Software Estimation Methods

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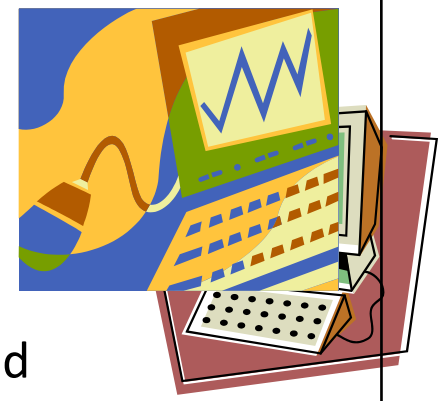
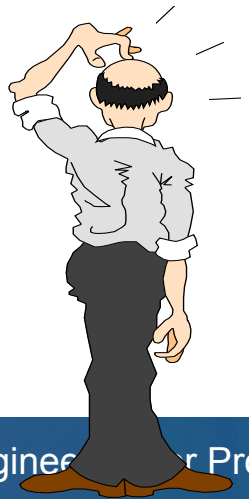
Computer Models

- Theory Based
- Empirical
- Regression Based

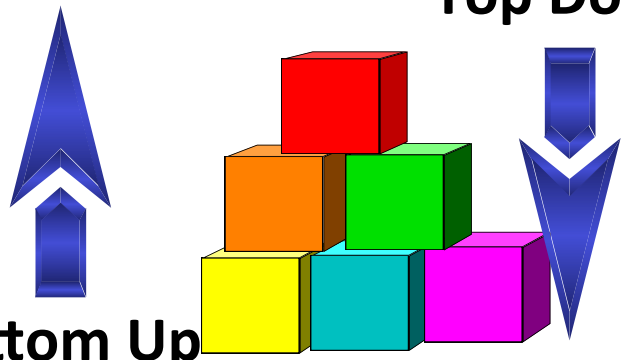


Price to Win

Top Down



Expert Judgment (Delphi)



Bottom Up

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Estimation Method	Description	Advantages	Disadvantages
Regression-Based Models Examples: COCOMO, REVIC	Historical information is used to develop algorithms which relate cost with one or more software metrics producing a scatter diagram	• Objective, repeatable, easy to use • Can be calibrated to company or project environment	• Inputs may be subjective (need Lines of Code (LOCs)) • May not handle exceptional circumstances • May be based on inefficient past practices
Empirical-Based Models Example: Checkpoint	Estimate is based on analogy with cost of previously completed projects in the same domain	• Based on actual experience • Can break down cost at detailed level	• Not always clear how to compare projects • May miss differences between project applications and environments
Theory-Based Models Examples: SLIM, Price-S	Estimate is based on underlying theoretical considerations for software development processes	• Repeatable • Get what you pay for • Lots of research	• Proprietary • Expensive
Expert Judgment (Delphi)	Uses one or more experts to arrive at consensus estimate	• Can factor in differences between past projects and this project • Can factor in exceptions	• Only as good as the experts • Not repeatable
Price-to-Win Estimate	Estimate is based on whatever the customer has to spend	• Often wins the contract	• Schedule and budget are unrealistic • Engineers become demoralized
Top Down Estimate	Derive estimate from global properties of the product divided among components	• System level focus will not leave out system level functions	• Does not identify low level technical issues • Sometimes misses detailed components • Does not provide details for cost analysis
Bottom Up Estimate	Cost of each component is estimated, then costs are added for overall estimation	• Estimate for each component based on detailed understanding • Estimate backed up by personal commitment of individuals • Estimation errors balance out	• Can underestimate by overlooking system level costs • Requires more effort • Some cost elements may be included more than once