Program Management

Sources : James Holt; Washington State University http://www.vancouver.wsu.edu/fac/holt/em530/
Toni Rizzo http://www.pdinstitute.com
Francis Patrick www.focusedperformance.com
Larry Leach http://www.advanced-projects.com/
Eliyahu Goldratt

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the generic Program Management problems

- **the job of a PM is to deliver a PROJECT (and NOT individual tasks) :**
  - on time
  - to spec and
  - within budget

- **the generic problems of the PM are :**
  - necessary things are not available (design freeze, spec, material, info, authorizations …)
  - resources are not available when needed
  - fights about priorities between projects
  - too many engineering changes
  - too much rework
  - original due dates are not met
  - budget overruns
  - there is also Parkinson and Murphy, so eventually …
  - we compromise on budget and spec to deliver somewhat within time

what are the consequences ? ……

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consequences of being late

Time to Market	***Quality--Cost--Delivery***	
TYPICAL EXPERIENCES	meet development due date	production costs	development costs
Deviation	+ 10%	+ 10%	+ 50%
Loss of earnings	25% to 30%	15% to 20%	5% to 10%
TYPICAL CONSEQUENCES	**2,5 ... 3**	**1,5 ... 2**	**0,1 ... 0,2**

Source: io Managementzeitschrift 65 (1996) Nummer 1 / 2 S.23, Studie Arthur D. Little

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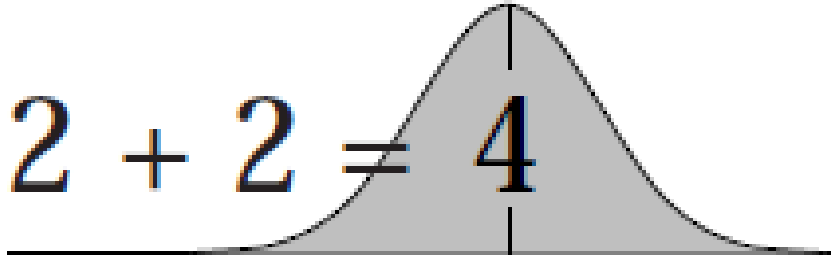
what can we do as PM's to improve the situation ?

- **we can play a "sixy game"**
  - to demonstrate that we add too much safety/slack to individual task estimates
  - to demonstrate we can safely remove the slack without jeopardizing the project
  - to demonstrate where to reinvest part of the slack as buffers to protect the project
  - to learn how to deal with (erroneous) reporting
  - to learn how to deal with an errant task – implement/use a resource bench

- **… and all this**
- **with the goal to enjoy an instructive game**
- **which should help make our lives easier**
- **and ultimately create customer, shareholder, employee and supplier satisfaction**

… but first we need to understand TASKS …



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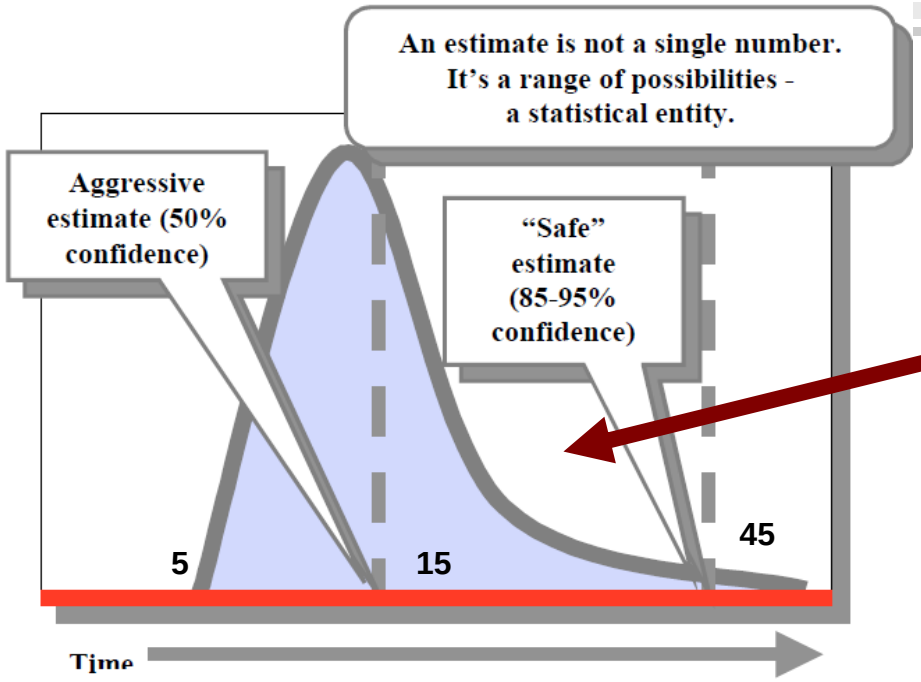
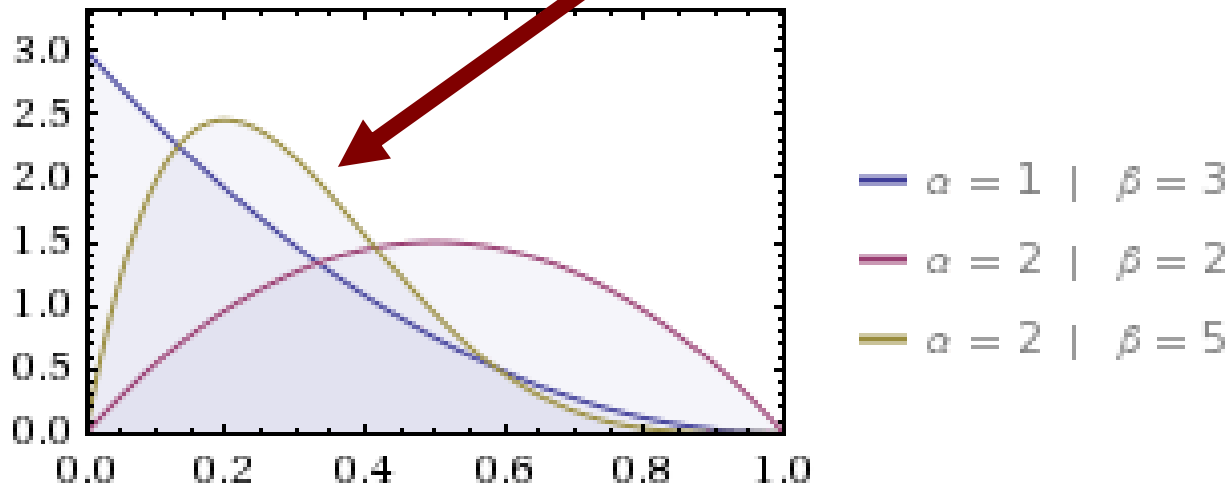
the statistics of task estimation



what is the time estimation for a meeting with someone who has requested just 5 min of your attention ?

the Beta Distribution is widely accepted to represent the theoretical distribution for individual task duration (= good enough)



PM law # 2 :

whatever can go wrong, will !

- **Murphy exists !**
- **Murphy hits !**
- **Murphy is especially after you !**
- **Sometimes he comes with his whole family !**

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simulating the "task duration" distribution

INTRODUCTION : understanding what a "task" means

- **give everybody a "fair" dice**
- **the task assignment is to roll a "six"**
- **the task duration is the number of rolls to get a "six". One roll = one day of work.**

QUESTIONS to the team :

- **what is your chance to roll a six?**
- **how many days/rolls do you think you may need to complete the job (= deliver a "six")**
- **what is the earliest to deliver ?**
- **what will be the maximum required to deliver ?**
- **how many rolls for a**
  - 50% chance to get a "six"
  - 67% chance to get a "six"
  - 85% chance to get a "six"
  - 95% chance to get a "six"

CONCLUSION :

- **we have a 16,7% (=1/6) chance to finish on the first day**
- **we have a 50% chance to finish within 4 days (the average is 3.5)**
- **we have a 67% chance within 6 days, 85% within 10 and 95% within 17 days**
- **obviously we have "good", "average", "willing" and "bad" resources**

