

NATIONAL INSTITUTE OF TECHNOLOGY SILCHAR

Cachar, Assam

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Subject Name: Software Engineering

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Q.1. Explain the COCOMO Model. Suppose a project was estimated to be 20,000 LOC. $(a, b) = (2.4, 1.05)$ and $(c, d) = (2.5, 0.38)$ are the multiplicative and exponential factor for basic COCOMO effort estimation eqn and development time estimation eqn. Calculate the Effort, development time, average staff size, and productivity of the project..

→ The COCOMO Model (Constructive Cost Model) is a regression model based on LOC (number of Line of Code). It is a procedural software cost estimation model developed by Barry W. Boehm, based on Heuristic Estimation Technique. This model implies that the size is the primary factor for cost, and other factors have lesser effect. The COCOMO model is also subdivided into three types:

- Basic COCOMO Model
- Intermediate COCOMO Model
- Complete COCOMO Model

Given,

$$\begin{aligned} \text{LOC} &= 20\text{K} \Rightarrow \text{KLOC} = 20 \\ (a, b) &= (2.4, 1.05) \\ (c, d) &= (2.5, 0.38) \end{aligned}$$

We have,

$$\begin{aligned} \text{Effort} &= a * (\text{KLOC})^b \text{ PM} \\ &= 2.4 * (20)^{1.05} \text{ PM} \\ &= 55.756 \text{ PM} \end{aligned}$$

$$\begin{aligned} \text{Development Time, } T_{\text{dev}} &= c * (\text{Effort})^d \text{ months} \\ &= 2.5 * (55.756)^{0.38} \text{ months} \\ &= 11.52 \text{ months} \end{aligned}$$

$$\begin{aligned} \text{Average Staff Size} &= \text{Effort} / T_{\text{dev}} \\ &= 55.756 / 11.52 \\ &= 4.83 \\ &= 4 \text{ staff} \end{aligned}$$

$$\begin{aligned} \text{Productivity} &= \text{KLOC} / \text{Avg. Staff Size} \\ &= 20 / 4 \\ &= 5 \text{ KLOC per staff-month} \end{aligned}$$

Therefore, Effort = 55.756 PM
 $T_{\text{dev}} = 11.52$ months
 Avg. Staff Size = 4 staffs
 Productivity = 5 KLOC per staff