

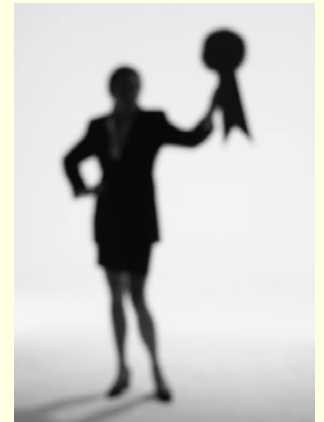
Estimating software-intensive projects

Combining techniques for the right result.

Emmanuel Gonnet, September 2008

Game Time

- You can win a prize!
- Estimate how many slides I will go through during my presentation?



Agenda

- ➔ ■ Solving business problems
- Examining some fundamentals
- Reviewing the estimation methods
 - Historical data
 - Counting
 - Decomposition
- Combining methods for better results
- Concluding – Best practices

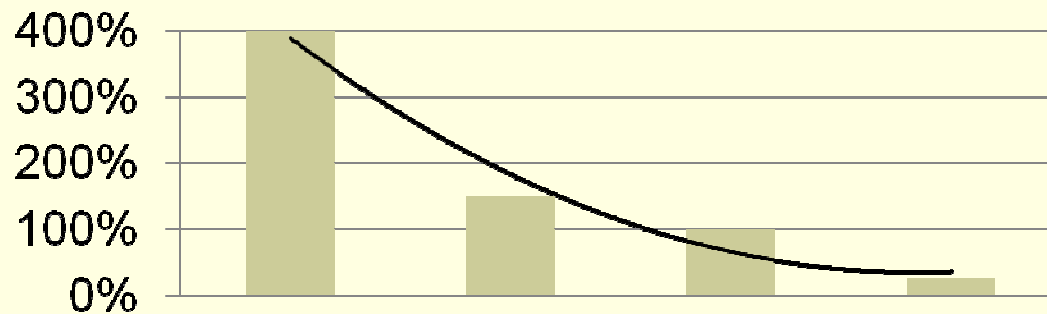
What business problems?

- Estimation solves issues related to “guesstimation” by:
 - Reducing gaps between targets and reality
 - Enabling planning and monitoring activities
 - Resource planning
 - Scheduling
 - Gating the investment process
 - Facilitating communication and transparency

