Critical chain.

Eli Goldratt.

problem - product becomes obsolete in 6 months and new product development takes 2 years.

smart people learn from their mistakes, wise people learn from others' mistakes.

Richard - narrator
Jim

(finance) Fred —— Think tank Isaac levy & Pullman made to come with a solution for the problem.
(engineer) Mark
(she) Ruth (marketing)

Fred, Mark, Ruth are in Richard's class.

common problems of project
① Budget overruns
② time "
③ compromising the content

Payback - time period from investing until we expect fruits of our investment to cover the investments.

higher the uncertainty, longer the tail of the distribution.

diff b/w the median of probablity and actual estimate is the safety we put in.

uncertainty - main cause of most problems.

in production -
most of lead time is in wait & queue.

critical path - determines time it will take to finish the project. any delay on critical path will delay the completion of the project.

PERT chart.

Gantt charts unlike PERT diagrams involve decision

Progress measured according to amount of work, or investment, already done. relative to the amount still to do.

Just-in-time ; TQM (Total quality management)
↳ eliminating errors.
necessary items
in necessary quantities
in necessary time

Theory of constraints TOC known for
(1) new management philosophy
(2) research methods it introduces
(3) broad spectrum of robust applications

Date:

Pareto principle can work in cost world having independent variables.

throughput world

1. identify the constraint
   strengthen it (physical & policy) → replace
   - by hiring more people & more machines
   - by squeezing out maximum from the capacity we already have.
2. Decide how to exploit the system's constraints
3. Subordinate everything else to above decision
4. elevate the system's constraints
5. if in previous step, a constraint has been broken go to step 1 but do not allow inertia to cause a system's constraints

if excess inventory is not produce, bigger stocks of raw mat can be stocked

lead time to be reduced for last moment changing mind.

real life systems - max 1-2 constraints

thinking process of TOC - evaporating cloud.

present a problem as a conflict b/w two necessary conditions.

124 tons per hour

+ estimation standard

5x5 = 13

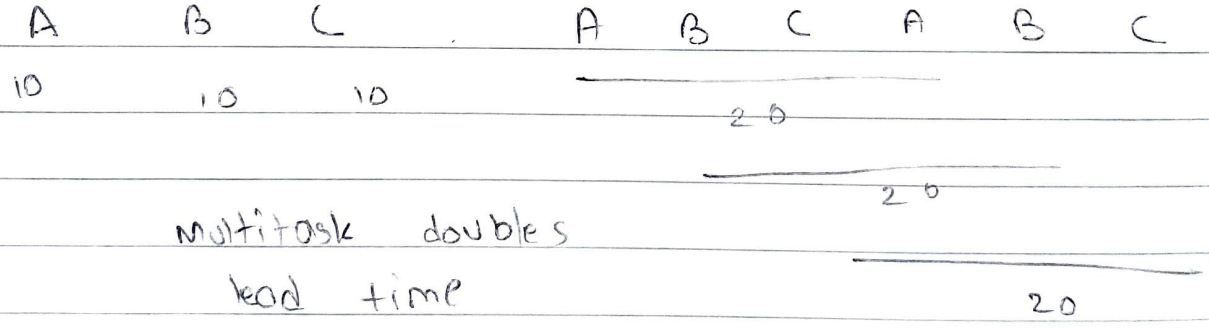
to achieve good cost perf - achieve good local perf everywhere ✗

Present a problem as a conflict b/w two necessary conditions.

Three mechanisms by which safety is inserted into time estimates

- pessimistic experience, end of distribution curve
- each level add its own safety (~~bigger the~~ no. of levels ↑ safety ↑)
- estimations protected from global cut.

in sequential steps - delays accumulate, advances do not.



multitask doubles lead time

three mechanisms to waste safety:

- student syndrome - no rush start at last minute
- multi-tasking
- dependencies b/w steps

QED - quod erat demonstrandum

that which was to be demonstrated

tie the first soldier to the bottleneck.

