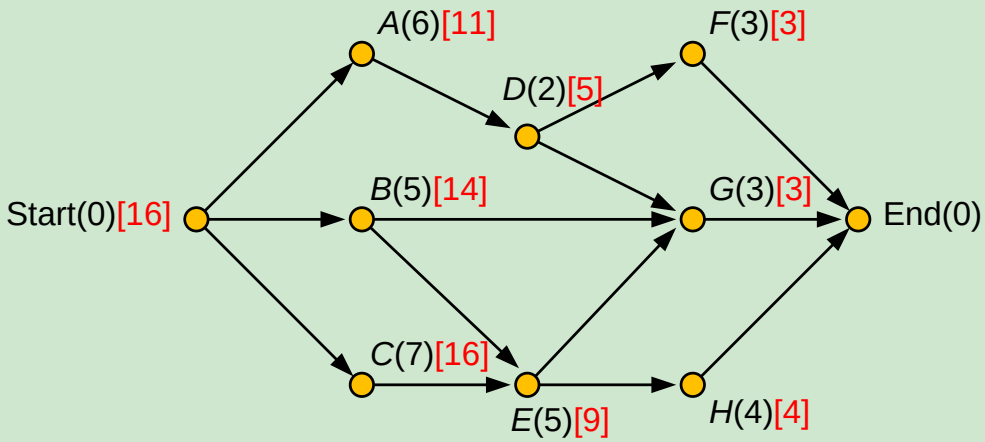

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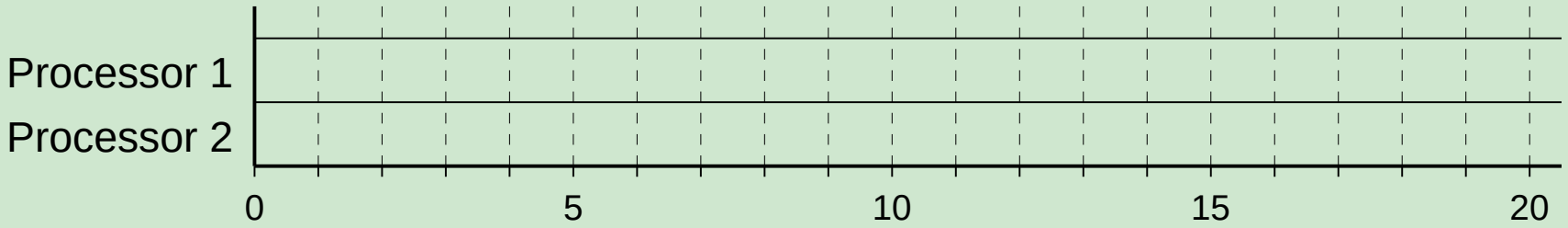

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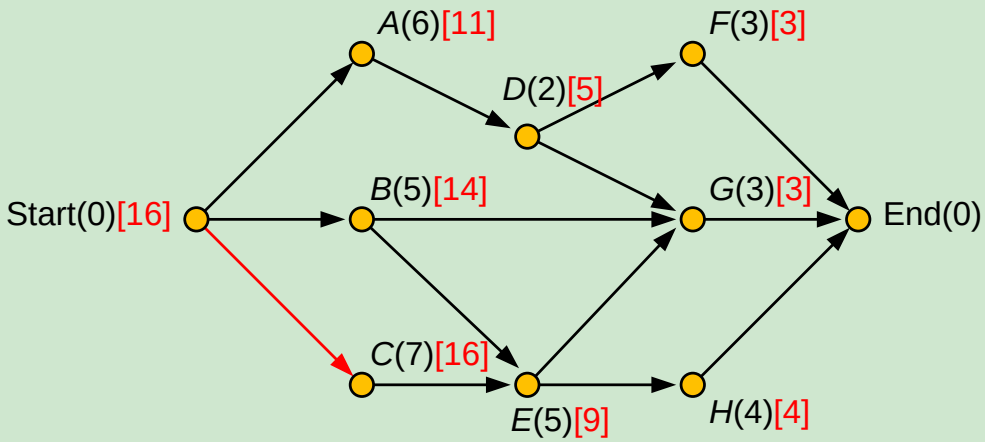
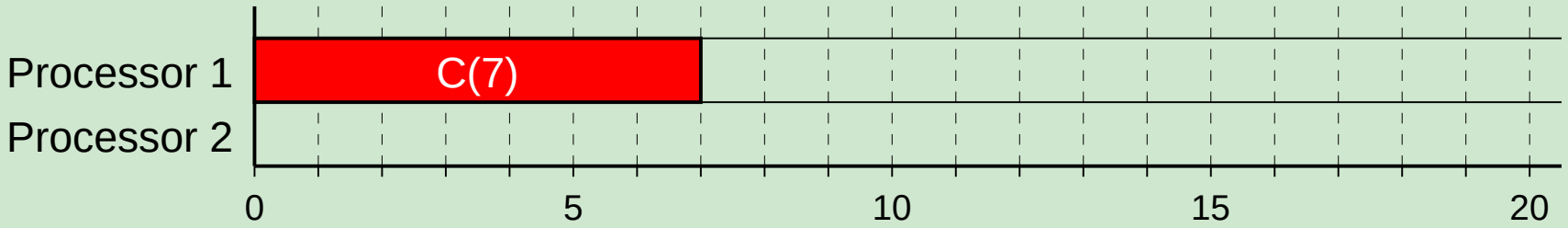


