

SOFTWARE PROJECT MANAGEMENT AND COST ESTIMATION

Object points (function + code)

- Count number of
 - screens
 - reports
 - 3GL components (Java, C++ classes)
- For each use following weighting based on complexity
- Object type simple Media Difficult
- Screen 1 2 3
- Report 2 5 8
- 3GL components 10

Function points verses Object points

- Function points
 - Established standard
 - Much legacy estimation data available
 - Supported by many tools
 - Can be calculated very early on, requirements stage
- Object points
 - Newer
 - Easier to calculate
 - Provides allowance for re-use

Cost Estimation

- From size estimation (FP, OP or KLOC)
- Map to cost using cost estimation model
- Two error factors
 - Original estimation error
 - Cost derivation error
- Or
- Use direct estimation
 - E.g. poker planning

Factors affecting productivity

- Application domain experience
- Process quality
- Project size
- Technology support
- Working environment

Estimation techniques

- Algorithmic cost modelling e.g. Constructive Cost Modelling (CoCoMo)
- Expert judgement
- Estimation by analogy
- Parkinson's Law
- Pricing to win

Constructive Cost Modelling (CoCoMo)

Algorithmic cost modelling

- Assumes there is mathematical relationship between
 - Measure of size of project and how much effort it takes
 - Uses data from many projects to produce model
 - Tries to take into account variations in input factors

Algorithmic cost modelling research

- Take a series of projects
- Make estimations at begin and part way through
 - Total size
 - Complexity
 - Re-use factors
- Measure how long the project takes in person months
- Try and correlate these 2 taking into account both factors

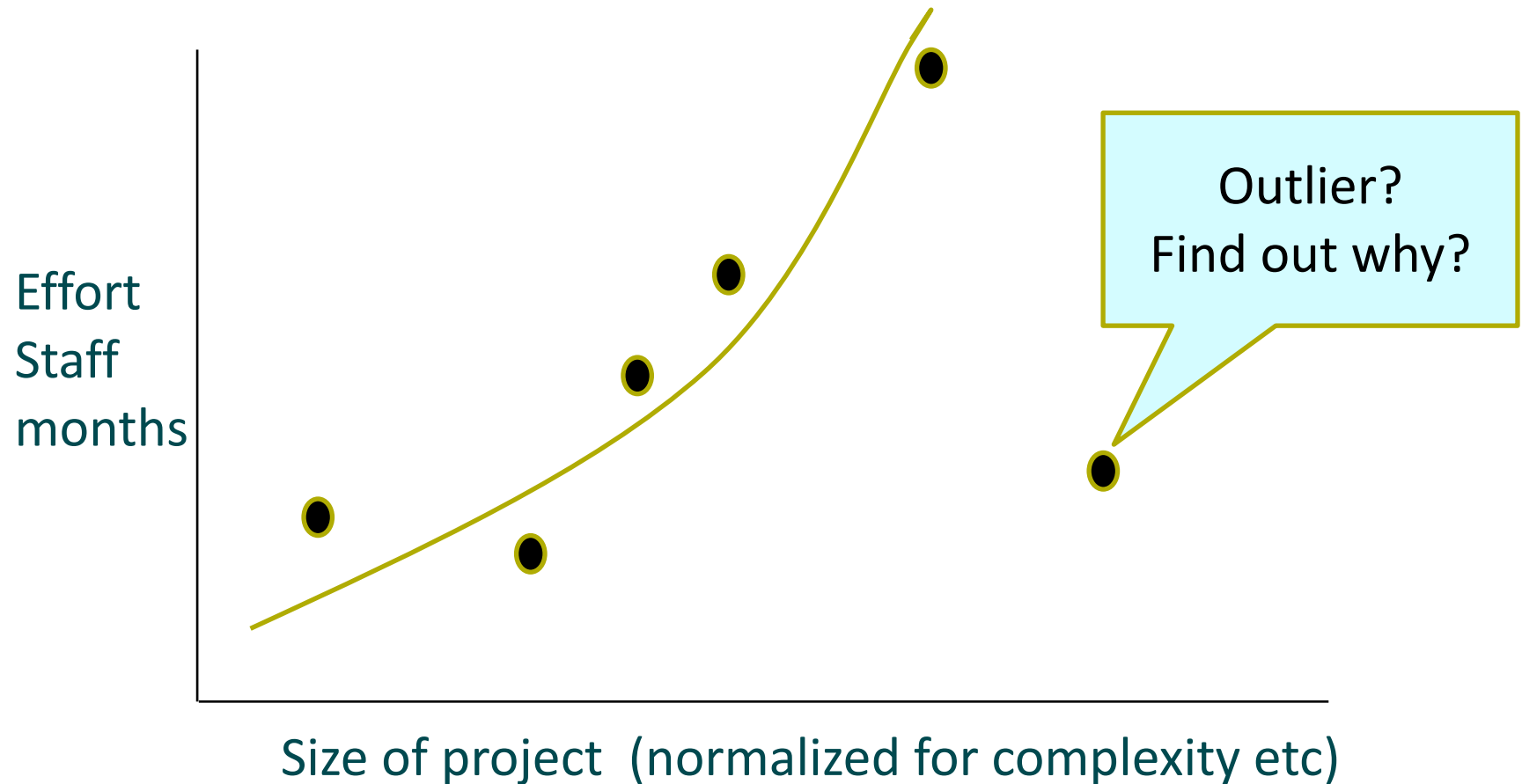
Problems with algorithmic cost modelling

- Development approach change
- Estimation of project size and complexity is difficult
- Model cannot take into account all factors
 - Development and testing approach
 - Regressive development way overrun time

COCOMO

- Barry W. Boehm 1981
- 63 projects at TRW Aerospace
- From 2,000 to 100,000 lines
- COCOMO II 2000
 - University of Southern California
 - University of California Irvine
 - COCOMO™ II Affiliates' Program

Modelling ..



Modelling cocomo

- Try and find mathematical relationship which fits graph on previous page
- Some thing like S^C
- Where S is size of project and C is dependent on type of project
- S may be increased dependent on complexity (see function points etc)

The COCOMO method

- Input
 - Conduct of the project (e.g. design model)
 - Staff available
 - Hardware and CASE tools involved
 - Nature of the product
- Output estimates
 - Size of the system (LOC and function points)
 - Project schedules and team factors
 - Cost and staffing profiles.

Summary

- Cost Estimation Modelling
 - Relies on expert judgement
 - Requires much effort
 - Produces subject results
- Alternatives
 - Group estimation
 - Analogy estimation
 - Pricing to win