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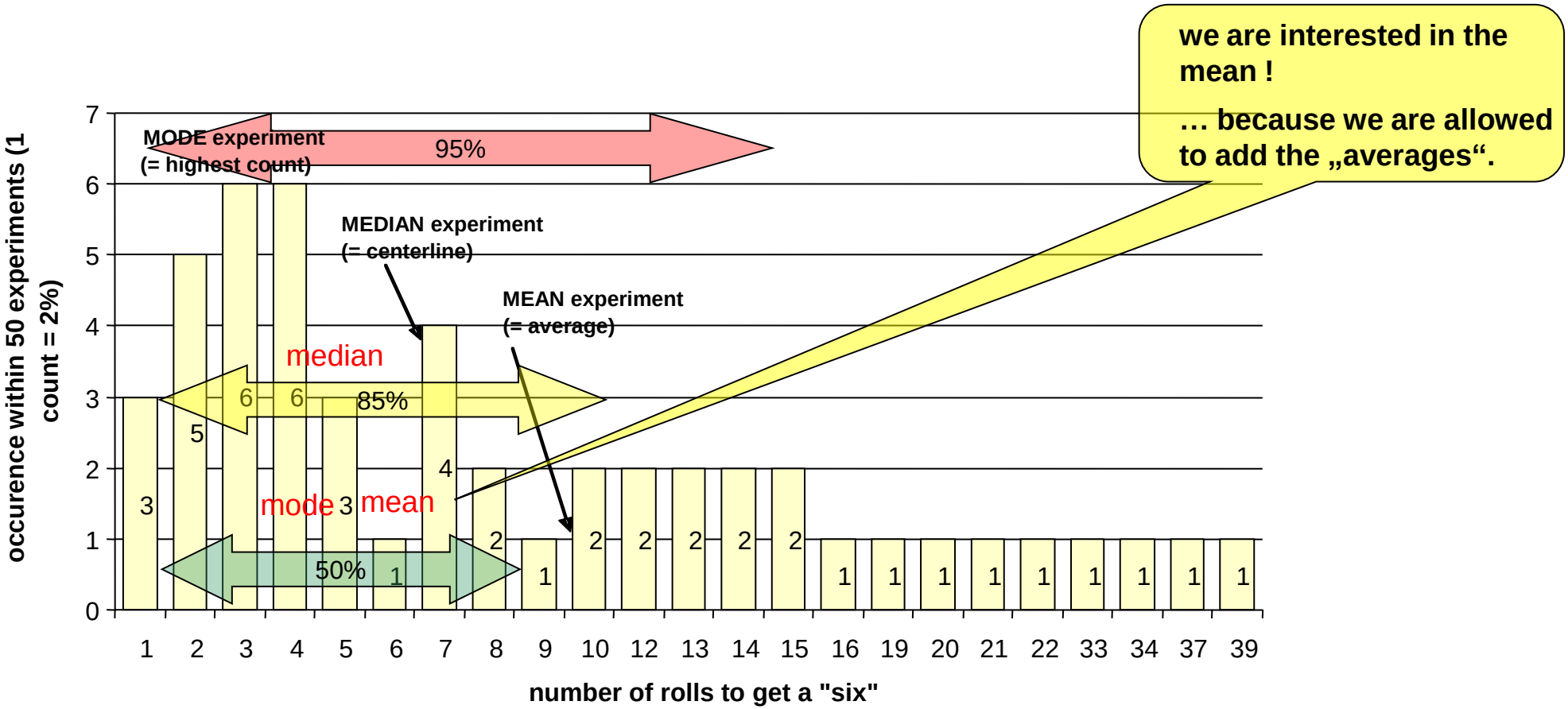
estimating task duration with rolling dice

- **this was “comrade EXCEL” rolling 50 times for a “six”**



- **so when we play the “SIXY” GAME : EACH PLAYER IS SIMULATING TASK WORK IN A PROJECT !**

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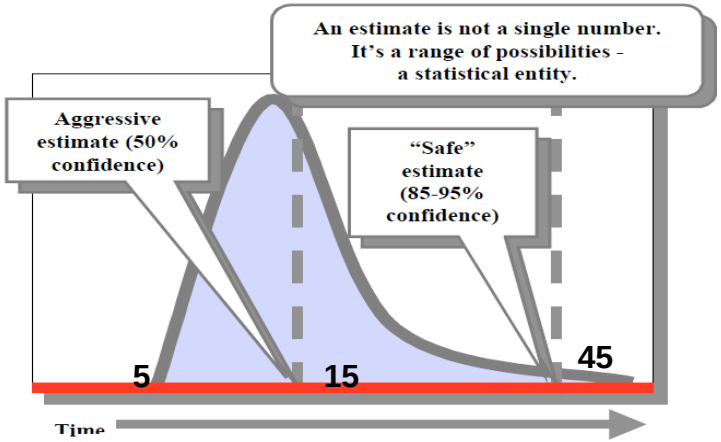
INTRODUCTION to the SIXY project :

- **we have to quote a project with 20 tasks. It is an important one and we must not fail !**
- **the task duration is the number of rolls to get a "six". One roll = one day of work.**
- **I will certainly hold you accountable for your individual task deliveries !**
- **to show your commitment I ask you to put 10$ on your PERFORMANCE**
- **now give me your estimate for your personal task duration**
- **96% confidence = 0.95 ^20 = 36% ?!**



add up the individual estimates in Excel to get the duration for the project to be quoted

CONCLUSION :

- **this is ___ days ! That is way too long**
- **the customers will not give us the project !**
- **YOU ARE ALL OUT OF A JOB !**

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85% confidence per individual task

IMPROVEMENT on the SIXY project :

- **the task assignment is still to roll a "six".**
- **the task duration baseline is set to 10 rolls to get a "six". One roll = one day of work.**
- **those who feel uncomfortable may drop out of the project**

QUESTIONS to the team :

- **we are quoting the project at 20 * 10 = 200 days !**
- **how comfortable are you with this aggressive plan?**
- **are you ready to bet your 10$?**

CONCLUSION :

- **it took us ____ days to complete the project !**
- **that was an improvement of 40% but is not sufficient to win the project**
- **we saw "good", "average", "willing" and "bad" resources – we need to change horses !**

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67% confidence per individual task

IMPROVEMENT on the SIXY project :

- **the task assignment is still to roll a "six".**
- **the task duration is set to a baseline of 6 rolls to get a "six". One roll = one day of work.**
- **those who feel uncomfortable may drop out of the project**

QUESTIONS to the team :

- **we are quoting now at 20 * 6 = 120 days. This is 1/3rd of the initial estimation !**
- **how comfortable are you with this aggressive plan**

CONCLUSION :

- **it took us ____ days to complete the project !**
- **we did stay within the baseline!**
- **that was an improvement by 1/3rd. .The customer is prepared to award us the project**
- **let's now see what we have learned so far**

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QUESTIONS :

- **how did the group do in relation to the original estimate?**
- **why do you think the outcome was much lower than your initial estimate ?**
- **who had to roll a high number to get a six? Why didn't this derail the overall project?**
- **how come that by working together we can complete much faster even if it is perfectly clear that each person needed more rolls to be secure?**
- **how can we apply this to our own environment?**

LESSON LEARNED :

- **PADDING: protects the individual (but not really) & NOT the project**
- **AGGREGATION: we can safely aggregate reduced task durations**
- **DUE DATES : we don't need them ! Do your job and hand over when finished.**

REMAINING QUESTIONS:

- **don't you think that this was academic. In reality we neither know the actual duration nor the probability function of the task duration. We have to rely on our EXPERTS !**
- **what do you think should be used as a discount of original task estimates?**
- **can we really reduce that much without taking too much risk?**

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67% confidence per individual task + buffer

IMPROVEMENT on the SIXY project :

- **the task assignment is still to roll a "six".**
- **the task duration is set to a baseline of 6 rolls to get a "six". One roll = one day of work.**
- **we invest 50% of our "gains" into a PROJECT BUFFER**

  gain = 10 – 6 = 4 days / task

  buffer = 20 * 0,5 *4 = 40 days buffer
- **so the total project will be quoted at 20*6+40 = 160 days**
- **this is still a 50% improvement over the first estimate**

QUESTIONS to the team :

- **how comfortable are you with this plan including buffer**
- **those who feel uncomfortable may drop out of the project**

CONCLUSION :

- **it took us ____ days to complete the project !**
- **we did meet the baseline again**
- **The customer is still prepared to discuss. After all it is**
  - **a 50% improvement over a conservative plan and**
  - **a 20% improvement over an "aggressive" plan!**
  - **we are almost 100% safe in meeting the timeline**