Priority list: *C*, *B*, *A*, *E*, *D*, *H*, *F*, *G*



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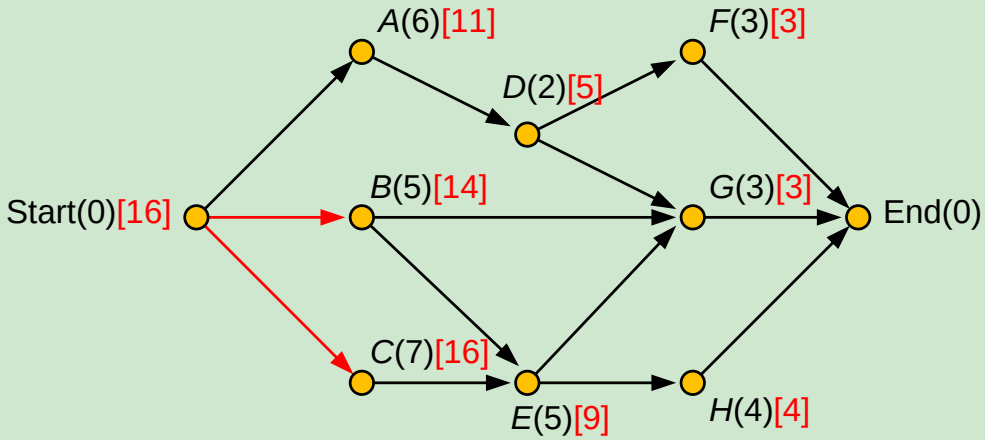

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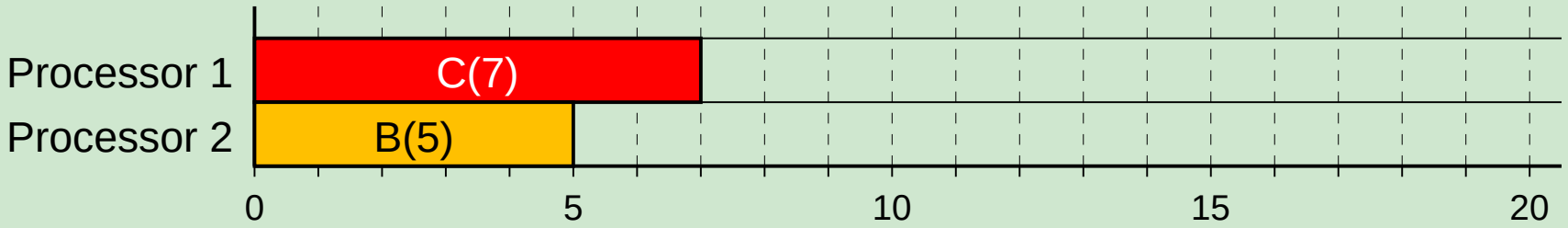

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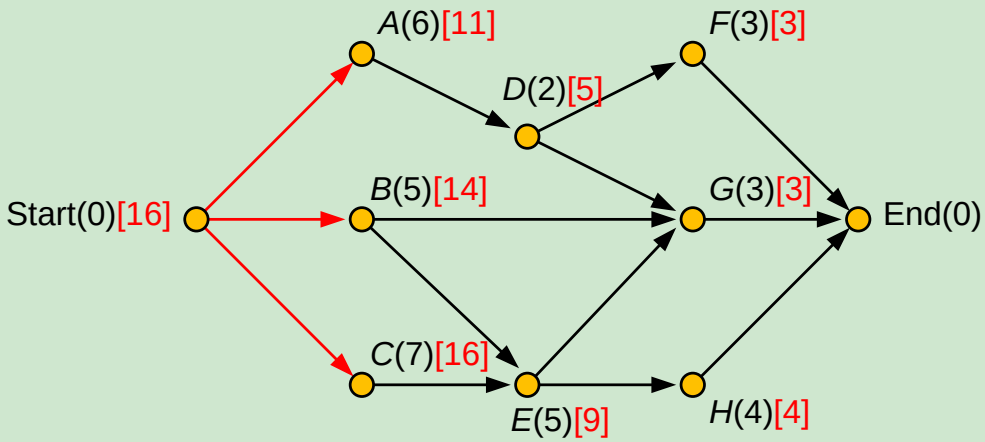

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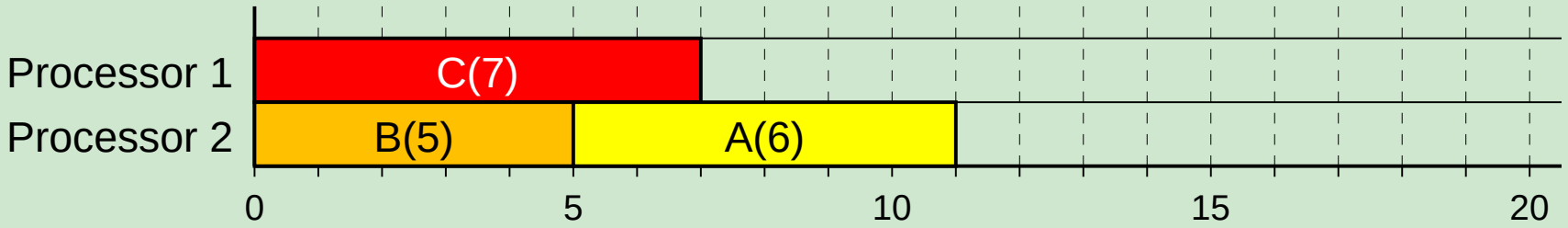

