

Tutorial 5 - Baseline Estimates, Work Size, and Productivity Rate

CS 587 – Software Project Management

Dr. Atef Bader

Illinois Institute of Technology



Baseline Estimations

- Assume we have sample data from Project #1 and Project #2 as shown in the next slide.
- We will use this sample data to extrapolate values for Project #3 Work Size and Productivity Rate.

• Project #1 Values

Task Name ▼	Amount of Work ▼	Productivity Rate ▼
▸ Coding and Unit Test		
Write Code	4233 SLOCS	6 SLOCS/Hour
▸ Unit Testing		
Prepare/Execute Test Cases	207 Test Cases	5 Test Cases/Day
Fix Found Defects	188 Defects	4 Defects/Day
Test Fixed Defects	188 Defects	7 Defects/Day
▸ Code Inspection		
Preparation for Code Inspection		90 SLOCS/Hour
Code Inspection Meeting		150 SLOCS/Hour
Rework	188 Defects	4 Defects/Hour

• Project #2 Values

Task Name ▼	Amount of Work ▼	Productivity Rate ▼
▸ Coding and Unit Test		
Write Code	6325 SLOCS	5 SLOCS/Hour
▸ Unit Testing		
Prepare/Execute Test Cases	572 Test Cases	5 Test Cases/Day
Fix Found Defects	512 Defects	10 Defects/Day
Test Fixed Defects	512 Defects	12 Defects/Day
▸ Code Inspection		
Preparation for Code Inspection		145 SLOCS/Hour
Code Inspection Meeting		180 SLOCS/Hour
Rework	912 Defects	7 Defects/Hour

We use the values given from the two Projects (#1 and #2) to extrapolate values in Project #3.

Project #3

Task Name ▼	Amount Of Work ▼	Productivity Rate ▼
▴ Coding and Unit Test		
Write Code	4570 SLOC	
▴ Unit Testing		
Prepare/Execute Test cases		
Fix Found Defects		
Test Fixed Defects		
▴ Code Inspection		
Prepare for Code Inspection		
Code Inspection Meeting		
Rework		

Walk Through Example: Coding

Step 1: Identify Tasks

- Identify tasks **considering** the information provided by Project #1 and Project #2.

Step 2: Extrapolate Productivity Rates

- Productivity Rates: For the task occurred in both Project #1 and #2, assume its productivity rate as the average of the same tasks' productivity rates from #1 and #2.

Coding	
Write Code	4570 SLOC
Unit Testing	
Prepare/Execute Test Cases	
Fix Found Defects	
Test Fixed Defects	
Code Inspection	
Preparation for Code Inspection	
Code Inspection Meeting	
Rework	

Extrapolating Productivity rates

In Project #1:

Productivity rate for “Write Code” = 6 SLOCS/Hour

In Project #2:

Productivity rate for “Write Code” = 5 SLOCS/Hour

So, the productivity rate in **Project #3** will be the average of the first two values,

$$\begin{aligned} \text{i.e } &= \frac{6+5}{2} = \frac{11}{2} = 5.5 \text{ SLOCS/Hour (Round up the number)} \\ &\approx 6 \text{ SLOCS/Hour} \end{aligned}$$

Walk Through Example: Coding

Step 3: Extrapolate Work Size

Example: Write code

➤ **Given:** Work size for Coding task = 4570 SLOC
= **4.57 KLOC**

➤ Need to extrapolate work size for:

- Prepare/Execute Test Cases
 - Fix Found Defects
 - Test Fixed Defects
 - Rework
- Example of questions to think for extrapolating:
- What is the average no. of test cases per **KLOC** in both Projects?
 - What is the average no. of defects per **KLOC** in both Projects?

Task Name	Amount Of Work
▸ Coding and Unit Test	
Write Code	4570 SLOC
▸ Unit Testing	
Prepare/Execute Test cases	
Fix Found Defects	
Test Fixed Defects	
▸ Code Inspection	
Prepare for Code Inspection	
Code Inspection Meeting	
Rework	

Prepare/Execute Test Cases

In Project #1:

Number of Test Cases/KLOC for “Prepare/Execute Test Cases”

$$= \frac{207 * 1000}{4233} = 48.90 \approx 49 \text{ Test Cases/KLOC} [\text{Round up to next integer}]$$

In Project #2:

Number of Test Cases/**K**LOC for “Prepare/Execute Test Cases”

$$= \frac{572 * 1000}{6325} = 90.43 \approx 91 \text{ Test Cases/KLOC}$$

Average of Test Cases/KLOC from Project #1 & Project #2

$$= \frac{49 + 91}{2} = \frac{140}{2} = 70 \text{ Test Cases/**K**LOC}$$

In Project #3: Taking the average value $70 * 4.57 = 319.9 \sim 320$ Test Cases

Fix Found Defects

In Project #1:

Number of Defects/**K**LLOC for “Fix Found Defects”

$$= \frac{188 * 1000}{4233} = 44.41 \approx 45 \text{ Defects/KLOC}$$

In Project #2:

Number of Defects/**K**LLOC for “Fix Found Defects”

$$= \frac{512 * 1000}{6325} = 80.94 \approx 81 \text{ Defects/KLOC}$$

Average of Defects/**K**LLOC from Project #1 & Project #2

$$= \frac{(45 + 81)}{2} = \frac{126}{2} = 63 \text{ Defects/KLOC}$$

In Project #3: Taking the average value $63 * 4.57 = 287.91 \sim 288$ Test Cases

Test Fixed Defects

Same as Fix Found Defects.

Rework

In Project #1:

Number of Defects/KLOC for “Rework”

$$= \frac{188 * 1000}{4233} = 44.41 \approx 45 \text{ Defects/KLOC}$$

In Project #2:

Number of Defects/KLOC for “Rework”

$$= \frac{912 * 1000}{6325} = 144.18 \approx 145 \text{ Defects/KLOC}$$

Average Number of defects/KLOC for Project #1 & Project #2

$$= \frac{(45 + 145)}{2} = \frac{190}{2} = 95 \text{ Defects/KLOC}$$

In Project #3: Taking the average value $95 * 4.57 = 434.15 \sim 435$ Test Cases

Calculated Values for Project #3

Task Name ▼	Amount of Work ▼	Productivity Rate ▼
▸ Coding and Unit Test		
Write Code	4570 SLOCS	5 SLOCS/Hour
▸ Unit Testing		
Prepare/Execute Test Cases	320 Test Cases	17 Test Cases/Day
Fix Found Defects	288 Defects	7 Defects/Day
Test Fixed Defects	288 Defects	13 Defects/Day
▸ Code Inspection		
Preparation for Code Inspection		149 SLOCS/Hour
Code Inspection Meeting		195 SLOCS/Hour
Rework	435 Defects	5 Defects/Hour

Questions ?