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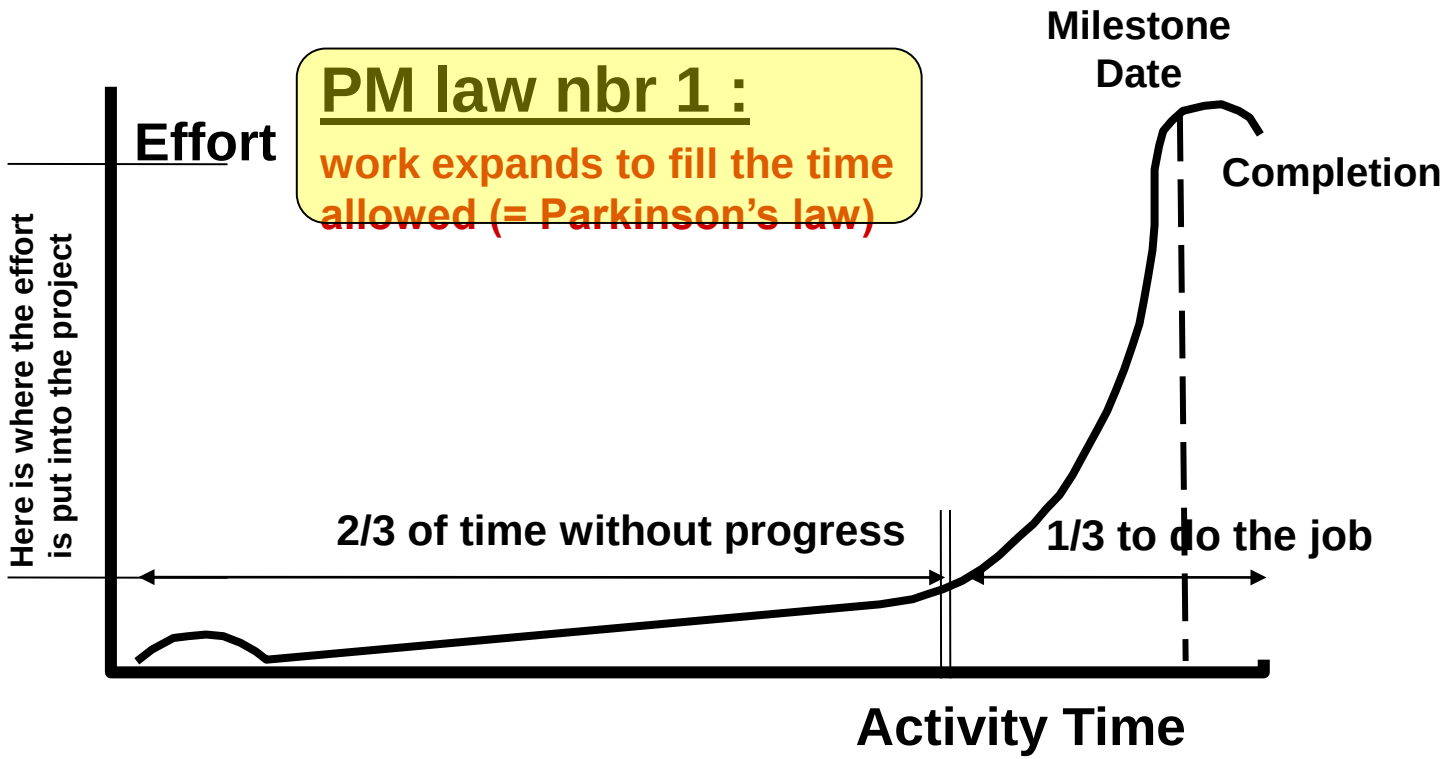
Lesson Learned part 2 : Parkinsons Law or „student syndome“



- **this confirms once more the observation that we can actually cut back on the time estimates**
  - **it means we are not allowing Parkinson’s law in our program planning**
  - **however in order to be reliable / professional we include buffers to protect us against Murphy**
  - **before we do more on Murphy we will have to touch the subject of erroneous reporting**

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PADDING :

- **protects the individual not the project. Avoid Parkinsons Law = "student syndrom"**

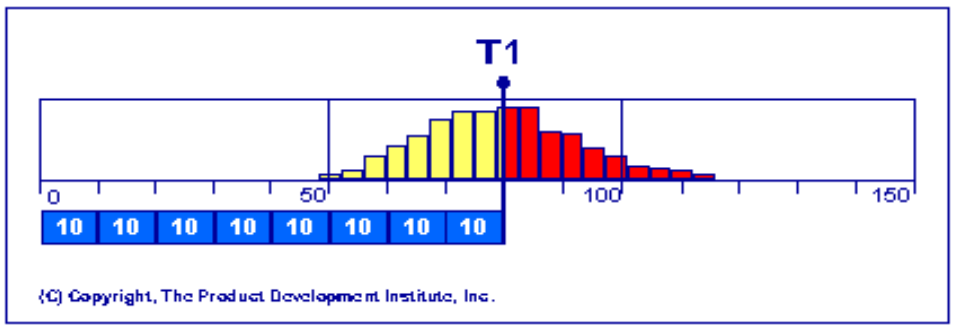
SLACK :

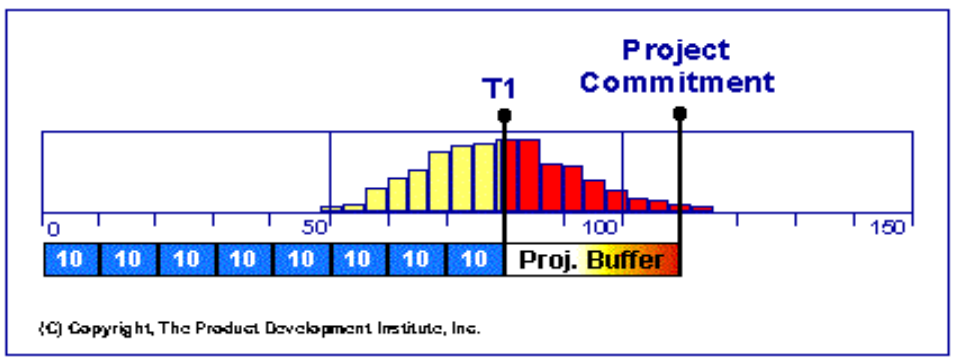
- **we can safely reduce all task estimates if we protect the project**

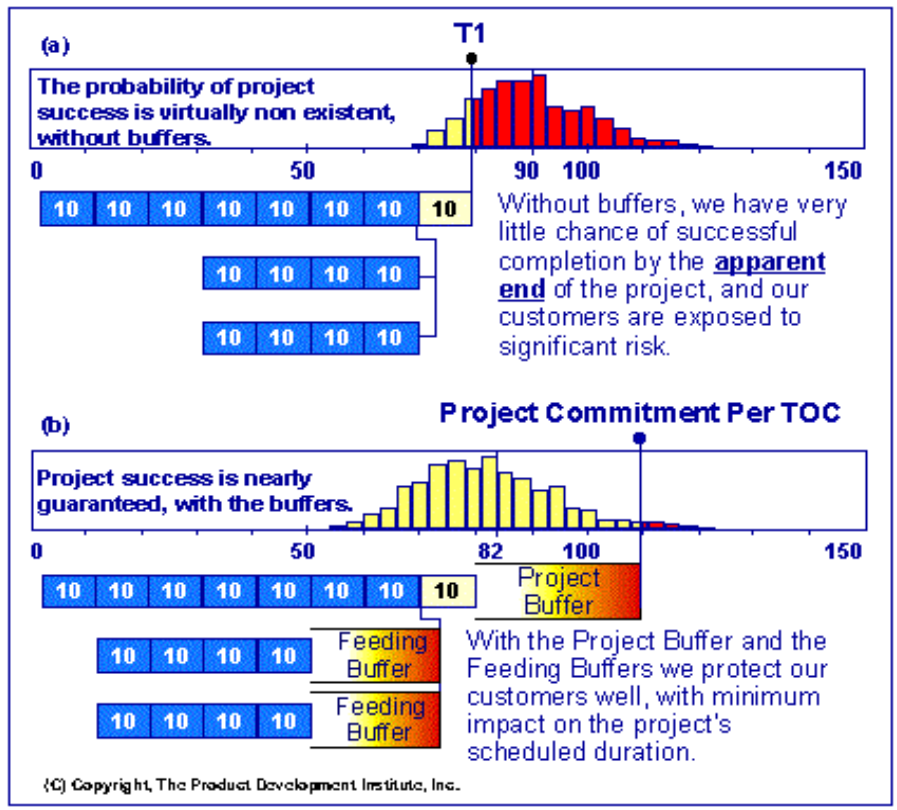
RULES OF THUMB :

- **reduce 50% of task duration and re-invest 30% back into buffering the project:**

PROJECT BUFFER FEEDING BUFFER CONSTRAINT BUFFER







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Summary of TASK estimation

TRADITIONAL :

- **protects the individual not the project.**
- **we are not sure even if we use a "safe" estimate of 20 * 17 = 340 days**

AGGRESSIVE :

- **we can safely reduce all task estimates as the averages will add up**
- **Good program reporting policies will support this further (see next chapter)**
- **50% of tasks complete within 4 days and 95% within 17 days**
- **➔ 10 * 4 + 10*17 = 210 days is 38% better than traditional**

BUFFERED :

- **reduce 50% of task duration and re-invest 30% back into buffering the project:**
  PROJECT BUFFER FEEDING BUFFER CONSTRAINT BUFFER
- **➔ 20 * 6 + 40 = 160 days is 53% better than traditional or 24% better than aggressive**
- **An almost 100% chance to deliver the project on time**

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erroneous reporting : the "Lazy" manager

INSTRUCTIONS for a simulation

- **PMs are effective and reliable. They deliver on time and report on time**
- **we are still rolling for a "six". The baseline is 20 rolls/"six" = 20 days = 1 month**

the Lazy Manager :

- **he has implemented a monthly accounting = monthly reporting**
- **lets roll and record the score**
- **how many of you finished within the last month ?**
  that makes ____ * 20 days/"six" = ____ days
- **how many of you finished within 40 days ?**
  that makes ____ * 40 days/"six" = ____ days or a total of _____ days

QUESTIONS to the team :

- **guess why he is called the Lazy Manager ?**
- **BTW : he is fired on the spot**

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erroneous reporting : the "New" manager

INSTRUCTIONS for a simulation

- **PMs are effective and reliable. They deliver on time and report on time**
- **we are still rolling for a "six". The baseline is 20 rolls/"six" = 20 days = 1 month**
- **lets use the score from the last rolls**
- **however there is now a "New" Manager who has his ideas about necessary changes**

the New Manager :