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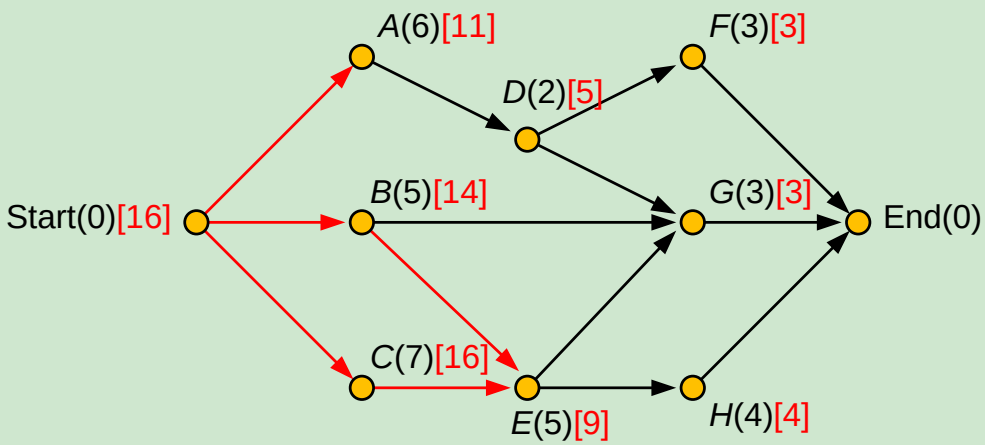

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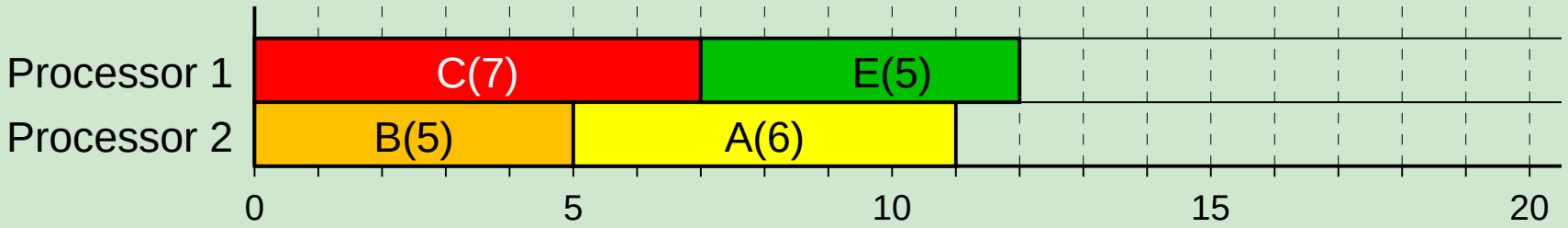

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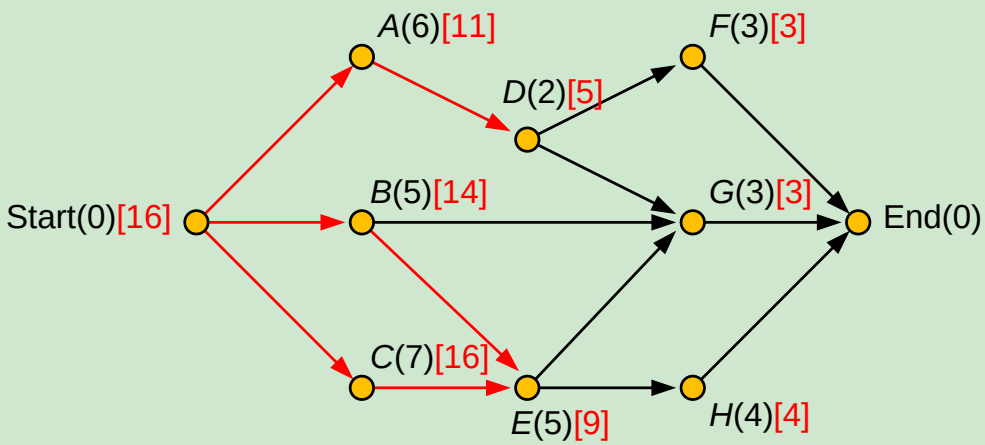

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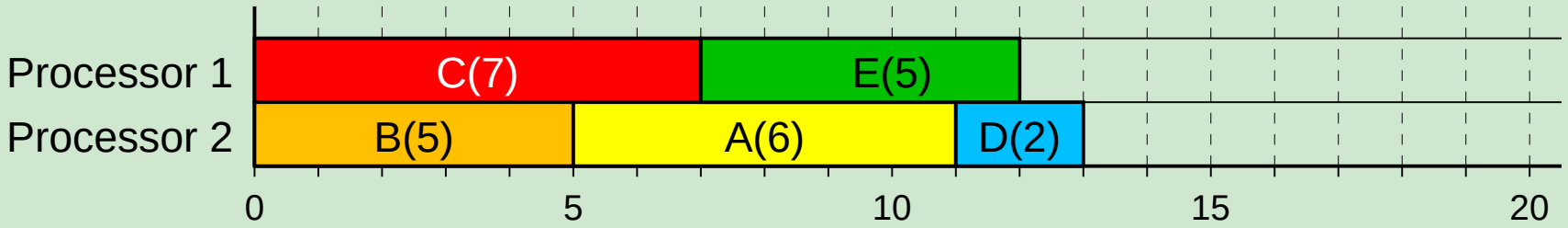

