Aston University
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Software Project Management

Tutorial 3 – Estimation II

Exercise 1

A start-up company is developing web applications for local businesses. The company needs to decide whether to purchase a software development tool that is meant to improve productivity. Having used the tool during a free trial period, the company's developers recorded the following information about a number of projects:

Project	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12
Used tool	Yes	No	No	Yes	No	Yes	Yes	No	No	No	Yes	No
Size	23	15	27	12	21	16	17	25	12	17	19	8
Effort	7	5	10	3	6	4	5	8	4	5	5	3

* Size given in thousands SLOC (i.e., source lines of code); effort given in pm (i.e., person$_x$month)

Analyse the data recorded by the company to check whether the tool is likely to improve productivity.

Hint: You will need to calculate the average development productivity for the projects that use the tool and for the projects that do not use it, and to compare the two values.

Exercise 2

The company ACME work with the following formats (see tables) to support the Software Project Management of their projects. Answer the following:

a. Given the table bellow for a given project Q:
   Calculate the Delphi Average Value expected for each Functional Unit (column 5)
   What is the Size expected?
   Calculate the Costs and Efforts for each Functional Unit (columns 8 and 9, rows 6,7 and 8)
   Calculate the Total cost and Total efforts

				Delphi	Unit			
				Average	Cost	Productivity		
Fnl.	Min	Likely	Max	**Expected**	**CpS**	**SpE**	**Cost**	**Effort**
Unit	← SLOC size →				(£/SLOC)	(SLOC/pm)	(£)	(pm)
GUI	1900	2500	2750		17	320		
Logic	4150	5000	6300		24	205		
DBA	3050	3500	3700		20	245		
				Total			Total	Total
				SLOC			Cost	Effort

b. Given the table bellow for a given project Q:
   Calculate the costs of each phase and the total cost of the project.
   What is the total effort estimated for the project Q?

Phase-->	Req	Design	Code	Testing	Total
Function	< ---------- Effort (pm) ---------->				
GUI	2	4	1	7	
Logic	3	22	8	21	
DBA	4	12	6	8	
Total pm					
CpE (£/pm)	5300	4900	4350	4600	
Cst (£)					

Exercise 3. The idea of this exercise is to review and practice knowledge from Tutorial 2. Specifically, you will revisit the exercise 3 of Tutorial 2 using another unit different from SLOC. Try to think of this case with other units such as classes implements, requirements instead of features or SLOC. *Is there any difference when solving the problem of cost estimations by analogy?*

A cost estimate is required for a new project N, which involves the development of a new application. The size of N has been estimated from its Requirements Definition at 200 ± 20 *features*. Due to experience in the company, we know the following:

- ◇ An old project O1 has been considered analogous to N in many respects, the main difference being its size, which was recorded as 100 *features*. Its measured effort value was 180 pm (pm = person×months).
- ◇ Another project O2 has also been considered to be analogous to N in many respects except that:
  (i) its size was recorded as 40 *features*;
  (ii) it was carried out using a suite of software tools that are reckoned to increase the effort needed on projects by around 20% (compared to when they are not used). O2's measured effort value was 100 pm.

Using *estimation by analogy*, derive a financial cost estimate for project N based on the above information, given also that:

- the 'effort-increase software tools used on O2 will be used on N
- the company currently assesses its unit effort cost rate for client-server applications at 4K £/pm.

Make sure that you include as part of your final estimate the upper and lower bounds on the cost derivable from all the information provided. Do the estimation in three stages:

i) Calculate two effort estimates separately from projects O1 and O2. Explain how you took into account the size differences and the fact that the software tools used on O2 will be used on N?

ii) Convert the separate effort estimates to financial costs

iii) Resolve any differences between the two financial cost estimates to arrive at a single estimate.