- **has implemented a weekly accounting = weekly reporting**
- **how many of you finished within the last week (= 5 days) ?**
  that makes _____ * 5 days/"six" = _____ days
- **how many of you finished within 10, 15, 20, 25, 30, 35 … days ?**
  that makes _____ * 10 days/"six" = _____
  and _____ * 15 days/"six" + _____ * 20 days/"six" + …
  or a total of _____ days

QUESTIONS to the team :

- **don't you think he deserves to be called the New Manager !**
- **he improved the project performance from _____ days down to _____ days !**
- **BTW : he gets a raise immediately !**

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erroneous reporting : the "BEAST"

INSTRUCTIONS for a simulation

- **PMs are effective and reliable. They deliver on time and report on time**
- **we are still rolling for a "six". The baseline is 20 rolls/"six" = 20 days = 1 month**
- **lets use the score from the previous rolls**
- **this time there is a "BEAST" who has his own ideas about necessary changes**

the BEAST :

- **he has implemented a daily accounting = daily reporting**
- **how many of you finished within the last day ?**
  that makes ____ * 1 day/"six" = ____ days
- **how many of you finished within 2,3,4,5,6,7,8,9,10,11 … days ?**
  that makes ____ * 2 days/"six" = ____
  and ____ * 3 days/"six" + ____ * 4 days/"six" + …
  or a total of _____ days

QUESTIONS to the team :

- **he deserves to be called a beast !**
- **he improved the project performance from _____ days down to _____ days !**
- **BTW : he gets a promotion immediately !**

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reporting : ask for the „time remaining“ to complete task

OBJECTIONS

- **its difficult to collect this info daily**
- **it will further burden core team member resources with additional reporting**
- **it will tie up the PM administering to get this info**

APPROACH

- **ask an assistant to visit the core team member resources daily**
- **have her collect the following info PER TASK**
  - did you complete your task today ?
  - if not : how much time is remaining ? (we are not asking for the due date !)
  - if not : what are you awaiting ?
  - what can we do to help you ?

IS IT WORTH THE EFFORT ?

- **Sure ! In our example the lead time is cut from ___days to ____days**
- **that’s what we need to provide to our customer/organisation to stay in business !**

PMs are effective and reliable. They deliver on time and report on time !

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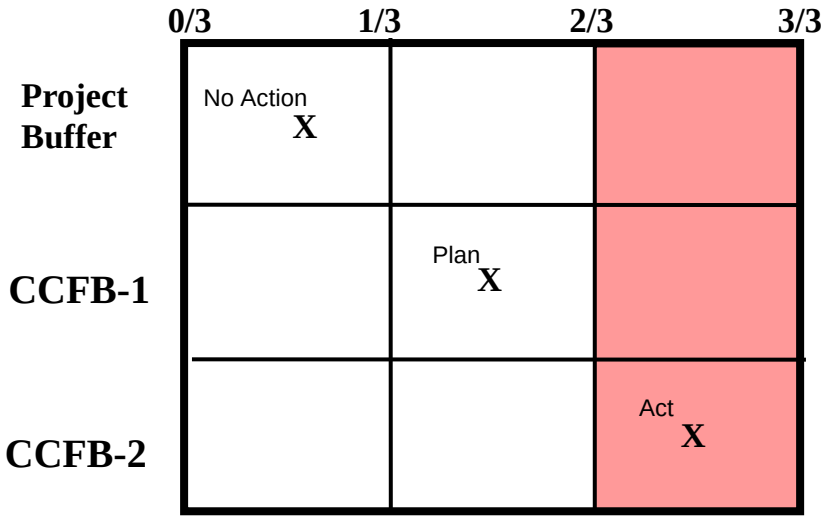
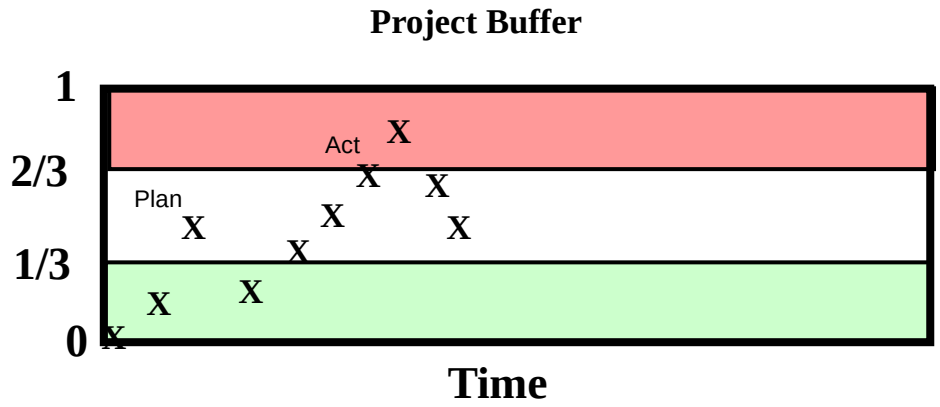
in the future : reporting of buffer penetration



Buffer penetration provides the essential measurement for CCPM project control.



For long projects, it may prove useful to plot buffer penetration vs. time.

Don't consider this for the time being !

First priority is to take out slack and to report on deliverables !

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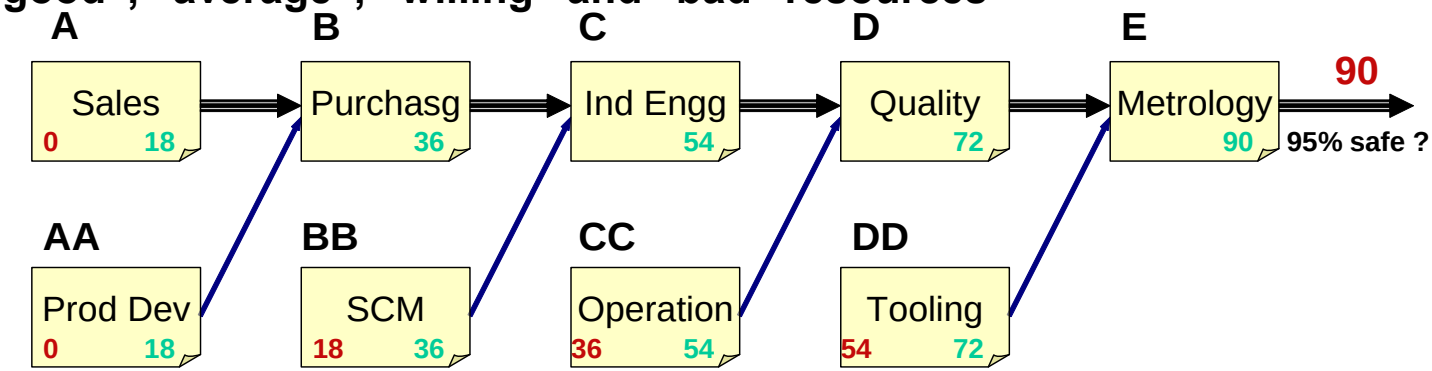
the "sixy" project : the traditional approach

now to the SIXY project and a traditional approach of project planing :

- **the task assignment is still to roll a "six"**
- **for simplicity reasons we use the attached SIXY project**
- **for simplicity reasons we estimate each task duration at 18 days = traditional approach**
- **rule : early reporting is done only if a "six" is confirmed by rolling a second "six"**
- **never mind that we have "good", "average", "willing" and "bad" resources**
- **let's roll**



QUESTIONS to the team :

- how often did you have to wait for the feeding branch to finish
- could you take benefit of early finishes
- where you able to recover once you where late ?

CONCLUSION :

- it took us ____ days to complete the project in the first run !
- it took us ____ days to complete the project in the second run !
- it took us ____ days to complete the project in the third run !
- **we should not be surprised that our programs are late (in this example 40% of the time)!**

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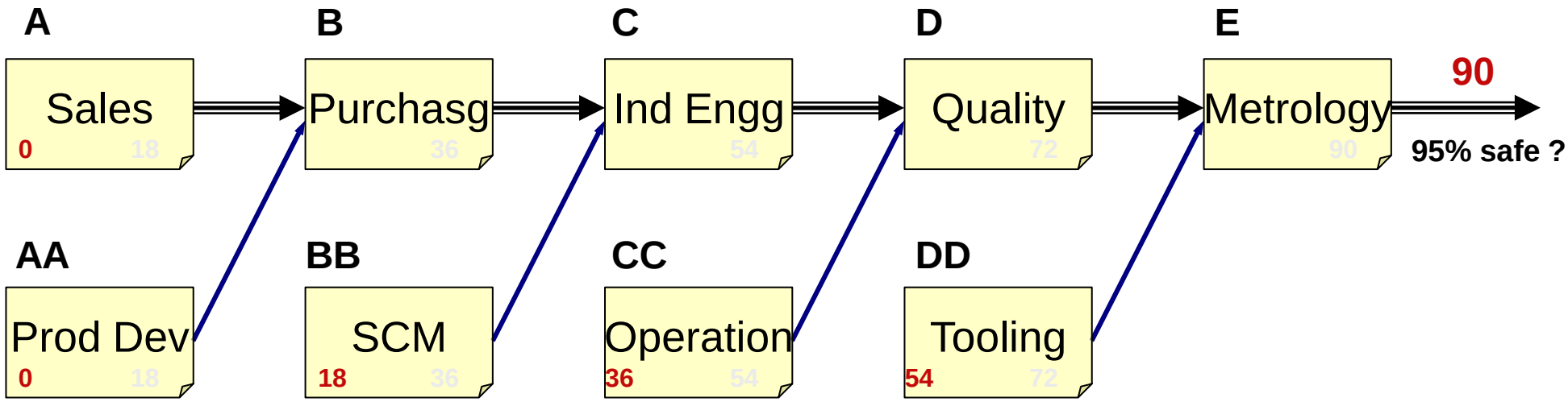
the "sixy" project plan (traditional)



