LOC Based Estimation.

Size Oriented Metrics:

LOC → Lines of Code.

↳ Direct Approach for measuring.

Cost of Lines of Code = $\frac{\text{Cost}}{\text{LOC}}$.

Total Estimated project Effort = $\frac{\text{Estimated Lines of Code}}{\text{Average productivity}}$.

1. Cost of LOC = $\frac{\text{Avg. Labour Cost}}{\text{Avg. Productivity.}}$

2. Total Estimated project Cost = Cost of LOC x Total Estimation.

3. Total Estimated project Effort = $\frac{\text{Total Estimation}}{\text{Avg. Productivity}}$.

Ex:

	Function	Estimated LOC
1.	User Interface & Control facility	2,300
2.	Two-Dimensional geometric Analysis	5,300
3.	3D geometric analysis	6,800
4.	Database Mgmt ~~System~~	3,350
5.	Computer graphics & Display facility	4,950
6.	Peripheral Control function	2,100
7	Design Analysis model	8,400
	Estimated Lines of Code	33,200

(+)

Average productivity based on historical data is 620 LOC/pm and labour rate is Rs. 8000 pm. Find the Total estimated project cost and effort.

Soln:

Total Estimation of LOC = 33,200

Avg. productivity = 620 loc per month.

Labour rate = Rs 8000 per month.

$$\text{Cost of LOC} = \frac{\text{Avg. Labour cost}}{\text{Avg. productivity}}$$

$$= \frac{8000}{620} = 12.9 = \text{Rs. } 13.$$

Total Estimated project cost = Cost of LOC x Total Estimation

$$= 13 \times 33,200$$

$$= 431,000$$

$$\text{Effort} = \frac{\text{Total Estimation}}{\text{Avg. productivity}}$$

$$= \frac{33,200}{620} = 53.8 \simeq 54 \text{ persons.}$$

Ex:

Consider the project ABC with some functions

Function	Estimated LOC
F_1	2500
F_2	5600
F_3	6450
F_4	3100
F_5	4740
F_6	2250
F_7	7980

and Avg. productivity is 500 Loc/pm and avg labor cost is 6000 per month. Calculate the estimated project cost and effort.

Function Oriented Metrics:

Types of FP Attributes

	Low	Avg	Complex/ Moderate
No. of External Inputs (EI)	3	4	6
" " Outputs (EO)	4	5	7
" " Logical inquiries (EQ)	3	4	6
" Internal Files (ILF)	7	10	15
" External interface file (EIF)	5	7	10.

Scale Table:

0 - No influence
1 - Incidental
2 - Moderate
3 - Average
4 - Significant
5 - Essential

FP = Function Point, UFP = Unadjustable Function Point.
CAF = Complexity Adjustment factor.
VAF = Value Adjustment factor.

$$FP = \underbrace{UFP}_{(or)\ CAF} \times VAF \rightarrow [0.65 + 0.01 \times \Sigma(F_i)]$$

↳ Total Count

$\Sigma(F_i)$ = Sum of all 14 questionnaires (i ranges from 1 to 14)
Usually $\Sigma(f_i)$ value will be given.

(TDI)

Note: → Total Degree of influence (0, 1, 2, 3, 4, 5)

$\Sigma(f_i)$ ranges from 0 to 70 (i.e.)

i) when $\Sigma(F_i) = 0$ [$\because 0 \times 14 = 0$] then VAF = 0.65

ii) when $\Sigma(F_i) = 70$ [$\because 5 \times 14 = 70$] then VAF = 1.35

1. Ex:

Consider the following FP Components & their Complexity. If the total degree of influence is 52, find the estimated function points.

Function type	Estimated Count	Complexity
EIF	2	6
ILF	4	7
EQ	22	6
EO	16	15
EI	24	10

Soln:

$$FP = CFA \times VAF$$

$$= \text{Total Count} * [0.65 + (0.01 \times \Sigma(f_i))]$$

Total Count = $2*6 + 4*7 + 22*6 + 16*15 + 24*10$

$= 12 + 28 + 132 + 240 + 240$

Total Count = 652 → CFA

$$VAF = 0.65 + (0.01 \times (\Sigma f_i))$$

$$VAF = 0.65 + (0.01 \times 52)$$

$$= 0.65 + 0.52$$

VAF = 1.17

$$FP = 652 \times 1.17$$

$$= 762.8 \approx 763 \text{ //}$$

2) Ex:

Given the values, compute function point when all Complexity adjustment factor and weighting factors are average. and 14 algm have been Counted.

EI = 50
EO = 40
EQ = 35
ILF = 6
EIF = 4

Soln:

$FP = CFA * (0.65 + (0.01 * \Sigma(Fi)))$.

= Total Count

Complexity adjustment is average ∴ Scale = 3

∴ Total Count = $50 \times 4 + 40 \times 5 + 35 \times 4 + 6 \times 10 + 4 \times 7$

= 628.

$\Sigma(Fi) = 14 * 3 = 42$ [∵ There are 14 steps so multiply 3 with 14].

∴ $FP = 628 \times (0.65 + (0.01 \times 42))$

$= 628 \times 1.07$

$= 671.9 = 672$ //.

3 Mark

Ex: Compute FP value for a project with the following information domain characteristics

no of user i/p = 24,
" o/p = 65
" user inquiries = 12
Nor of files = 12
" external interface = 4

Ans: 759.

Assume all complexity adjustment values are moderate & 14 Algm have been Counted.

↳ 2 for VAF

↗ Complex for Total count

i) Cost per FP = $\frac{\text{Average Labour Rate}}{\text{Average Productivity}}$.

ii) Total Estimated Project Cost = Cost per FP x Total Count. (FP Estimated)

iii) Total Estimated Project Effort = $\frac{\text{FP Estimated}}{\text{Average Productivity}}$.

i) Cost per FP = $\frac{8000}{6.5}$ = $1230.

ii) Total Estimated Project Cost = 1230 x 375
= $461,000.

iii) Estimated Effort = $\frac{375}{6.5}$ = 57.6 ≃ 58 persons.

Process Based Estimation

Total Estimated project Cost = Effort x Labour Rate.