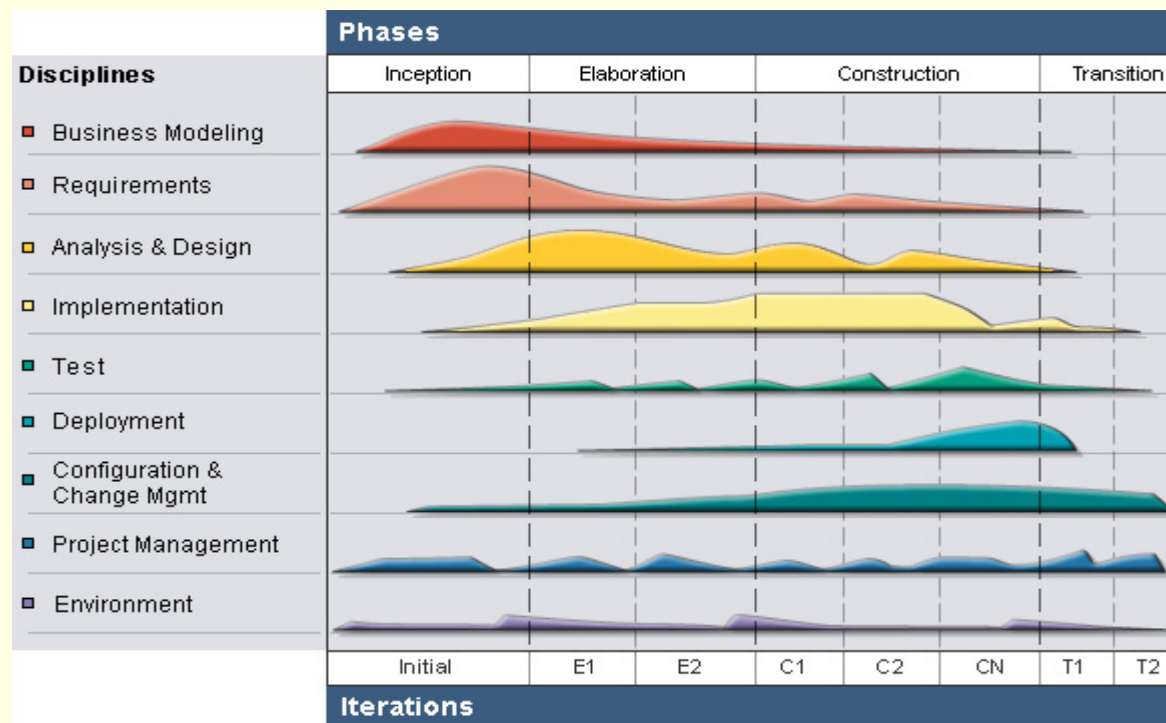
Agenda

- Solving business problems
- ➔ ■ Examining some fundamentals
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 - Expert judgment
 - Historical data
 - Counting
- Concluding – Best practices

Accuracy varies with time



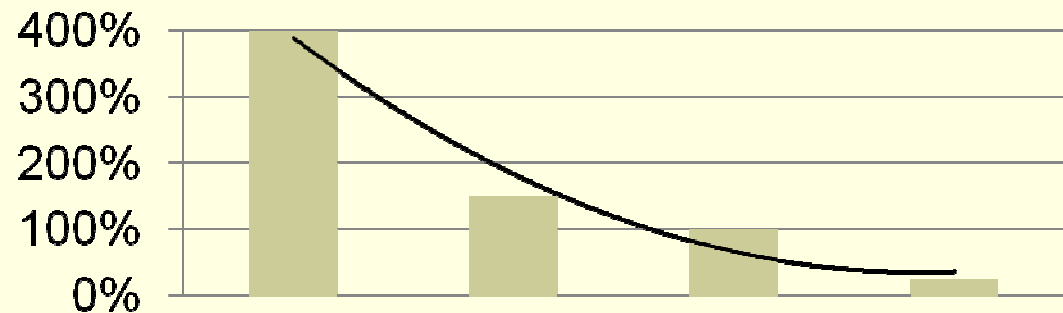
Source: COCOMO



Source: The Rational Unified Process

Implications

- Single point estimates are not accurate
- Accuracy should improve with time
- The estimation method should change as the project progresses.



Choice of an estimation method

- The choice of estimation method depends on:
 - The nature of the software (embedded, ...)
 - The size of the project (small, medium..)
 - The point in time when the estimation is done
 - The type of project (Greenfield, maintenance...)
 - Others?

Implications

- Organizations should master multiple estimation methods that map to the possible scenarios they may face.
 - Some estimation techniques are not appropriate for certain combinations of variables
- A decision tree is needed to identify the right technique in the right context

Cost is size times productivity

$$\text{Cost} = \text{Size} * \text{Productivity}$$

Where

- Cost could be “days”
- Size could be “number of work units”
- Productivity could be “days/number of work units”

Implications

- Regardless of the technique used:
 - Size of the effort should be estimated
 - Productivity and contextual assumptions should be articulated.
- Sizing and productivity information should be transferable between estimation techniques
 - Establishing “work units” is paramount
 - Productivity is a major data element

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Historical data

- Based on past experience and recorded information
- Techniques are:
 - Expert judgments (i.e. wideband delphi)
 - Industry benchmarks
 - Recorded data (i.e. Timesheets)
 - Analogy
- Are you records in the C=S*P format?

Counting

- Based on the computation of certain elements
- Techniques are:
 - Function points, use case points...
 - Proxy-based methods
 - What else can you count?
- Good way to size the effort
 - Still require productivity information

Decomposition

- Based on the division of work into “bite-size” components
- Techniques are:
 - Decomposition into WBS
 - Decomposition of functions...
- Still requires historical data and counts:
 - List of tasks
 - Counting the functions ...
- Benefits from the law of large numbers