INSTRUCTION to the team :

- **one roll represents a day**
- **if you roll a "six", then repeat the roll. If it is a "six" again then you report the early finish of your task. If no confirming "six" then you report the planned task duration.**
- **the PM has to ensure that the feeding resources start their work ON TIME whatever the actual status of the project**

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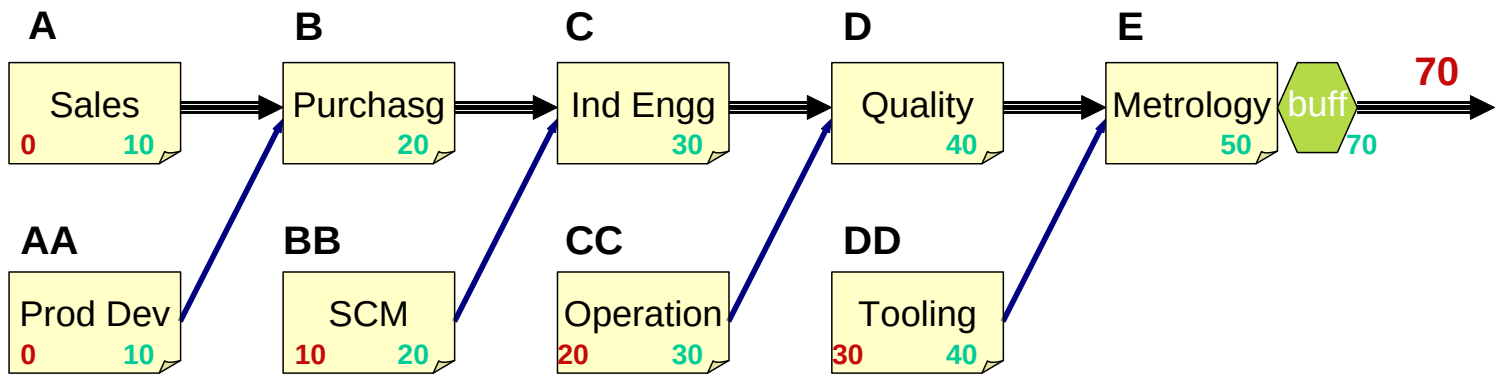
now to the SIXY project with a project buffer :

- **the task assignment is still to roll a "six"**
- **for simplicity reasons we estimate each task duration at 10 days (= 85% safety)**
- **we reinvest 50% of time savings into a project buffer (= (18-10)*5 tasks*0.5 = 20 days)**
- **rule : early reporting is done only if a "six" is confirmed by rolling a second "six"**
- **let's roll**



QUESTIONS to the team :

- how often did you have to wait for the feeding branch to finish
- could you take benefit of early finishes
- where you able to recover once you where late ?

CONCLUSION :

- it took us ____ days to complete the project in the first run !
- it took us ____ days to complete the project in the second run !
- it took us ____ days to complete the project in the third run !

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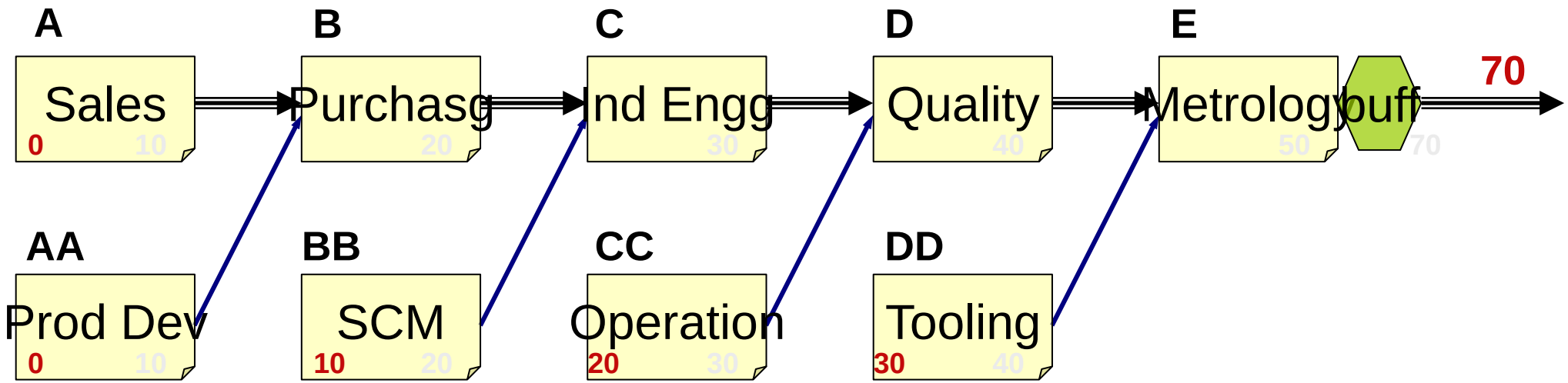
the "sixy" project plan (buffered)



INSTRUCTION to the team :

- **one roll represents a day**
- **if you roll a "six", then repeat the roll. If it is a "six" again then you report the early finish of your task. If no confirming "six" then you report the planned task duration.**
- **the PM has to ensure that the feeding resources start their work ON TIME whatever the actual status of the project**

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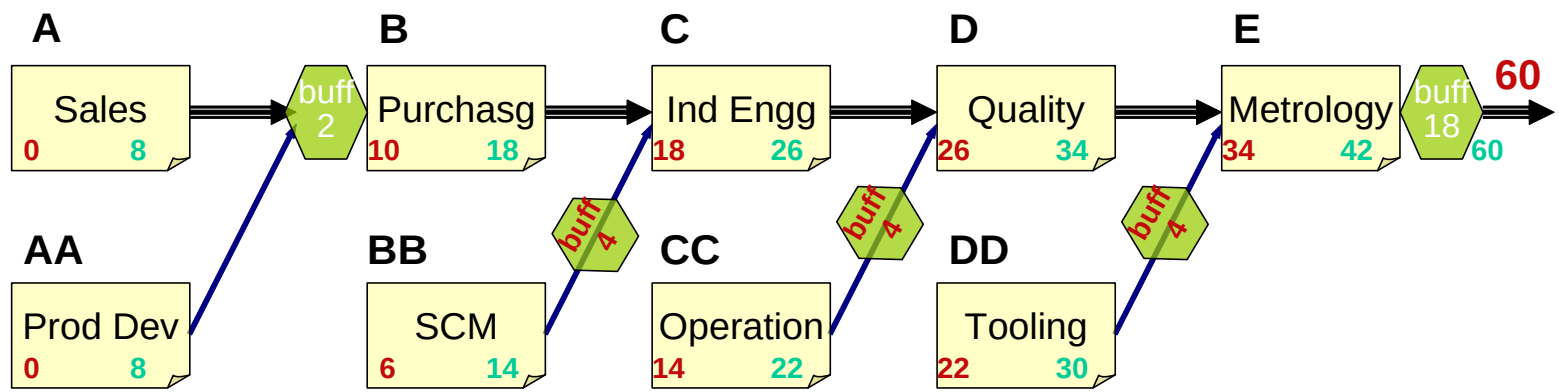
now to the SIXY project with a smell of CCPM :

- **the task assignment is still to roll a "six"**
- **for simplicity reasons we estimate each task duration at 8 days (= 65% safety)**
- **we reinvest 50% of time savings into buffers : 20 days ProjBuff and 4 days FeedBuff**
- **rule : early reporting is done only if a "six" is confirmed by rolling a second "six"**
- **let's roll**



QUESTIONS to the team :

- how often did you have to wait for the feeding branch to finish
- could you take benefit of early finishes
- where you able to recover once you where late ?

CONCLUSION :

- it took us ____ days to complete the project in the first run !
- it took us ____ days to complete the project in the second run !
- it took us ____ days to complete the project in the third run !