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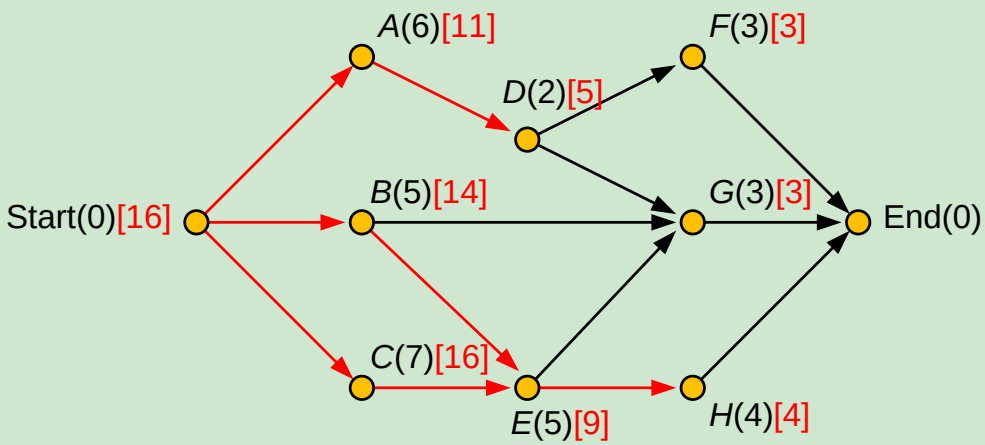

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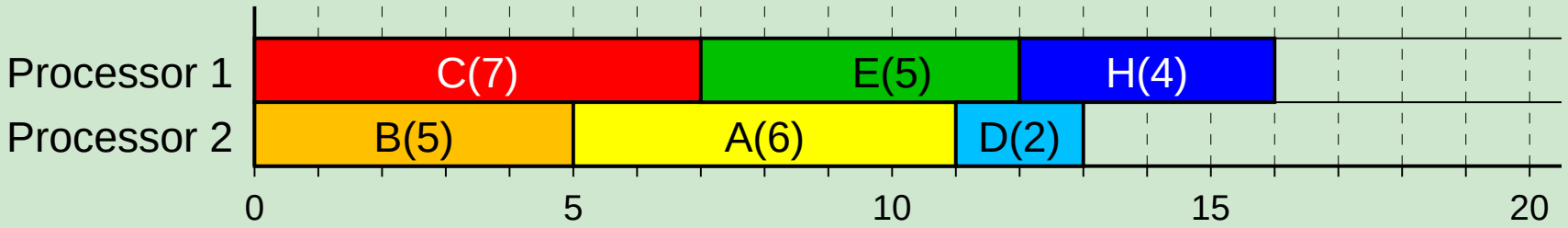

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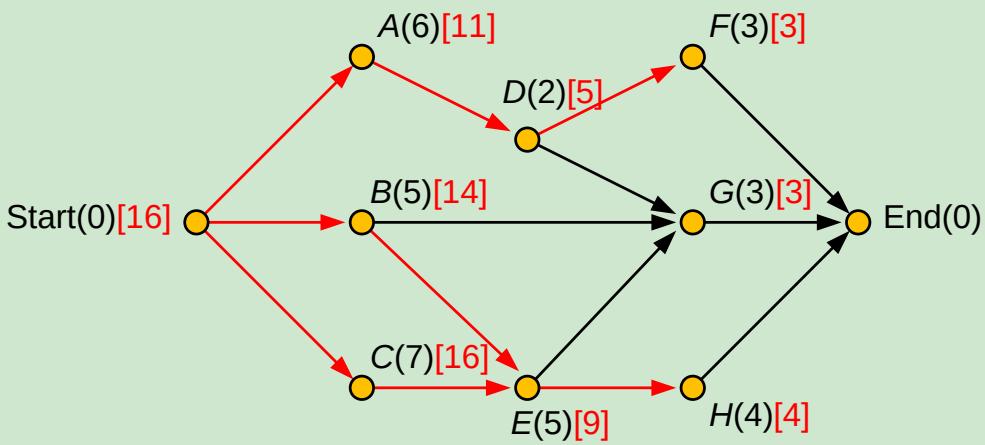

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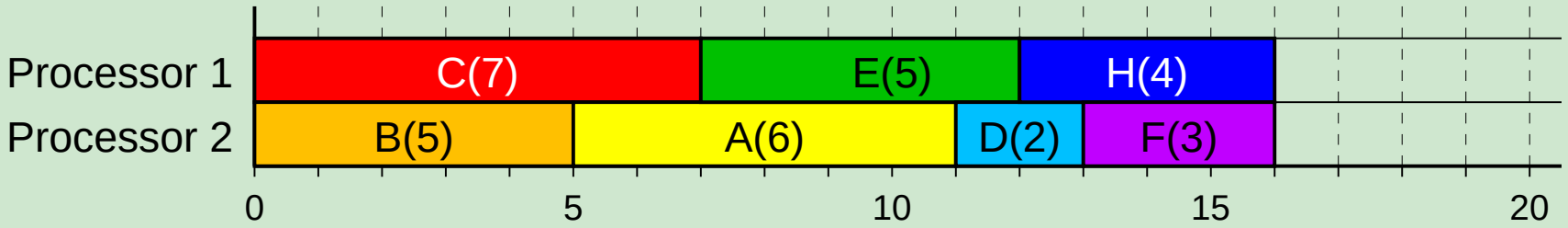

