

# Analisa Network

# Ada 2 Metode Yang umum digunakan

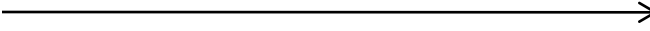
- CPM (Critical Path Method)
- PERT (Program Evaluation and Review Technique)

# Diagram Jaringan Kerja

- Perancangan Proyek
- Gambar kegiatan proyek
- Simbol – simbol yang digunakan :

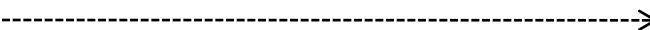
## 1. Anak Panah

Menyatakan kegiatan

Gambar : 

## 2. Anak Panah Terputus – putus

Menyatakan kegiatan semu atau Dummy

Gambar : 

3. Anak Panah dengan garis sejajar atau tebal

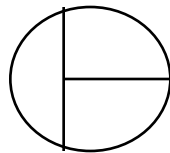
Menyatakan Jalur kritis, jalur kritis jalur terpanjang dari jaringan kerja

Gambar :

4. Peristiwa 

Menyatakan Peristiwa atau suatu kejadian

Gambar :



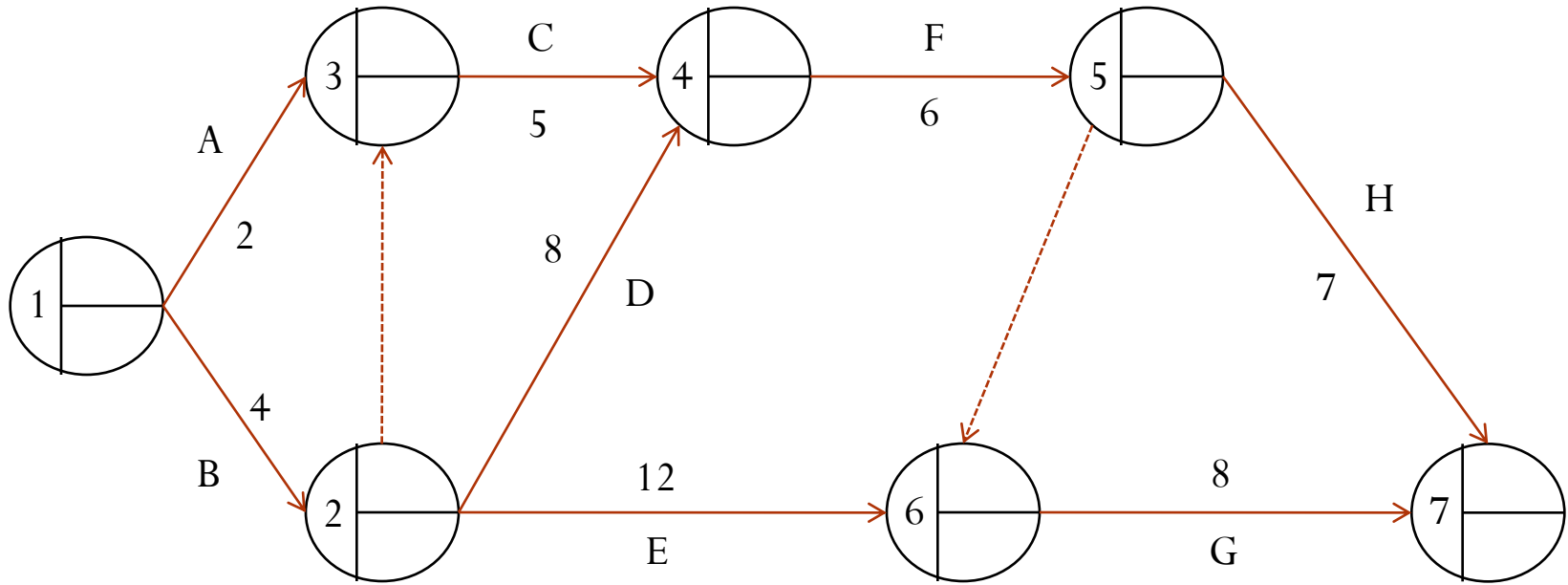
# Metode CPM (Critical Path Method)

- Earliest Start Time (ES) : waktu tercepat untuk bisa memulai suatu kegiatan dengan waktu normal, tanpa mengganggu kegiatan lain
- Latest Start Time (LS) : waktu paling lambat untuk bisa memulai kegiatan dengan waktu normal, tanpa mengganggu kegiatan-kegiatan lainnya
- Earliest Finish Time (EF) : waktu paling cepat untuk menyelesaikan suatu pekerjaan dalam waktu normal, tanpa mengganggu kegiatan lain
- Latest Finish Time (LF) : waktu paling lambat untuk menyelesaikan suatu kegiatan dalam waktu normal, tanpa mengganggu kegiatan lain

