

Critical path analysis

2017-18

NATURE AND PURPOSES OF CRITICAL PATH ANALYSIS

Complete tasks more quickly

→ improve *efficiency* and *profitability*

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NATURE AND PURPOSES OF CRITICAL PATH ANALYSIS

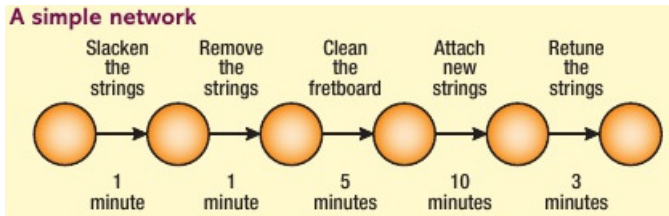
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 - ▶ purchase materials when needed (e.g., *just-in-time*)

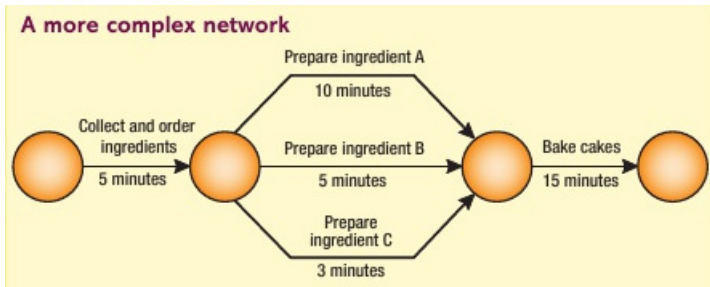
NETWORKS

EXAMPLE: TASKS OF AN INSTRUMENT REPAIRER



NETWORKS

EXAMPLE: TASKS OF A CAKE MANUFACTURER



NETWORK ANALYSIS

- ▶ businesses involve a *series of complicated tasks and orders*
→ have to be carried out in a *certain order*

NETWORK ANALYSIS

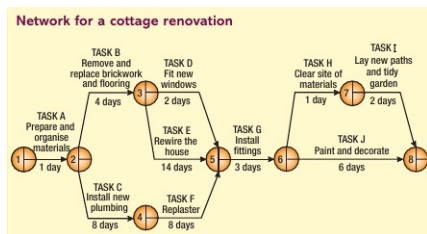
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→ have to be carried out in a *certain order*
- ▶ *estimate the time* required to complete a project
- ▶ identify the *sequence* or *path* of tasks
→ importance of planning networks ahead

NETWORK ANALYSIS

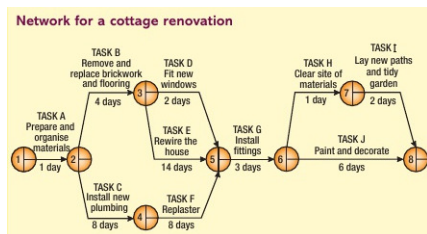
EXAMPLE: RENOVATING A COTTAGE



- ▶ *arrows and lines:*

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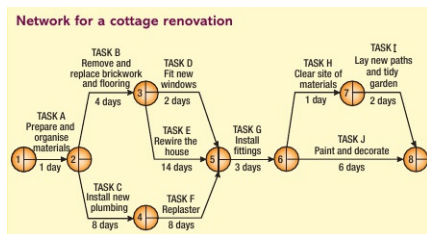
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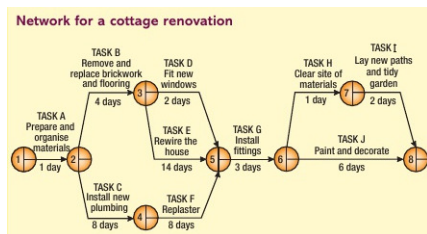
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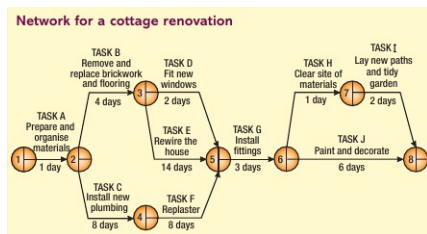
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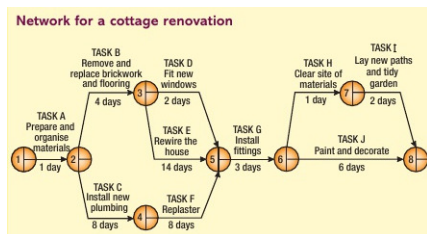
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- ▶ circles in diagram are called *nodes*: start & finish of tasks