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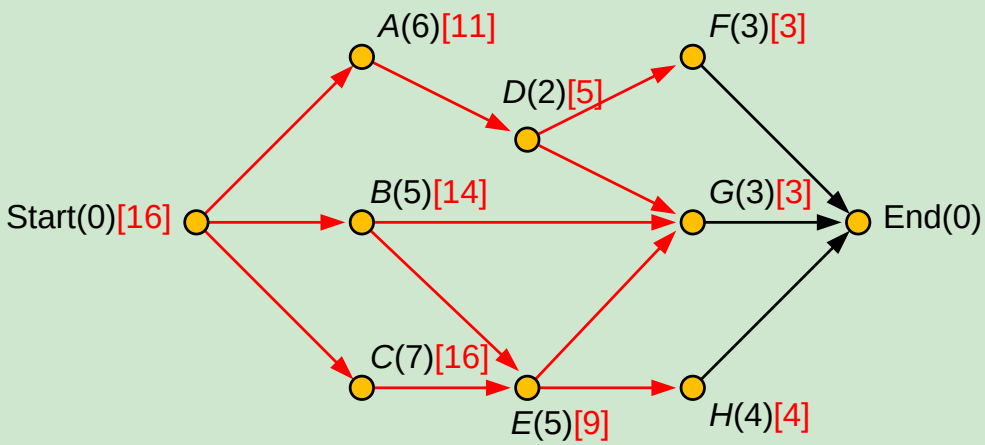

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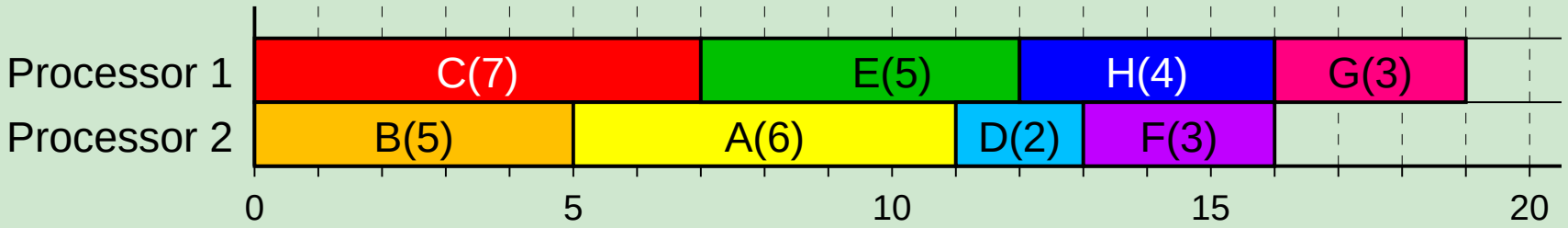

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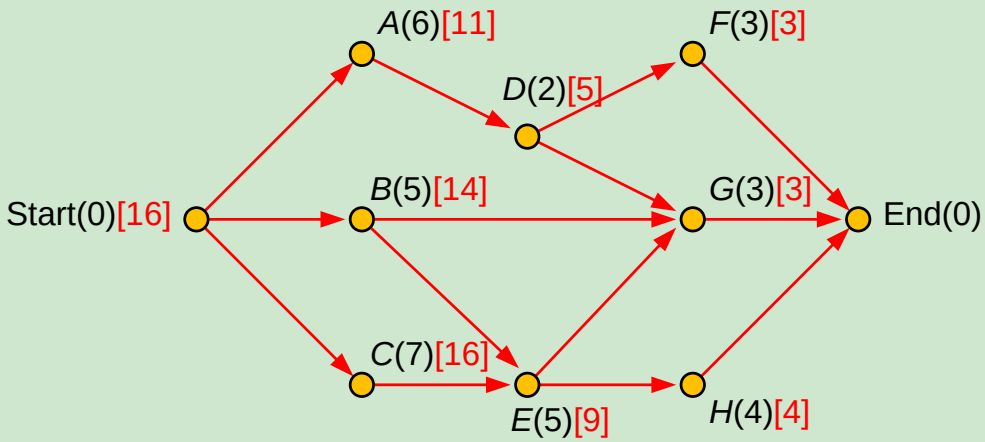

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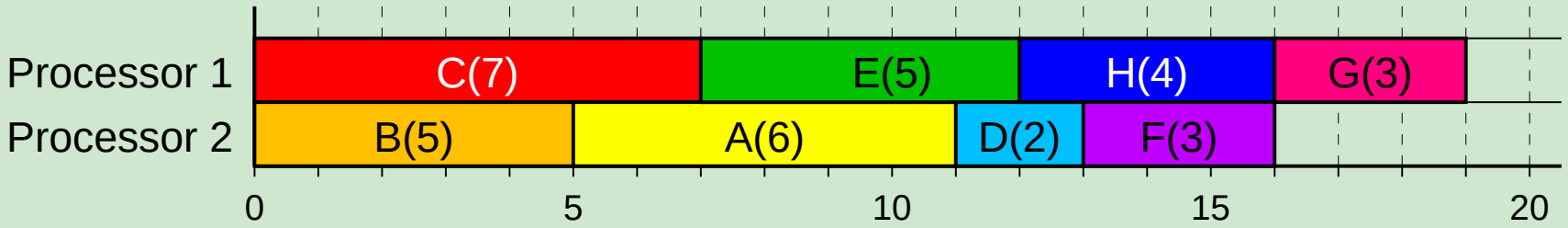


Outline

1. The Critical-Path Algorithm
2. Example
3. Assignment

Example

Task	Precedent Tasks	Processing Time	Critical Time
A		4	
B		7	
C		2	
D		3	
E	A	8	
F	A, B, C	6	
G	C, D	4	
H	D	2	
I	E, F	5	
J	F, G, H	10	

Example

Task	Precedent Tasks	Processing Time	Critical Time
A		4	
B		7	
C		2	
D		3	
E	A	8	
F	A, B, C	6	
G	C, D	4	
H	D	2	
I	E, F	5	5
J	F, G, H	10	10

Example

Task	Precedent Tasks	Processing Time	Critical Time
A		4	
B		7	
C		2	
D		3	
E	A	8	13
F	A, B, C	6	
G	C, D	4	
H	D	2	
I	E, F	5	5
J	F, G, H	10	10

