

# Supplementary Slides for Software Engineering: A Practitioner's Approach, 5/e

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# Chapter 5

## Software Project Planning

# Software Project Planning

**The overall goal of project planning is to establish a pragmatic strategy for controlling, tracking, and monitoring a complex technical project.**

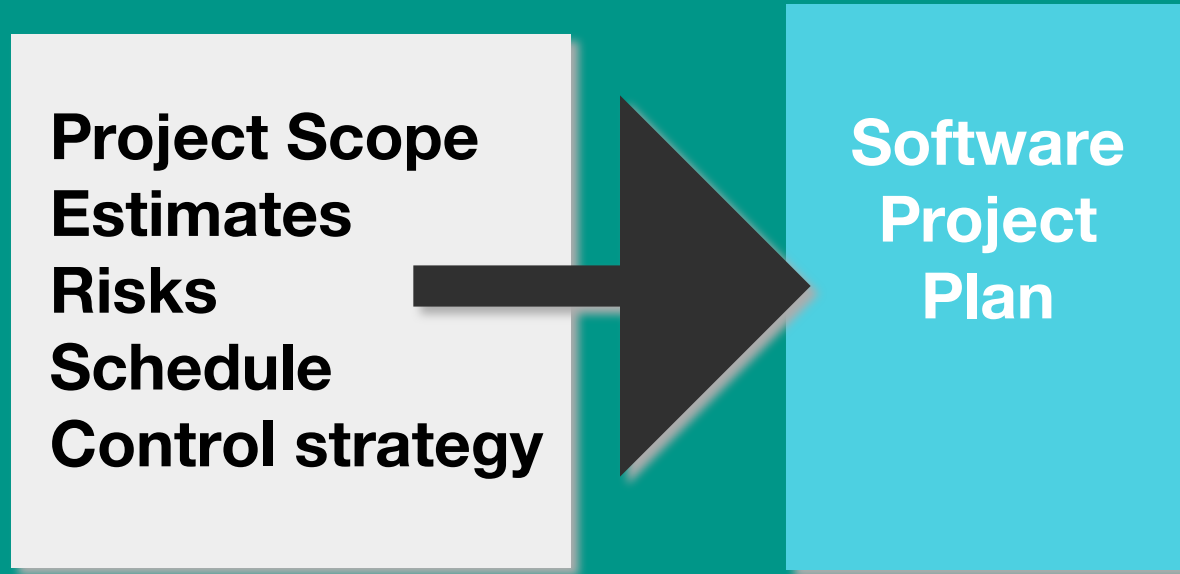
**Why?**

***So the end result gets done on time,  
with quality!***

# The Steps

- **Scoping**—understand the problem and the work that must be done  
do survey, take make/buy decision, survey helps to identify different aspects, thus better planning can be done
- **Estimation**—how much effort? how much time?  
Estimation leads to the planning which leads to the tracking
- **Risk**—what can go wrong? how can we avoid it? what can we do about it?
- **Schedule**—how do we allocate resources along the timeline? what are the milestones?
- **Control strategy**—how do we control quality? how do we control change?

# Write it Down!



# To Understand Scope ...

- Understand the customers needs
- understand the business context
- understand the project boundaries
- understand the customer's motivation
- understand the likely paths for change
- understand that ...

*Even when you understand,  
nothing is guaranteed!*

# Cost Estimation



- project scope must be explicitly defined
- task and/or functional decomposition is necessary
- historical measures (metrics) are very helpful
- at least two different techniques should be used
- remember that uncertainty is inherent

# Estimation Techniques

- past (similar) project experience
- conventional estimation techniques
  - task breakdown and effort estimates
  - size (e.g., FP) estimates
- tools (e.g., Checkpoint)



