**SOEN 6841**

**Software Project Management – Assignment 2**

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**3.2 Describe the COCOMO technique for deriving effort and cost estimates for software projects?**

* COCOMO stands for Constructive Cost Model, a well-documented, independent model. Unlike the Function Point Analysis, the COCOMO doesn’t use past data, it purely depends on the current project data. This model uses the project assumptions, other factors that are based on cost, and definition for any project. Lines of code that a program contains are necessary to estimate the effort. There are three different ways to calculate the effort. Basic, Intermediate, and Detailed COCOMO estimation techniques.

1. **BASIC COCOMO:**

* A rough estimate based on the software size and is useful during the initial stages of any given project. The basic COCOMO model assumes that the effort is only a function of the number of lines of code and some constants evaluated according to the type of software system.

Effort (p-m) = A \* (SIZE IN KLOC)sf,

Where, p-m – Person Months

A – Constant value (Say 2.94)

SF – exponent scale factor

KLOC – Thousands of Lines of code

* After calculating the effort in person-months, the cost can be estimated by multiplying the effort and the cost per person per month which is the hourly based salary of individual persons.
* These cost estimates are calculated by using certain techniques like activity-based costing or cost factor analysis.

1. **INTERMEDIATE COCOMO:**

* In this method we estimate the effort using the product size.
* Here in this model, the parameters include 15 cost drivers are used. Cost effort is any factor that directly or indirectly influences the effort and cost of the project.
* These cost drivers are divided into a few groups that are: product attributes, hardware attributes, project attributes, etc., each of these are rated on a scale ranging from very low to extra high.

Effort = A \* EAF \*(SIZE IN KLOC)sf,

Where, A – Constant (Say 2.94)

EAF – Effort Adjustment Factor.

SF – exponent scale factor

KLOC – Thousands of Lines of code

* Once the adjusted effort is estimated the cost is calculated by multiplying the effort by the labor cost per person-month.

1. **DETAILED COCOMO:**

* The main purpose of the model is to estimate by dividing the project into small tasks. The factors that are used in the intermediate model and the additional information of each component of the project.
* When a project is divided into several phases each of them has a unique effort estimation.

Effort = ∑(A \* EAFi \*(SIZE IN KLOC)sf),

**COCOMO ESTIMATION MODELS:**

1. **Application Composition Model:** This is based on the number of application points, used for Systems developed using dynamic languages, DB programming, etc.
2. **Early Design Model:** This is based on several function points used for initial effort estimation and it is based on the system requirements and the design options.
3. **Reuse Model:** The reuse model is based on the lines of code that are reused or generated, used to estimate the effort and to integrate reusable components or the code that is generated by default.
4. **Post-architecture Model:** The number of lines of source code is estimated by this model and is used for Development effort based on system design specification.

In conclusion, COCOMO estimates the effort, cost, and time of a given project according to its size and based on the factors that affect the cost drivers.

**REFERENCE**:

1. <https://concordiauniversity.on.worldcat.org/oclc/774289078>