Example

Task	Precedent Tasks	Processing Time	Critical Time
A		4	
B		7	
C		2	
D		3	
E	A	8	13
F	A, B, C	6	16
G	C, D	4	
H	D	2	
I	E, F	5	5
J	F, G, H	10	10

Example

Task	Precedent Tasks	Processing Time	Critical Time
A		4	
B		7	
C		2	
D		3	
E	A	8	13
F	A, B, C	6	16
G	C, D	4	14
H	D	2	
I	E, F	5	5
J	F, G, H	10	10

Example

Task	Precedent Tasks	Processing Time	Critical Time
A		4	
B		7	
C		2	
D		3	
E	A	8	13
F	A, B, C	6	16
G	C, D	4	14
H	D	2	12
I	E, F	5	5
J	F, G, H	10	10

Example

Task	Precedent Tasks	Processing Time	Critical Time
A		4	20
B		7	
C		2	
D		3	
E	A	8	13
F	A, B, C	6	16
G	C, D	4	14
H	D	2	12
I	E, F	5	5
J	F, G, H	10	10

Example

Task	Precedent Tasks	Processing Time	Critical Time
A		4	20
B		7	23
C		2	
D		3	
E	A	8	13
F	A, B, C	6	16
G	C, D	4	14
H	D	2	12
I	E, F	5	5
J	F, G, H	10	10

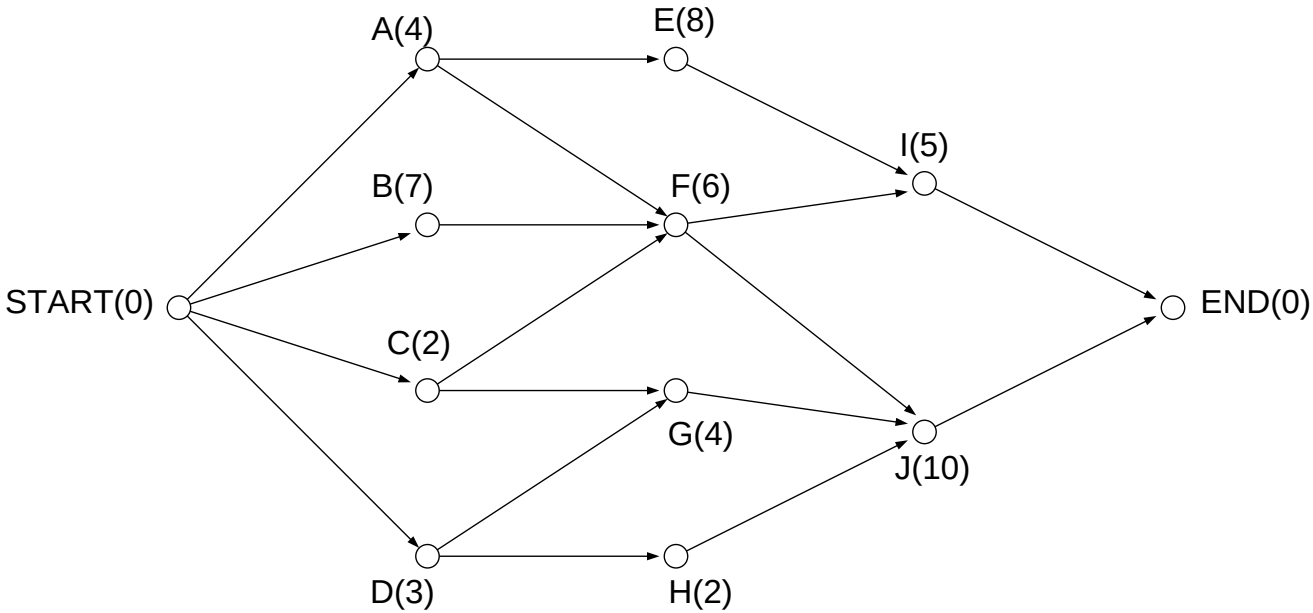
Example

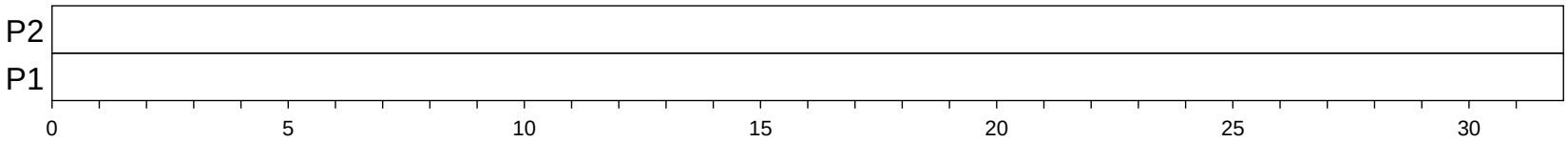
Task	Precedent Tasks	Processing Time	Critical Time
A		4	20
B		7	23
C		2	18
D		3	
E	A	8	13
F	A, B, C	6	16
G	C, D	4	14
H	D	2	12
I	E, F	5	5
J	F, G, H	10	10

Example

Task	Precedent Tasks	Processing Time	Critical Time
A		4	20
B		7	23
C		2	18
D		3	17
E	A	8	13
F	A, B, C	6	16
G	C, D	4	14
H	D	2	12
I	E, F	5	5
J	F, G, H	10	10