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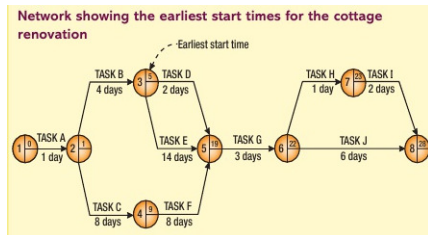
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- ▶ nodes contain information about *timing*

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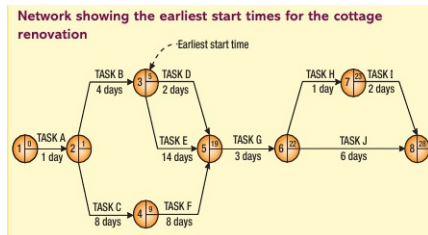
EARLIEST START TIME (EST)



- Located at the top right of the node

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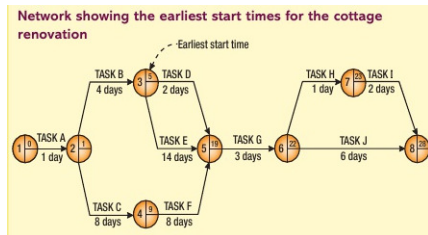
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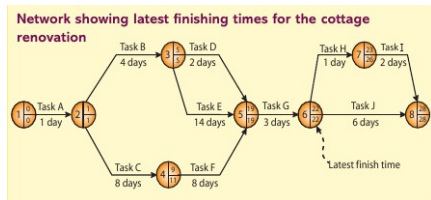
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- ▶ same for node 8!

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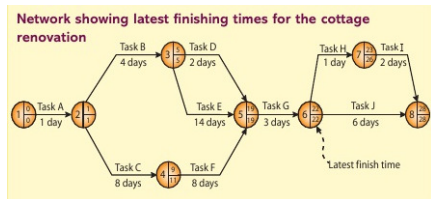
LATEST FINISHING TIME (LFT)



- ▶ Located at the bottom right of the node

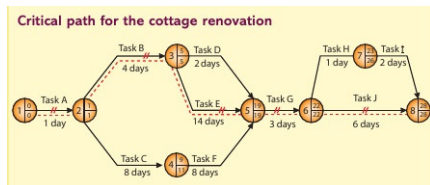
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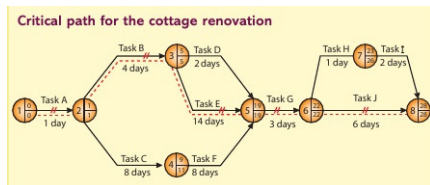
- ▶ Located at the bottom right of the node
- ▶ LFT of earlier nodes
= LFT at node - time taken to complete previous tasks

IDENTIFYING THE CRITICAL PATH



- ▶ *critical path*: where the earliest start time and the latest start finish times in the nodes are the same

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- ▶ indication: broken line, crossed line, highlighted line, colored line

CALCULATING THE FLOAT

Float time: amount of time by which a task can be delayed without causing the project to be delayed

► *Total float*:

$$\begin{aligned} \text{Total float} &= \text{LFT of activity} \\ &\quad - \text{EST of activity} \\ &\quad - \text{duration} \end{aligned}$$

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► *Free float*:

$$\begin{aligned} \text{Free float} &= \text{EST start of next task} \\ &\quad - \text{EST start of this task} \\ &\quad - \text{duration} \end{aligned}$$

CALCULATING THE FLOAT

Table 1 Float

Task/activity	LFT	EST	Duration	Total float	EST next	EST this	Duration	Free float
A	1	0	1	0	1	0	1	0
B	5	1	4	0	5	1	4	0
C	11	1	8	2	9	1	8	0
D	19	5	2	12	19	5	2	12
E	19	5	14	0	19	5	14	0
F	19	9	8	2	19	9	8	2
G	22	19	3	0	22	19	3	0
H	26	22	1	3	23	22	1	0
I	28	23	2	3	28	23	2	3
J	28	22	6	0	28	22	6	0

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- ▶ difficulty to assign material elsewhere (e.g., crane)
- ▶ complexity increases with size of project (e.g., skyscraper)
→ use computer software

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- ▶ **Sales maximisation:** An attempt to sell as much as possible in a given time period (or an attempt to generate as much sales revenue as possible in a given time period)

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- ▶ **Franchise:** A business model in which a business (the franchisor) allows another operator (the franchisee) to trade under their name

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- ▶ **Memorandum of Association:** A document that sets out the constitution and states key external details about a limited company

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- ▶ **Secondary sector:** Production involving the concersion of raw materials into finished and semi-finished goods

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