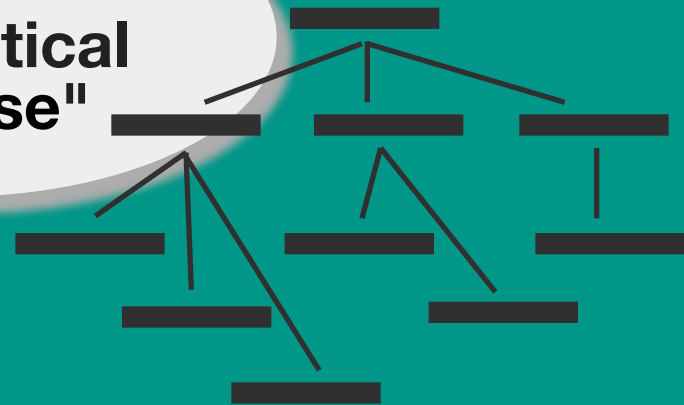


# Functional Decomposition

**Statement  
of Scope**

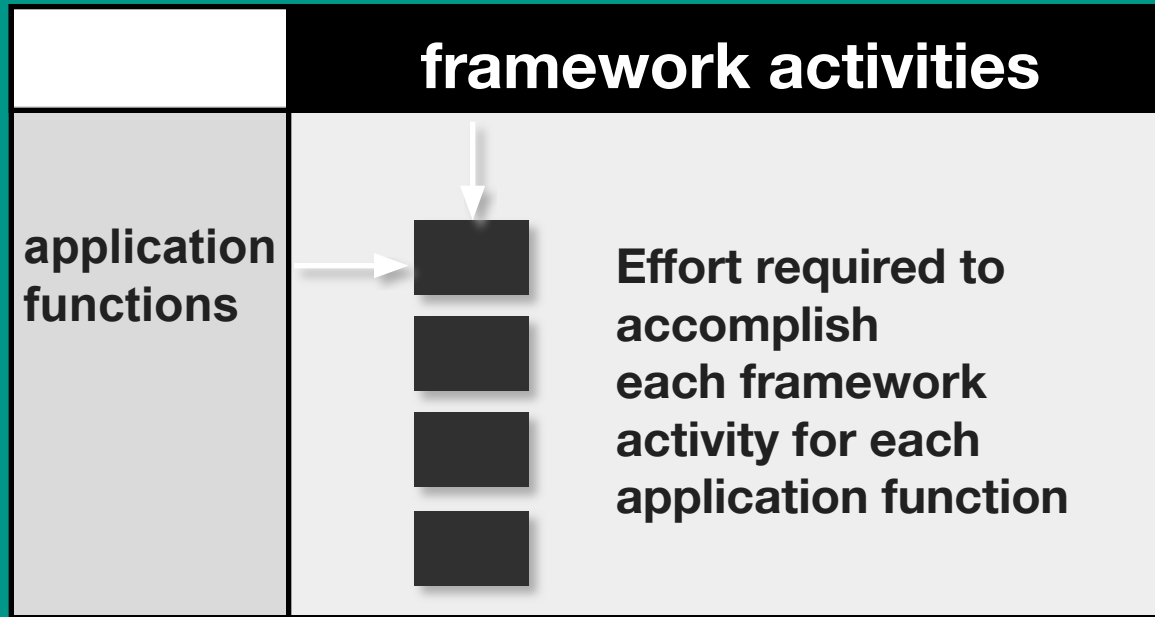
**perform  
a  
"grammatical  
parse"**

**functional  
decomposition**



# Creating a Task Matrix

Obtained from “process framework”



# Conventional Methods: LOC/FP Approach

- compute LOC/FP using estimates of information domain values
- use historical effort for the project

# Example: LOC Approach

Functions	estimated LOC	LOC/pm	\$/LOC	Cost	Effort (months)
UICF	2340	315	14	32,000	7.4
2DGA	5380	220	20	107,000	24.4
3DGA	6800	220	20	136,000	30.9
DSM	3350	240	18	60,000	13.9
CGDF	4950	200	22	109,000	24.7
PCF	2140	140	28	60,000	15.2
DAM	8400	300	18	151,000	28.0
Totals	33,360			655,000	145.0