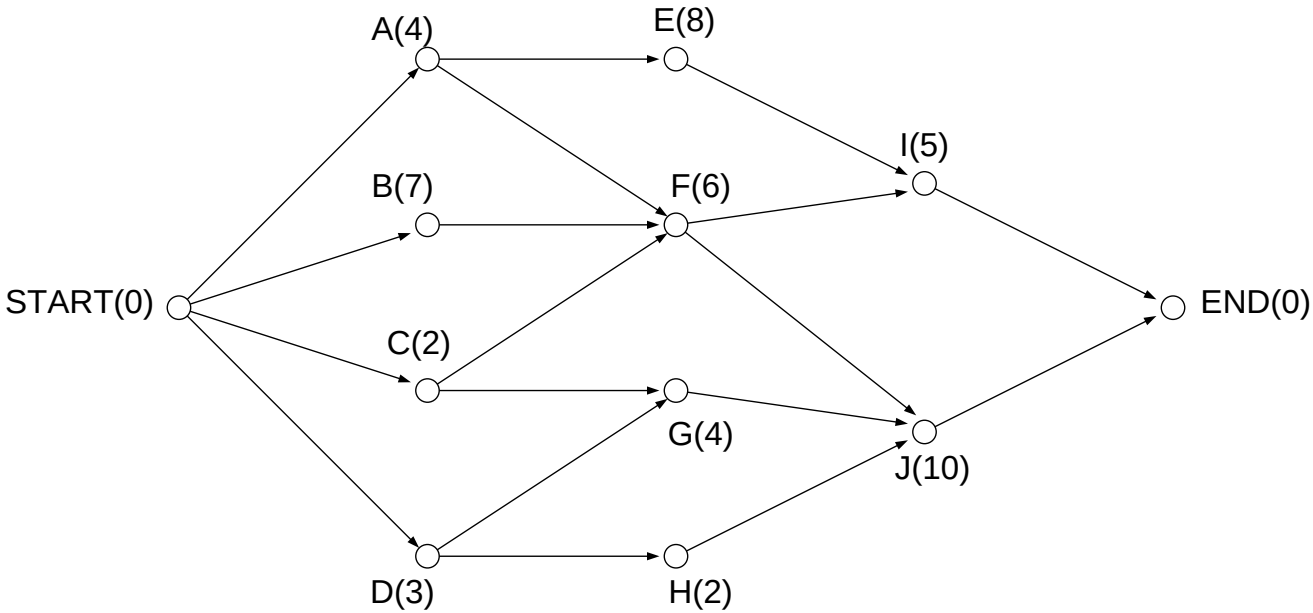
Example

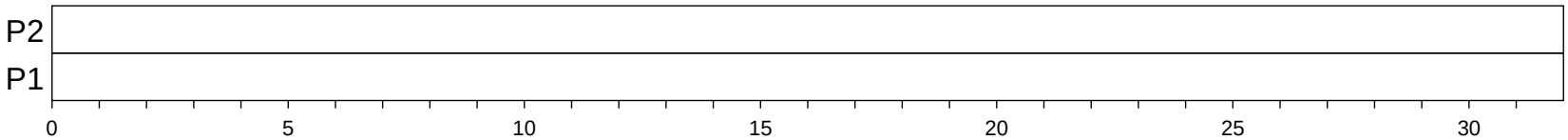




Schedule the tasks using 2 processors.