# Contoh Soal

Aktivitas	Aktivitas Pendahulu	Waktu Pelaksanaan (Minggu)
A	-	2
B	-	4
C	A, B	5
D	B	8
E	B	12
F	C, D	6
G	E, F	8
H	F	7

# Network



# Menghitung ESi

- $ES1 = 0$
- $ES2 = \max \{ES1 + t_{12}\} = 0 + 4 = 4$
- $ES3 = \max \left\{ \begin{array}{l} ES1 + t_{13} = 0 + 2 = 2 \\ ES2 + t_{23} = 4 + 0 = 4 \end{array} \right\} = 4$
- $ES4 = \max \left\{ \begin{array}{l} ES3 + t_{34} = 4 + 5 = 9 \\ ES2 + t_{24} = 4 + 8 = 12 \end{array} \right\} = 12$
- $ES5 = \max \{ES4 + t_{45}\} = 12 + 6 = 18$
- $ES6 = \max \left\{ \begin{array}{l} ES5 + t_{56} = 18 + 0 = 18 \\ ES2 + t_{26} = 4 + 12 = 16 \end{array} \right\} = 18$
- $ES7 = \max \left\{ \begin{array}{l} ES5 + t_{57} = 18 + 7 = 25 \\ ES6 + t_{67} = 18 + 8 = 26 \end{array} \right\} = 26$



# Menghitung LSi

- $LS7 = 26$
- $LS6 = \min \{LS7 - t_{67}\} = 26 - 8 = 18$
- $LS5 = \min \left\{ \begin{array}{l} LS7 - t_{57} = 26 - 7 = 19 \\ LS6 - t_{56} = 18 - 0 = 18 \end{array} \right\} = 18$
- $LS4 = \min \{LS5 - t_{45}\} = 18 - 6 = 12$
- $LS3 = \min \{LS4 - t_{34}\} = 12 - 5 = 7$
- $LS2 = \min \left\{ \begin{array}{l} LS4 - t_{24} = 12 - 8 = 4 \\ LS6 - t_{26} = 18 - 12 = 6 \\ LS3 - t_{23} = 7 - 0 = 7 \end{array} \right\} = 4$
- $LS1 = \min \left\{ \begin{array}{l} LS2 - t_{12} = 4 - 4 = 0 \\ LS3 - t_{13} = 7 - 2 = 5 \end{array} \right\} = 0$

# Memeriksa kegiatan Kritis

- Kegiatan A

$$ES1 = LS1 \rightarrow 0 = 0$$

$$ES3 = LS3 \rightarrow 4 \neq 7$$

$$ES1 + t_{13} = ES3 \rightarrow 0 + 2 = 4 \rightarrow 2 \neq 4$$

- Kegiatan B

$$ES1 = LS1 \rightarrow 0 = 0$$

$$ES2 = LS2 \rightarrow 4 = 4$$

$$ES1 + t_{12} = ES2 \rightarrow 0 + 4 = 4 \rightarrow 4 = 4$$

- Kegiatan D

$$ES2 = LS2 \rightarrow 4 = 4$$

$$ES4 = LS4 \rightarrow 12 = 12$$

$$ES2 + t_{24} = ES4 \rightarrow 4 + 8 = 12 \rightarrow 12 = 12$$

- Kegiatan E

$$ES2 = LS2 \rightarrow 4 = 4$$

$$ES6 = LS6 \rightarrow 18 = 18$$

$$ES2 + t_{26} = ES6 \rightarrow 4 + 12 = 18 \rightarrow 16 \neq 18$$

- Kegiatan F

$$ES4 = LS4 \rightarrow 12 = 12$$

$$ES5 = LS5 \rightarrow 18 = 18$$

$$ES4 + t_{45} = ES5 \rightarrow 12 + 6 = 18 \rightarrow 18 = 18$$

- Kegiatan H

$$ES5 = LS5 \rightarrow 18 = 18$$

$$ES7 = LS7 \rightarrow 26 = 26$$

$$ES5 + t_{57} = ES7 \rightarrow 18 + 7 = 26 \rightarrow 25 \neq 26$$

- Kegiatan G

$$ES6 = LS6 \rightarrow 18 = 18$$

$$ES7 = LS7 \rightarrow 26 = 26$$

$$ES6 + t_{67} = ES7 \rightarrow 18 + 8 = 26 \rightarrow 26 = 26$$

- Kegiatan Kritis : B, D, F, Dummy 2, G
- Jalur Kritisnya : 1 – 2 – 4 – 5 – 6 – 7
- Waktu Kritisnya :  $4 + 8 + 6 + 0 + 8 = 26$
- Waktu penyelesaian persoalan diatas minimal 26 minggu