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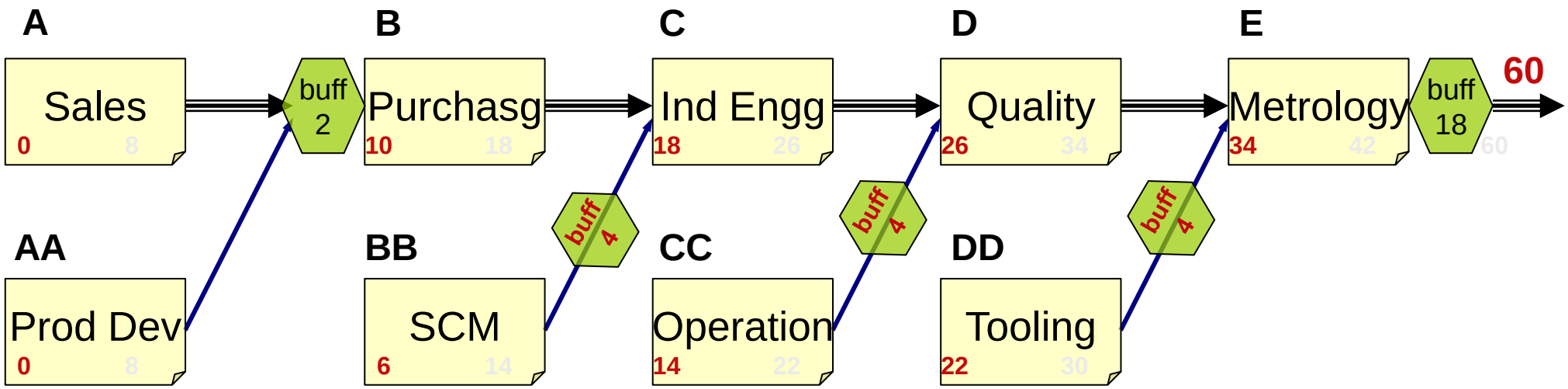
the "sixy" project plan (CCPM)



INSTRUCTION to the team :

- **one roll represents a day**
- **if you roll a "six", then repeat the roll. If it is a "six" again then you report the early finish of your task. If no confirming "six" then you report the planned task duration**
- **CHALLENGE for the PM : you have to kick off the work of the feeding branches !**

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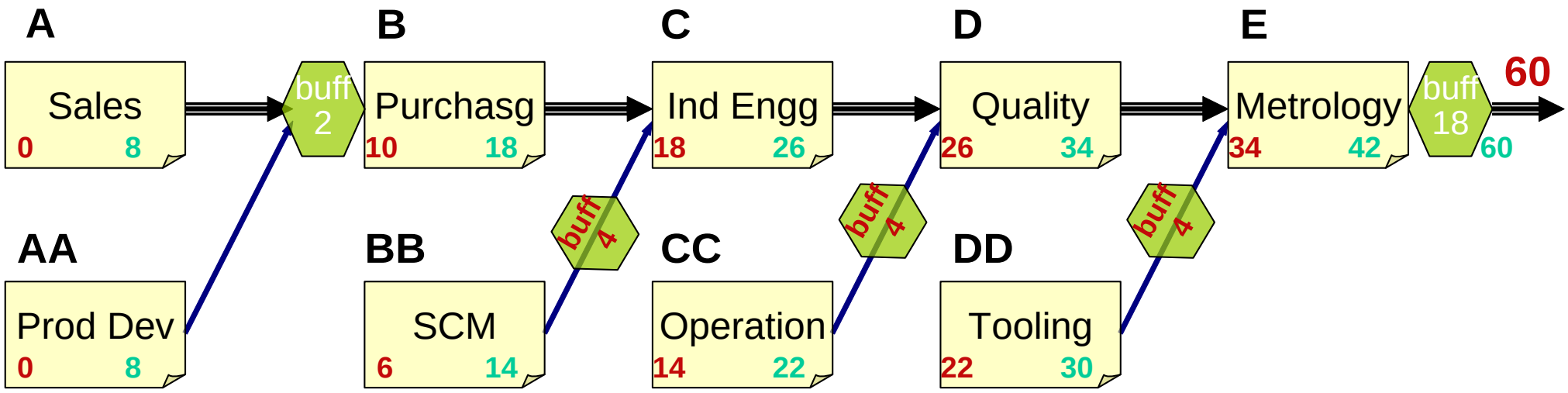
discussing the "sixy" project plan (CCPM)



- **we need 60 days or less (this is 95% safe) instead of 90 days or more (40% of the time)**
- **what was the difference : the dice, the willing worker, the tasks …?**
- **did we have more early finishes now then before ?**
- **how often did feeding chains delay the program compared to the traditional approach**
- **how often did the feeding chains of AA & BB delay the project**
- **how often did the feeding chains of CC & DD delay the project. Why the difference ?**

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now to the SIXY project with resource bench :

- **the task assignment is still to roll a "six"**
- **we hire two professionals to step in when one resource is late**
- **the Pro's are shared with other programs – cost conciousness !**
- **If either the resource or the Pro roll a "six" then the task is completed**

QUESTIONS to the team :

- how often did you have to wait for the feeding branch to finish
- could you take benefit of early finishes
- where you able to recover once you where late ?

CONCLUSION :

- it took us ____ days to complete the project in the first run !
- it took us ____ days to complete the project in the second run !
- it took us ____ days to complete the project in the third run !

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now to the SIXY project with resource bench :

- **the task assignment is still to roll a "six"**
- **we hire two professionals to step in when one resource is late**
- **the Pro's are shared with other programs – cost conciousness !**
- **In addition every resource which has finished is added to the resource bench**
- **if either the resource or the Pro roll a "six" then the task is completed**

QUESTIONS to the team :

- how often did you have to wait for the feeding branch to finish
- could you take benefit of early finishes
- where you able to recover once you where late ?
- should we try and build a really aggressive plan with a baseline of 4 days per task ?
- would you think we cold make it with CCPM, daily reporting and a resource bench ?

CONCLUSION :

- it took us ____ days to complete the project in the first run !
- it took us ____ days to complete the project in the second run !
- it took us ____ days to complete the project in the third run !

APPENDIX

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Multi-tasking game

- **3 tasks**
- **agree on the time per task; agree on project plan**

- **Exp 1:**
  - **give three tasks**
  - **force to work alternately**
  - **record end date & compare to plan**

- **Exp 2:**
  - **give three tasks**
  - **let start with one task**
  - **remove the 2 remaining**
  - **give back one as soon as prior is finished**

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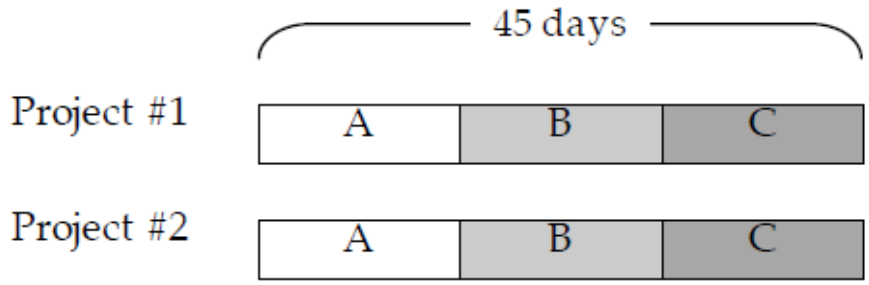
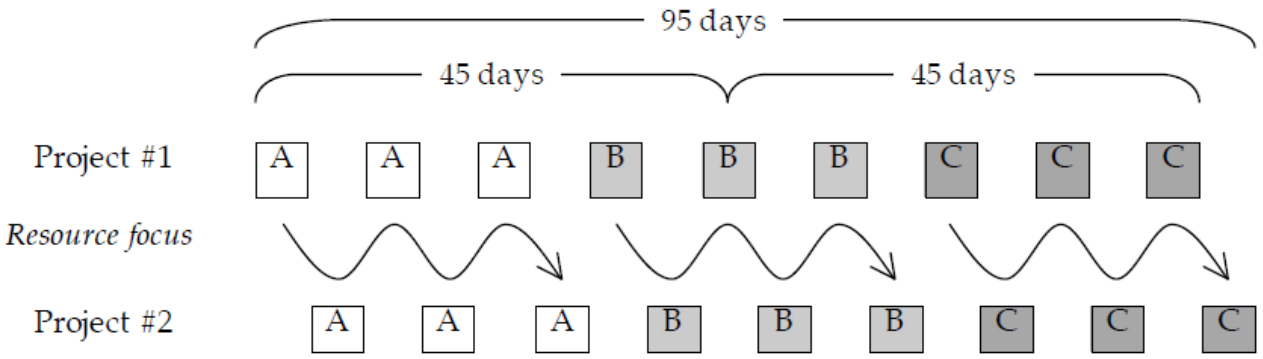
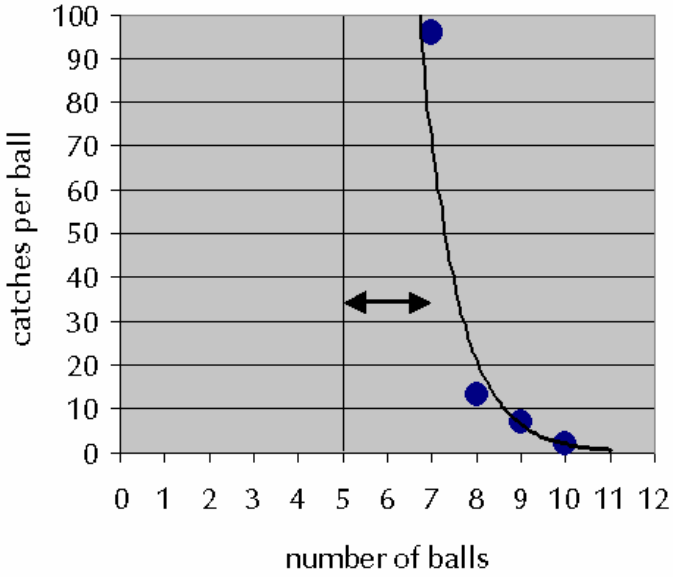
bad multitasking







how many juggles can a (world class) juggler handle ?