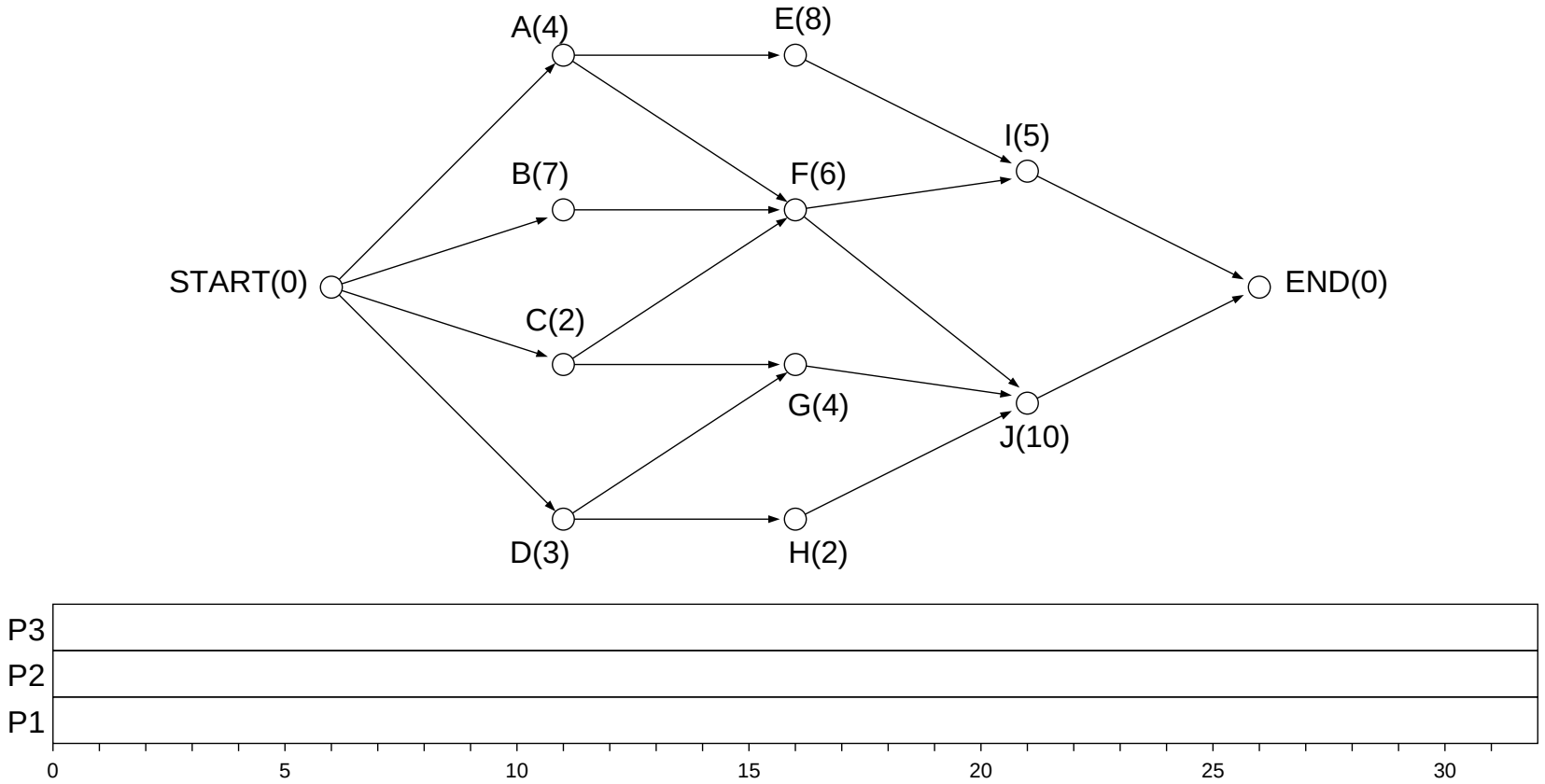
Example





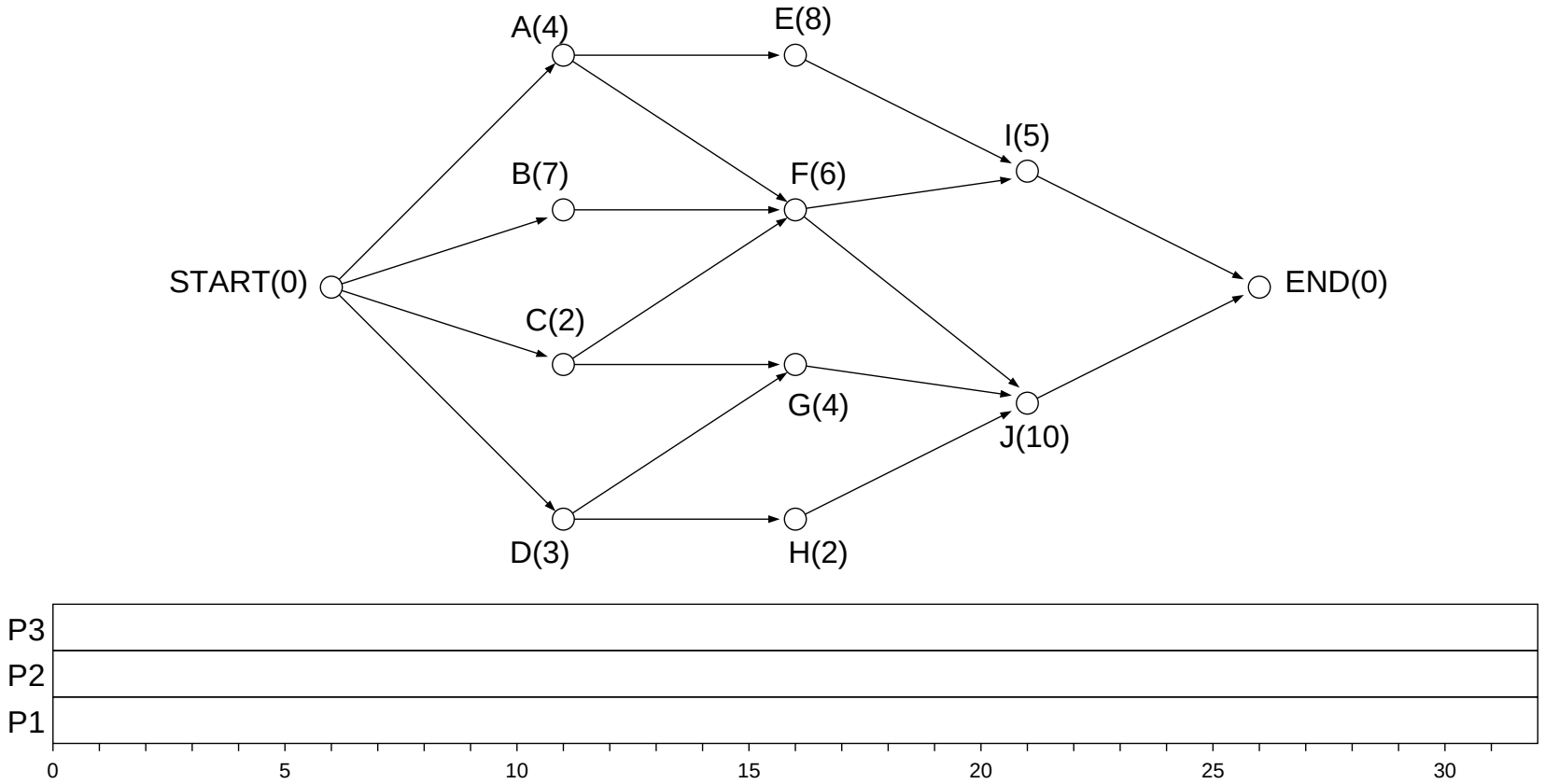
Schedule the tasks using 2 processors.
Compare to the decreasing-time algorithm

Example



Schedule the tasks using 3 processors.

Example



Schedule the tasks using 3 processors.
Compare to the decreasing-time algorithm

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- Chapter 8: Exercises 49, 50, 51, 52, 56.