1- identify the bottleneck
2- buffer - current prod° lead time and cut in half

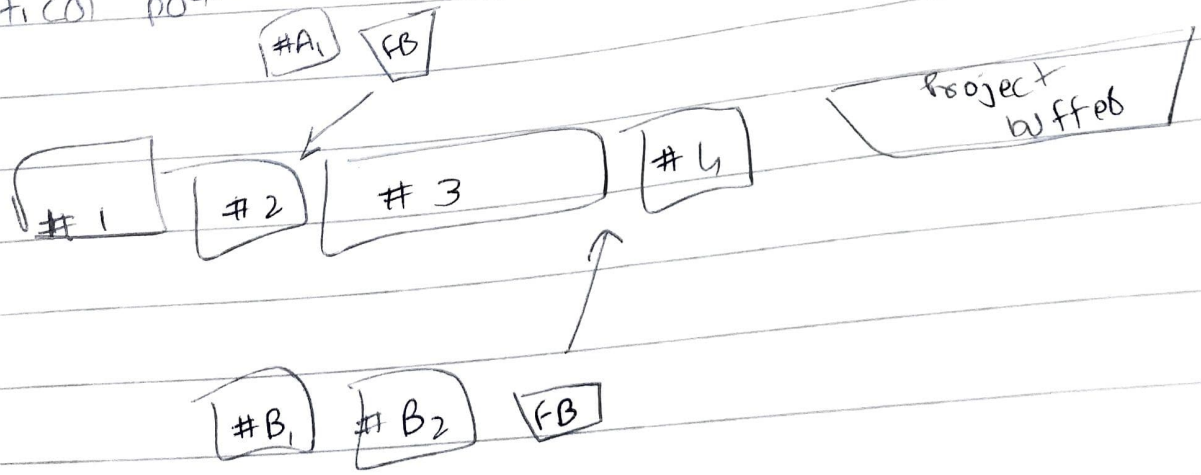
Measure progress only on critical path

Projects
- done by vendors & subcontractors
- done by resources of company itself

Main changes
- Persuading various resources to cut their lead time estimates
- eliminating milestones or eliminating compl° due dates for individual steps.
- frequent reporting of expected completion times

Persuading vendors & subcontractors to shorten their lead times

feeding buffers - where a noncritical path mergers into critical path.