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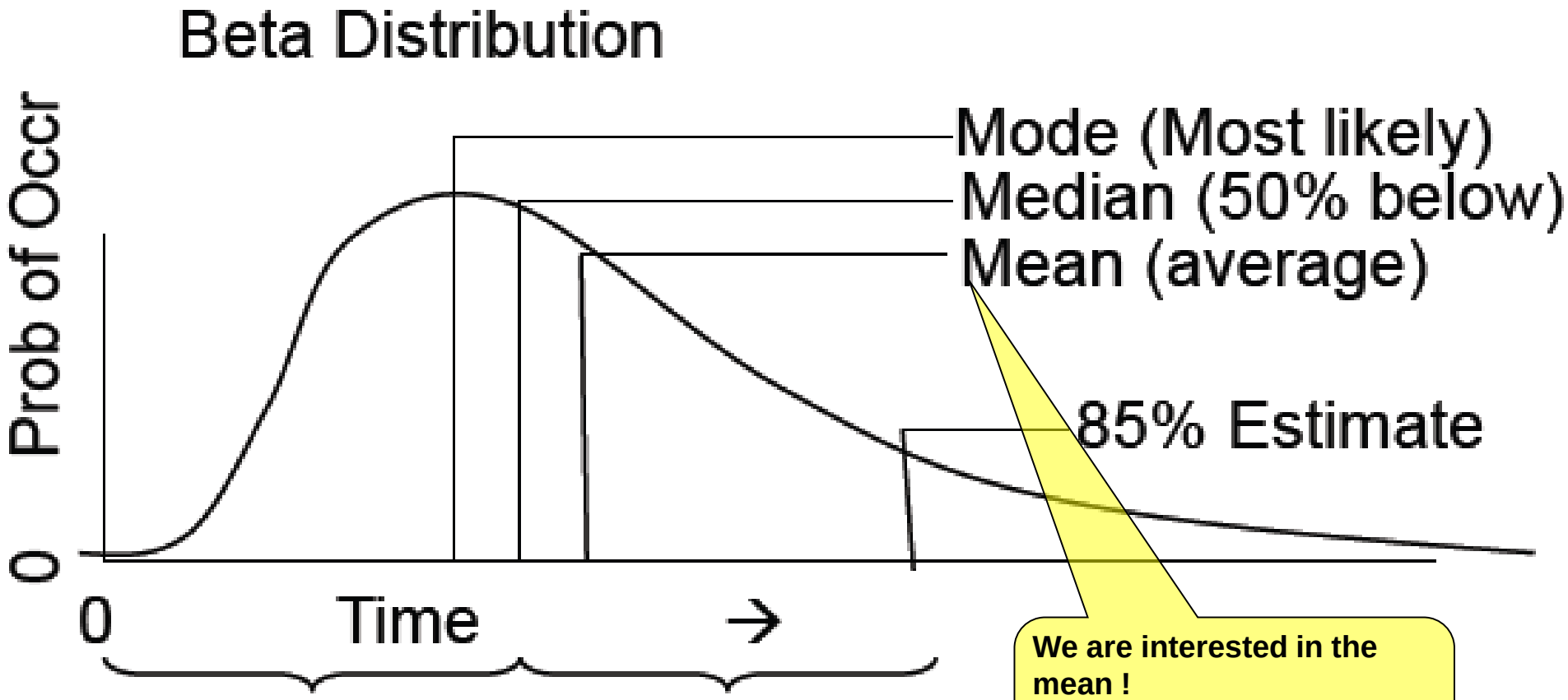
duplicating task duration with rolling dice

- **rolling a “fair” die with 6 faces will produce the following distribution**



➢ **SO WHEN WE PLAY THE SIXY GAME : EACH PLAYER IS SIMULATING TASK WORK IN A PROJECT !**

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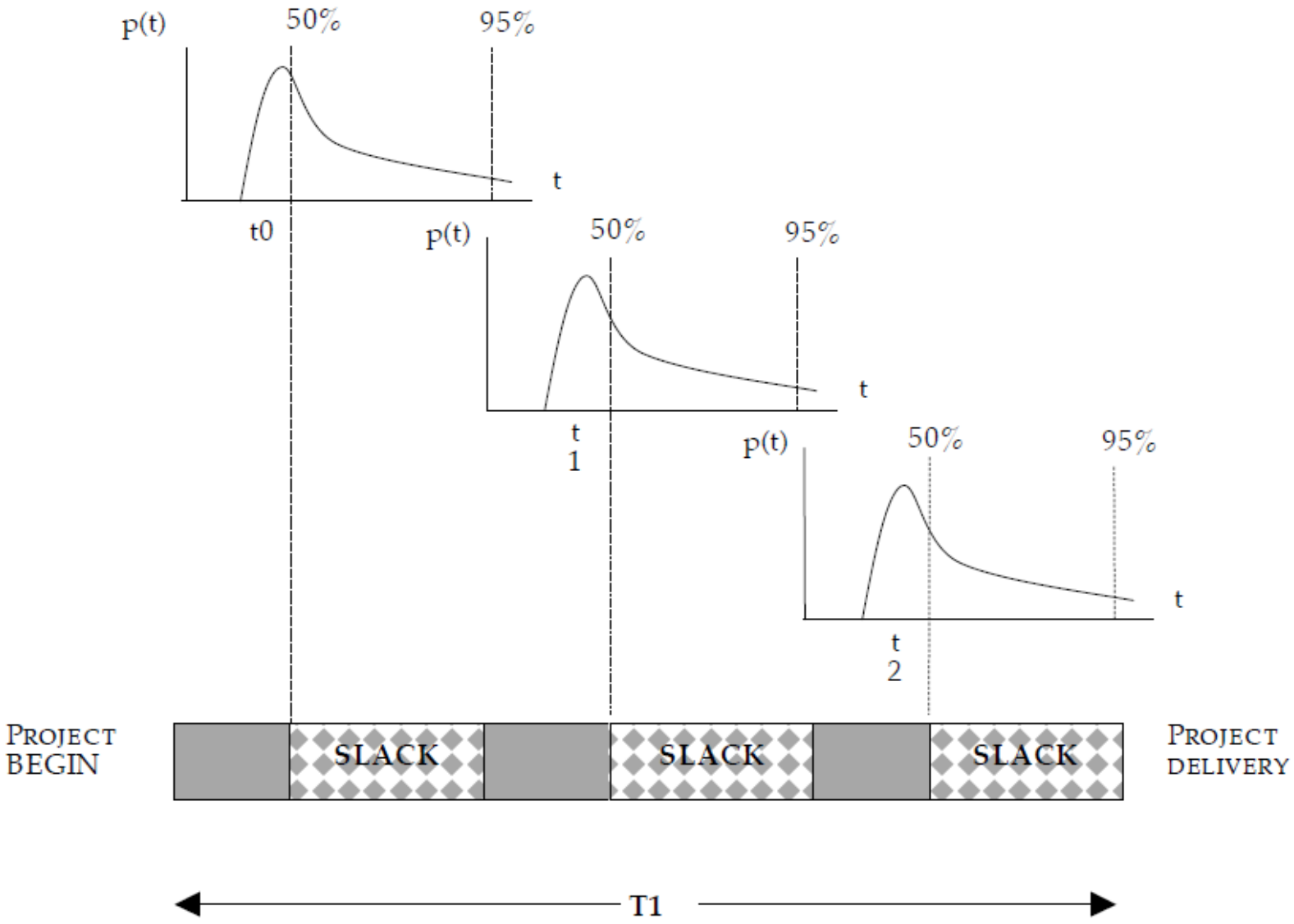
achieving 90% certainty by adding slack to task durations