# Example: FP Approach

measurement parameter	count	weight			
number of user inputs	40	x	4	=	160
number of user outputs	25	x	5	=	125
number of user inquiries	12	x	4	=	48
number of files	4	x	7	=	28
number of ext.interfaces	4	x	7	=	28
algorithms	60	x	3	=	180

count-total

569

complexity multiplier

.84

feature points

478

×

0.25 p-m / FP = 120 p-m

# Tool-Based Estimation

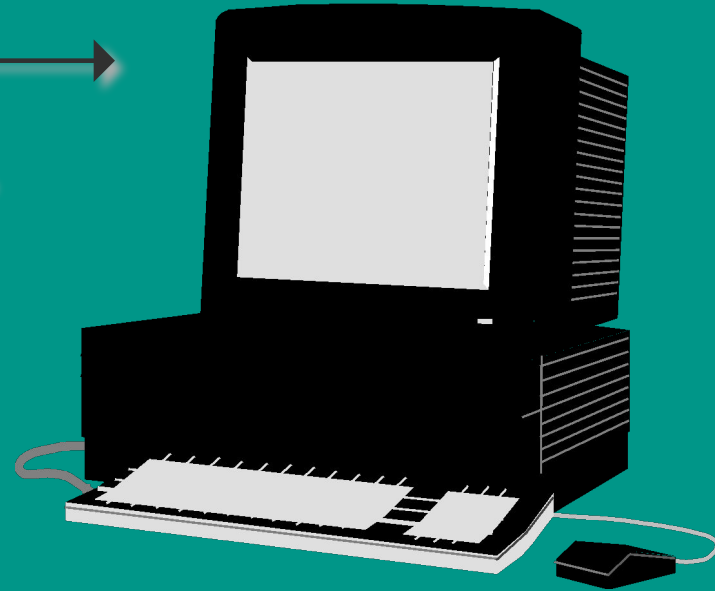
**project characteristics**



**calibration factors**

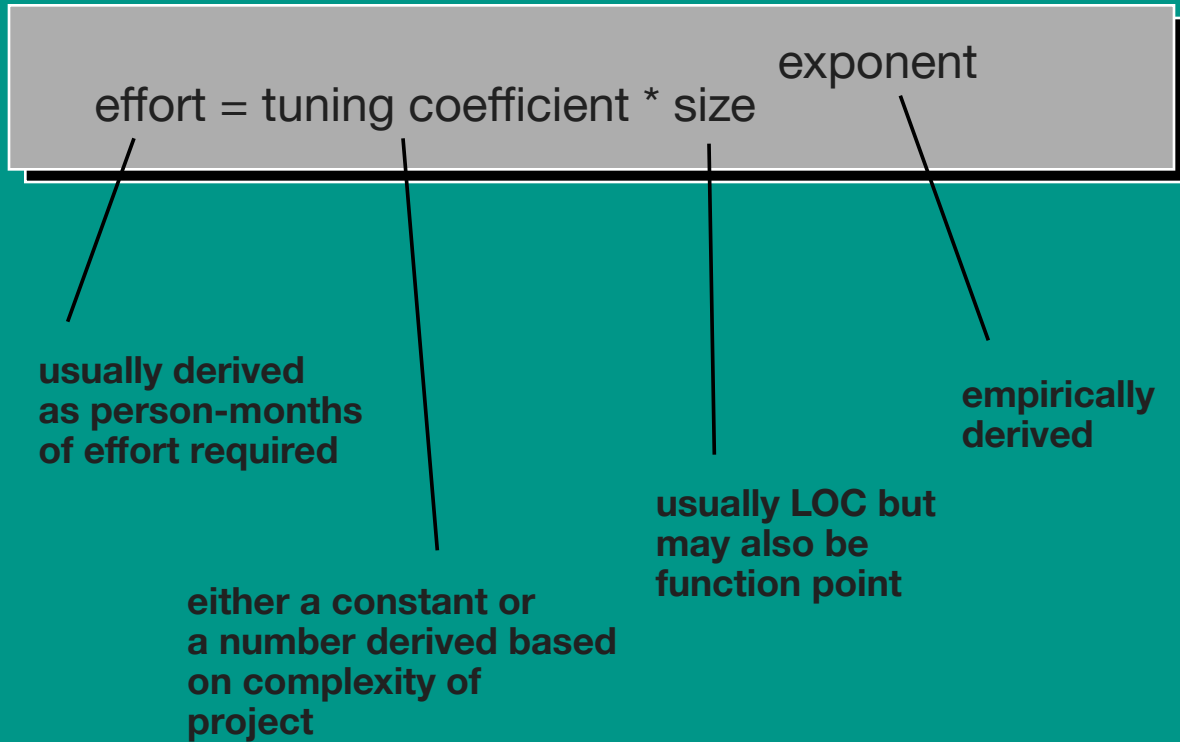


**LOC/FP data**



# Empirical Estimation Models

*General form:*

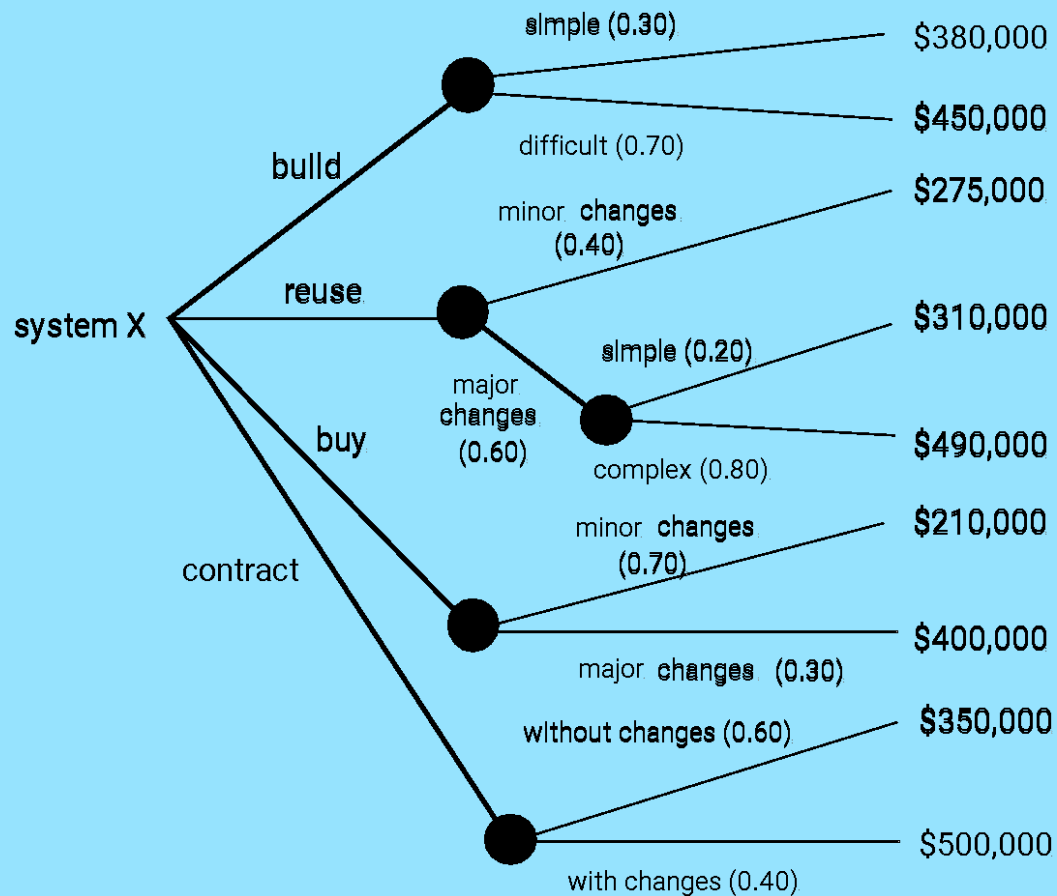


# Estimation Guidelines

- **estimate using at least two techniques**
- **get estimates from independent sources**
- **avoid over-optimism, assume difficulties**
- **you've arrived at an estimate, sleep on it**
- **adjust for the people who'll be doing the job—they have the highest impact**



# The Make-Buy Decision



# Computing Expected Cost

expected cost

$$= \sum (\text{path probability})_i \times (\text{estimated path cost})_i$$

*For example, the expected cost to build is:*

$$\begin{aligned} \text{expected cost}_{\text{build}} &= 0.30(\$380\text{K}) + 0.70(\$450\text{K}) \\ &= \$429 \text{ K} \end{aligned}$$

*similarly,*

$$\text{expected cost}_{\text{reuse}} = \$382\text{K}$$

$$\text{expected cost}_{\text{buy}} = \$267\text{K}$$

$$\text{expected cost}_{\text{contr}} = \$410\text{K}$$