

# CS 428

# Webster #3

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- ▶ Same problem as project estimation, but for a project already underway
  - ▶ Most organizations are very bad at predicting when a given project will ship
  - ▶ Usually rely on ‘metrics’ that aren’t at all useful
- ▶ A meaningful, useful project metric has three key qualities:
  - ▶ Informative/predictive: tells you something important and/or when you will deliver
  - ▶ Objective: should yield the same value regardless of who is doing the measuring
  - ▶ Automated: can be done quickly and without direct human intervention
- ▶ Almost all major metrics used in IT projects lack one, two, or all three qualities

## Lies, damned lies, and project metrics [Part I, Part II, Part III] (Baseline, 2008)

- ▶ **Weinberg's Law of Metrics:** “That which gets measured, gets fudged.”
  - ▶ We will distort work and reporting to achieve required or valued metrics
- ▶ **The Metric Law of 90s:** “The first 90 percent of a development project takes 90 percent of the schedule. The remaining 10 percent of the project takes the other 90 percent of the schedule.”
  - ▶ We tend to focus on low-hanging fruit in order to make metrics look good
- ▶ **The Metric Law of Least Resistance:** “The more human effort required to calculate a metric, the less often (and less accurately) it will be calculated, until it is abandoned or ignored altogether.”
  - ▶ Hence the need for automation (cf. classic joke about drunk looking for keys)
- ▶ Must-read book: *Measuring and Managing Performance in Organizations* by Robert D. Austin (Dorset House, 1996)

## WEB #3 (cont.): Metric “Laws”



## Web #3 (cont.): Visual Assessment in Real Life



## ► Why is project completion so hard to predict?

- The amount of analysis (gathering relevant subject-matter information) that still has to occur
- The amount of invention (novel problem solving) that still has to occur (cf Armour, as usual)
- The amount of discovery (e.g., running into roadblocks and dead ends) that still has to occur (again, Armour)
- The adequacy of the current architecture, design and implementation
- The amount of actual coding that still has to occur
- The amount of quality engineering (testing, reviews, etc.) that still has to occur
- Unexpected turnover among engineering personnel
- Changes in market requirements and/or opportunities
- Changes in external systems upon which you depend

## WEB #3 (cont.): The challenge

- ▶ First, instrumentation: automated collection of wide range of metrics/characteristics over time
  - ▶ Result: time-stamped history for each metric/characteristic
  - ▶ These should be automated and objective
  - ▶ Can be tied to configuration management system and run on a regular basis
- ▶ Second, heuristics: use data collected
  - ▶ After project is done and with known timeline, use Bayesian analysis to see which combination of metrics best anticipate milestone completion
  - ▶ Use human analysis as well to look for correlations between metrics and actual progress (or lack thereof)
  - ▶ Refine set of metrics/characteristics for next project and see how well they predict progress

## WEB #3 (cont.): Potential approach to useful metrics