Focus on use case points

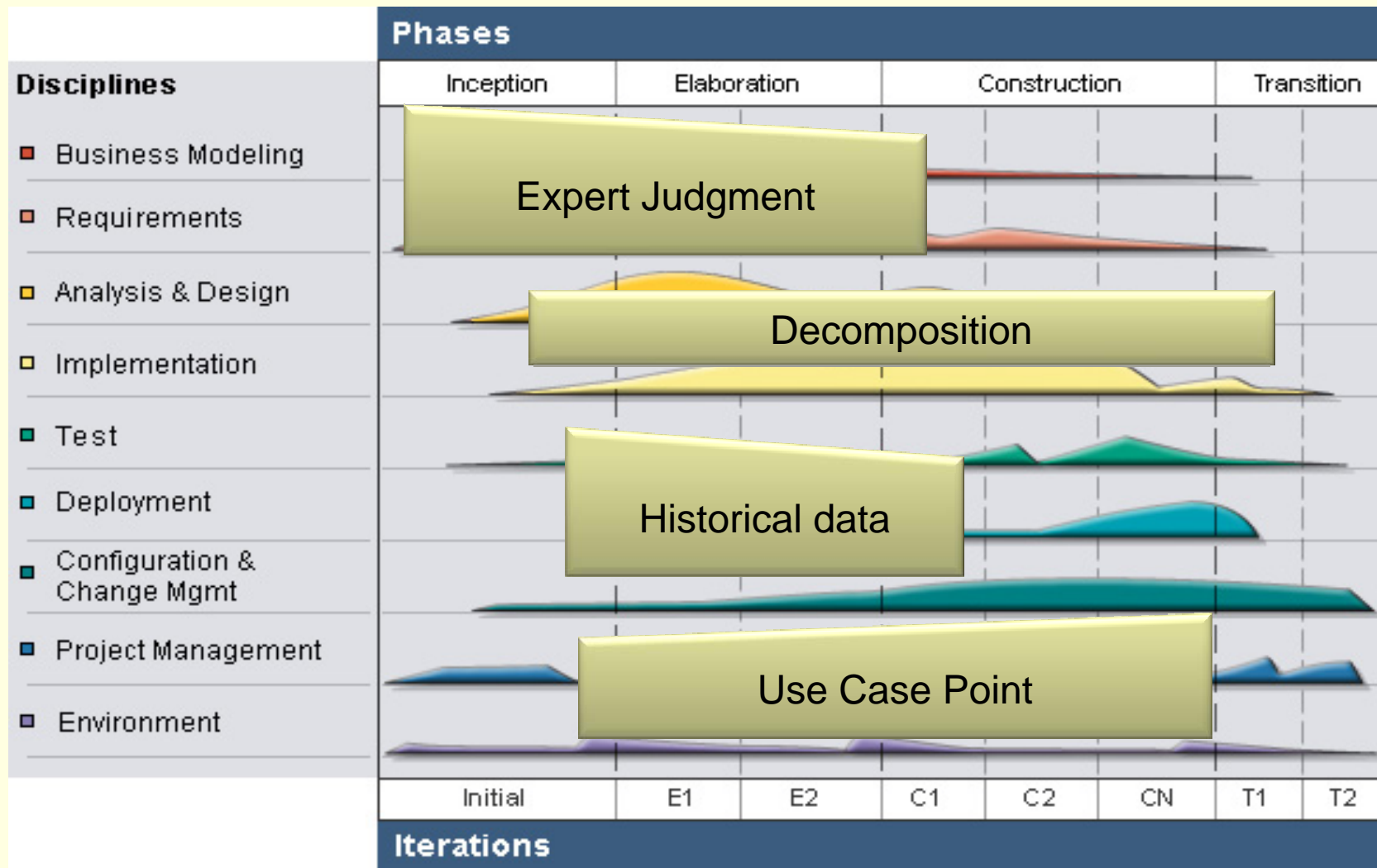
- $(AW + UW) * TF * EF * PHF$
 - Where $(AW+UW) * TF$ represent the size
 - Where $EF*PHF$ represents the productivity
- Requires
 - The counting of use cases and actors
 - Measures of productivity elements (data)
- Preferred method for the unified process post inception-phase

AW: Actor Weight, UW: Use Case Weight, TF: Technical Factors, EF: Environment Factors, PHF: Person Hour Factor

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Example: combining techniques for better accuracy



Best practices

- Contextualize the estimation process
 - Adopt the method that matches the situation
 - Combine methods for better results
- Choose work units and a data collection scheme
 - Measure both size and productivity
 - Employ measurable work units
 - Record data for better calibration and process improvement (learning)

Thanks you! Q/A



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Winners?

- This presentation had 21 slides.