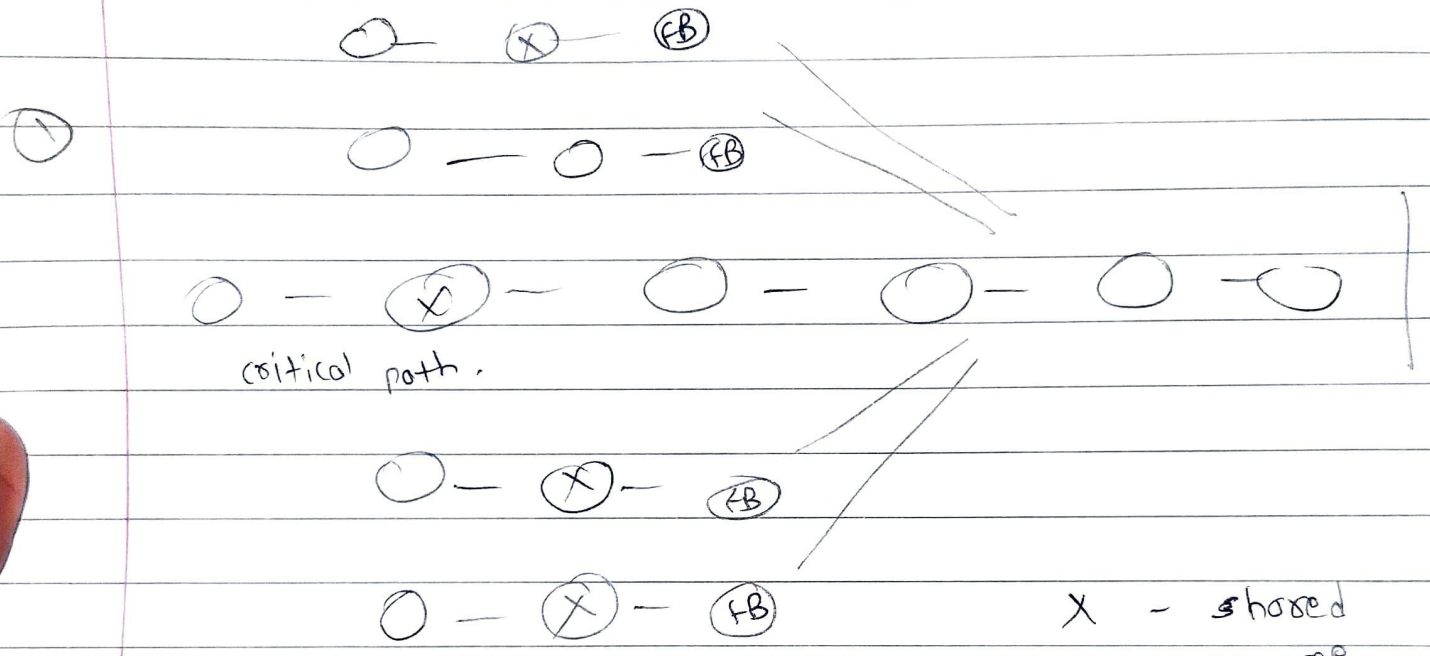


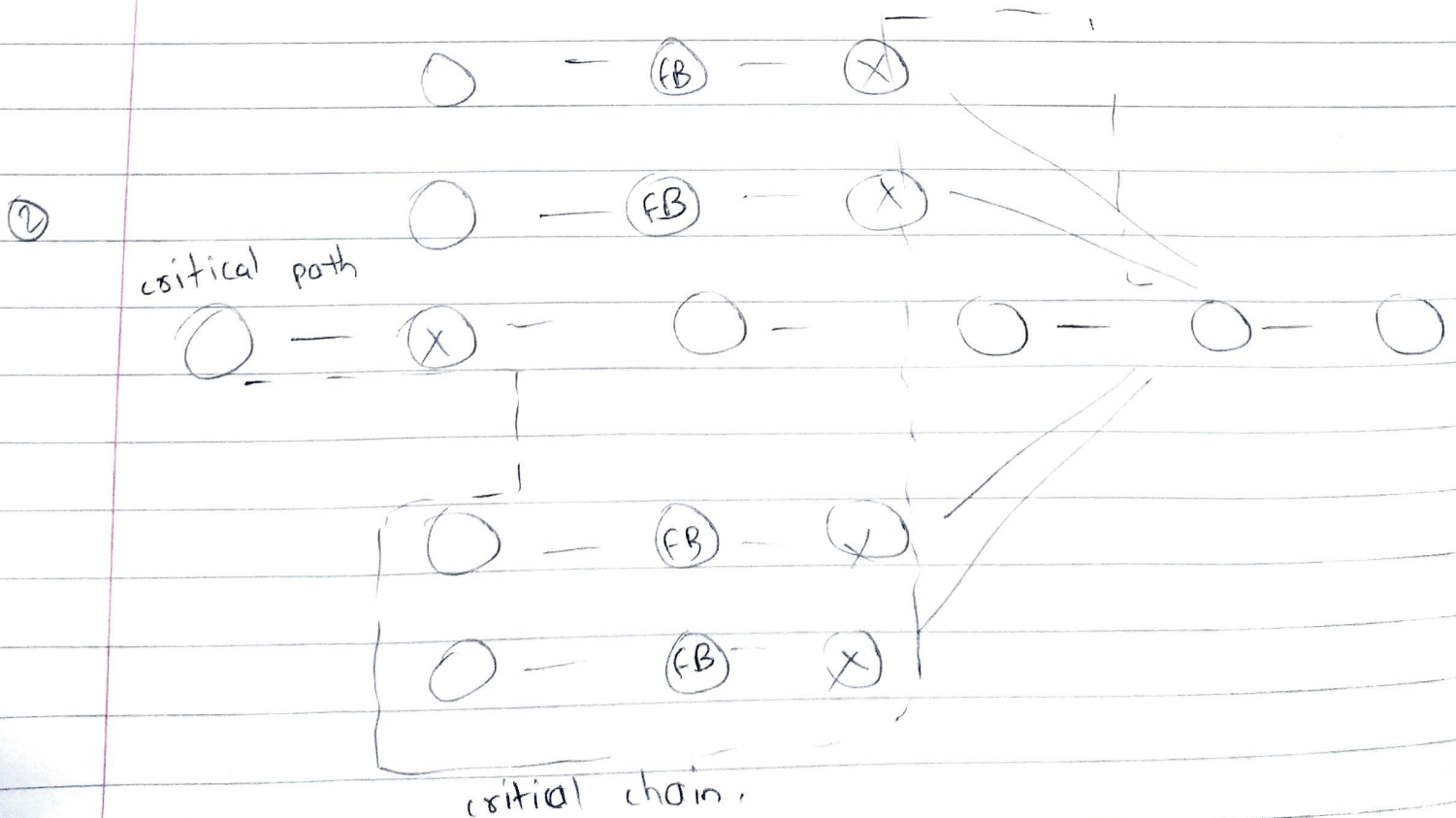
longest chain of dependent steps - constraint

↓

critical chain

resource contention — shared resources





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In ① done sequentially which created situation of Murphy in ② fB change position.

critical chain. removes resource contention within a project and not between projects

resource contention- some resource is supposed to do two diff steps at same time

Don't take estimates as if they are real, 10 days might be 7 or 15

bottleneck buffer is introduced. and anything ~~to~~ that come in path of bottleneck was scheduled on early start of 2 weeks.

when many projects involved went through same bottleneck. Each project was first treated as stand-alone and then adjust for the bottleneck

Monitor feeding buffer, if resource ~~const~~ contention starts to exhaust one feeding buffer after another then only declare it as resource constraint.

need of choosing b/w two good projects come only when availability of money is a constraint

Net present value not a good way to justify investments

Net present value - way to translate future investment and income into terms of current money

Payback period

Time

Net present value

Money

They are take as separated time or money.

for investment time & money together need to taken in consideration

Money - dollars

investment - dollar - days