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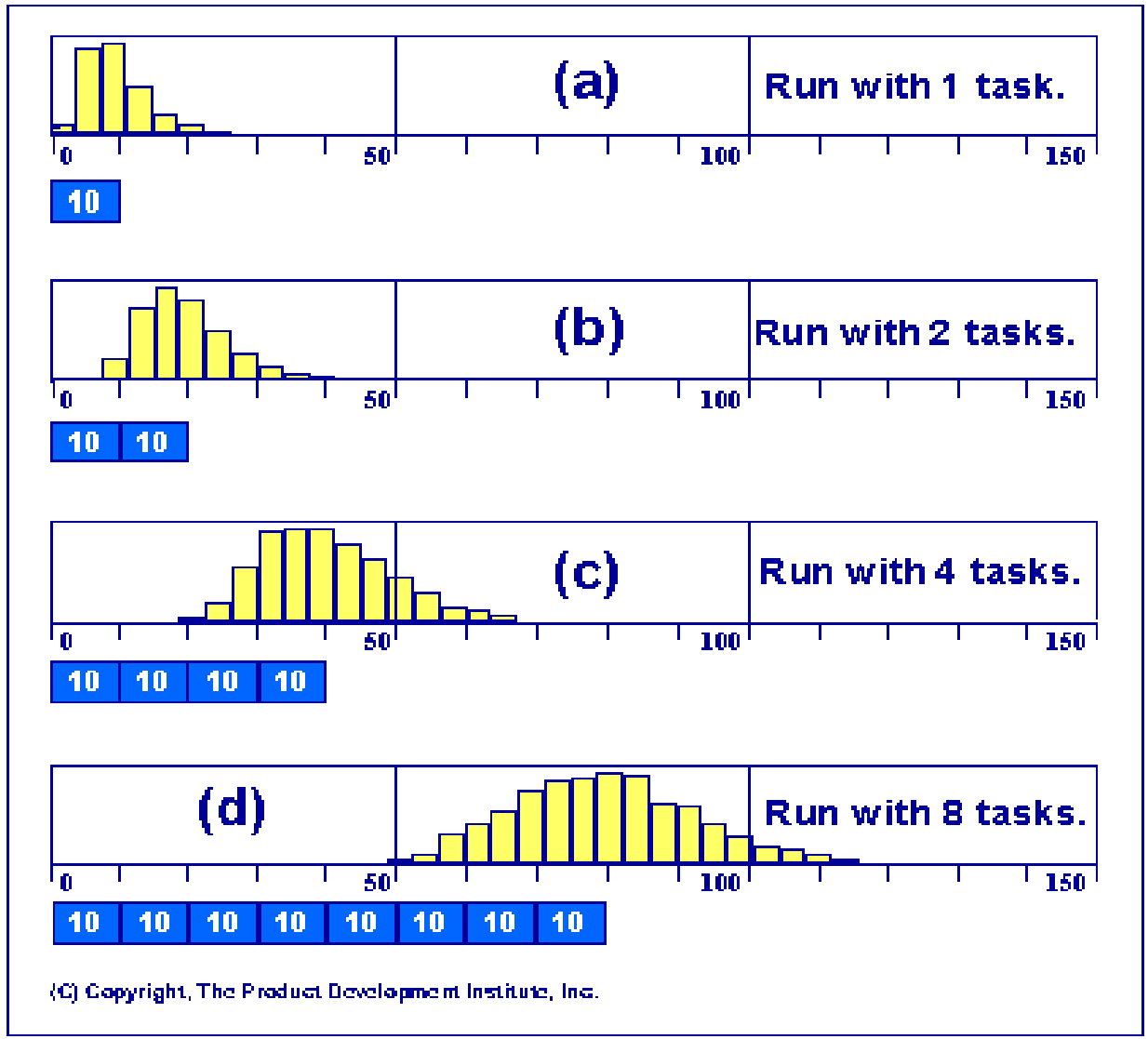
addition of task durations in a project



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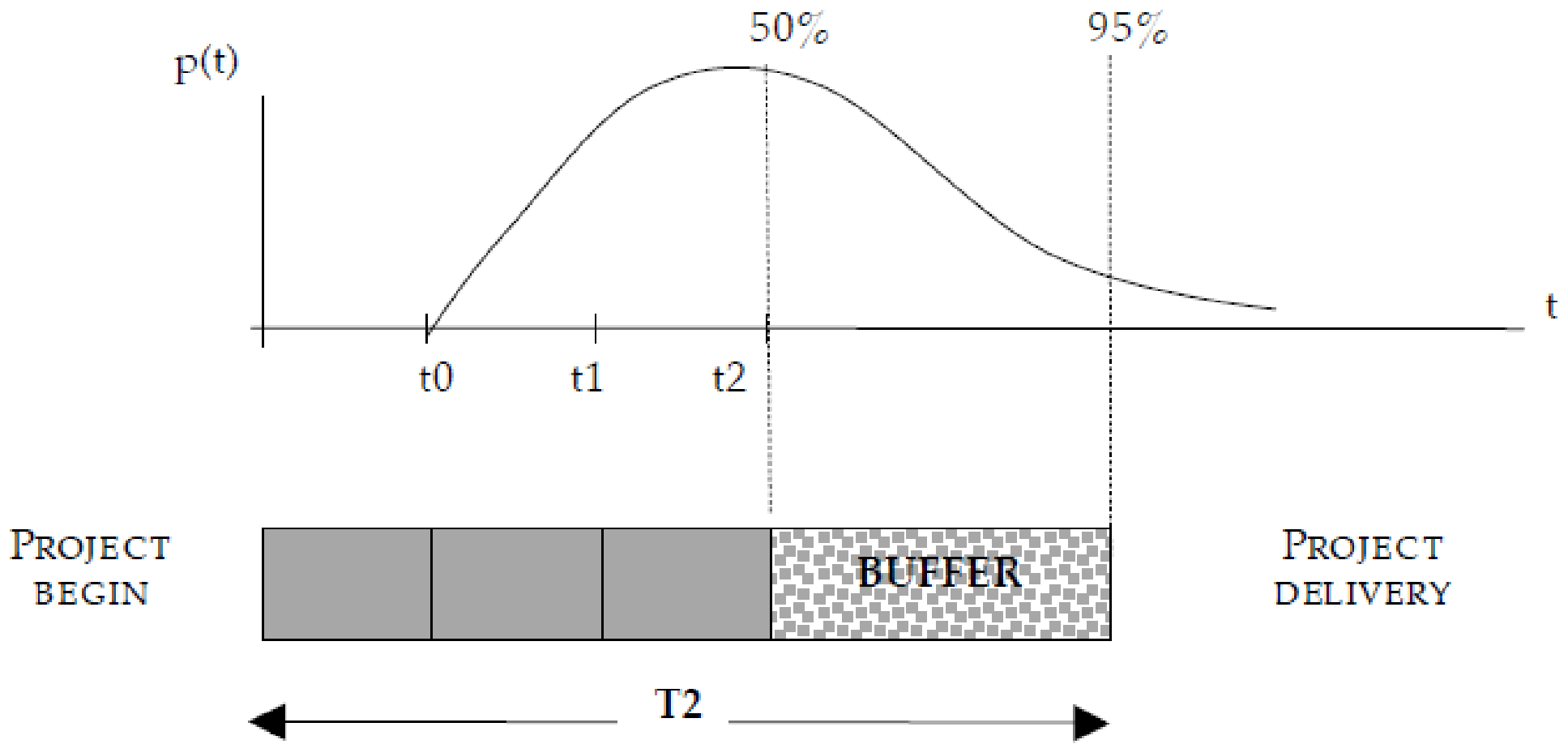
achieving 90% certainty with a project buffer



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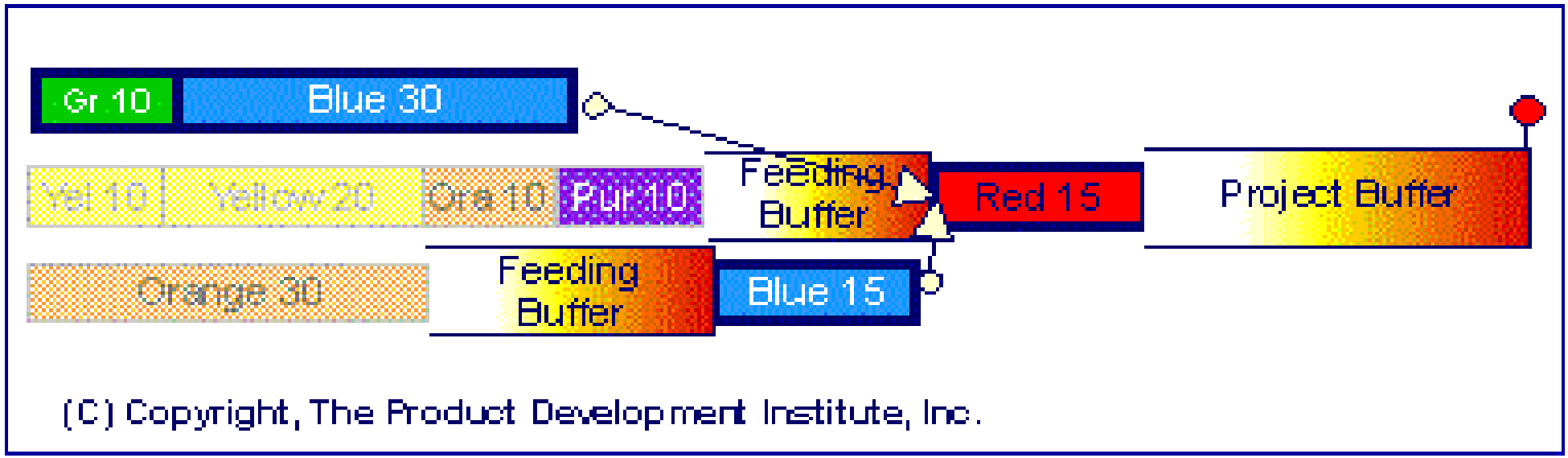

reporting buffer penetration