

ch2+ch3 (Numerical)

- ① Calculate the adjusted function point for a s/w application with a total unadjusted function point of count 400 with some following values:

external input (low) = 3

external output (low) = 2

external inquiries (low) = 1

internal logical files (low) = 7

external interface files (low) = 2

Soln Here we will be referencing the below table to calculate the ~~total unadjusted function point~~ $\sum(F_i)$ value:

	Low	Average	High
External I/p files			
External o/p files	3	4	6
External inquiries	4	5	7
Internal logical files	3	4	6
External interface files	7	10	15
	5	7	10

So, the formula to calculate the adjusted fop

$$F.P = \text{Total unadjusted fop} \times [0.65 + 0.01 \times \sum(F_i)]$$

$$F.P = 400 \times [0.65 + 0.01 \times \sum(F_i)] \quad \text{--- (1)}$$

We know,

$$\sum(F_i) = 3 \times 3 + 4 \times 2 + 3 \times 1 + 5 \times 2 + 7 \times 1$$

$$= 9 + 8 + 3 + 10 + 7$$

$$= 37$$

\therefore From eq n (1)

$$F.P = 400 \times [0.65 + 0.01 \times 37]$$

$$= 400 \times [0.65 + 0.37]$$

$$= 400 \times 1.02$$

$$= 408$$

\therefore The required adjusted f.p value = 408 //

- ② You are required to develop a Hotel management system in which the estimated LOC calculated to be 85,000 and a review of historical data reveals that the average productivity for this system is 200 LOC/pm and the labour rate is 7500 per month.

What would be the estimated project cost and estimated effort for this kind of S/W?

Soln Here we are given with

$$\text{estimated LOC} = 85000$$

$$\text{average productivity} = 200 \text{ LOC/pm}$$

$$\text{labour rate} = 7500/\text{month}$$

To find: estimate project cost = ?
estimated effort = ?

we know that:

$$\text{productivity} = \frac{\text{NOP (new object point)}}{\text{effort}}$$

$$\text{effort} = \frac{\text{NOP}}{\text{productivity}}$$

$$\text{effort} = \frac{85000}{200}$$

$$\therefore \text{Effort} = 425 \text{ pm}$$

$$\begin{aligned} \therefore \text{estimated project cost} &= \text{effort} \times \text{labour rate} \\ &= 425 \times 7500 \\ &= \text{Rs } 3,187,500 \end{aligned}$$

- ③ A college MIS has to be developed in which the estimated LOC = 58,000 and average productivity is 500 LOC/pm and the labour rate is Rs 20,000/pm. Calculate the estimated project cost and estimated effort for the given S/W.

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soln Given

$$LOC = 58000$$

$$productivity = 500 LOC/pm$$

$$labour rate = ₹20,000/pm$$

$$\text{to find: Project Cost} = ?$$

$$effort = ?$$

we know

$$productivity = \frac{LOC}{effort}$$

$$\therefore effort = \frac{LOC}{productivity}$$

$$\therefore effort = \frac{58000}{500} = 116 pm$$

$$\therefore effort = 116 pm$$

$$project cost = effort \times labour rate$$

$$\therefore PC = 116 \times 20,000$$

$$\therefore Project cost = ₹23,20,000 //$$

Q4) Consider a software development project has identified a risk related to potential data breach. The estimated probability of the data breach occurring during a project is 15% and the estimated financial impact in Rupees is 100000. Find Risk exposure.

soln

Given

$$Probability of data breach = 15\% = \frac{15}{100}$$

$$\therefore \text{probability of risk occurrence} = 0.15$$

$$\text{Cost of mitigating project risk} = 100000$$

$$\begin{aligned} \text{So, Risk exposure} &= PC \\ &= 0.15 \times 100000 \\ &= 10000 \times 15 \\ &= 15000 \end{aligned}$$

$$\therefore Risk exposure = 15000$$

(4)

⑤ Risk identification: only 60% of the s/w component scheduled for reuse will be integrated into the application. The remaining functionality will have to be custom developed.

Risk probability : 65% likely

Risk impact : 50 reusable s/w components were planned. If only 60% can be used, 70 components would have to be developed from scratch. The average component is : 200 LOC and Local data integrate that the s/w engineering cost for each LOC = \$20.

What will be the risk exposure = ?

↳ Here

$$\text{Risk occurrence probability} = P = 65\% = 0.65$$

$$\begin{aligned} \text{Cost of mitigating risk} &= 70 \times 200 \times 20 \\ &= 200 \times 200 \\ &= \$40,000 \end{aligned}$$

$$\begin{aligned} \text{So, Risk Exposure (RE)} &= P \times C \\ &= 0.65 \times 40,000 \\ &= 400 \times 65 \\ &= 26,000 \end{aligned}$$

⑥ Given data for a web based social media site developed by XYZ organization :

- No. of user input = 97
- No. of user output = 52
- No. of user enquiries = 48
- No. of external interface = 30
- No. of internal logical files = 60

Now assuming that the complexity of given web app development is average, calculate the function point if the productivity of XYZ's software developer is 32 f/p/m and salary structure is 13000/month on average.

estimate total cost of slw. (5)

Given
 user input = 97
 user o/p = 52
 external enquiries = 448
 external interface = 30
 internal logical files = 60

Productivity = 32 f.p./pm
 Salary (labour rate) = 13000/month

To find: adjusted function point (f.p.)?
 Total cost = ?

We know
 adjusted f.p. = Total unadjusted f.p. $[0.65 + 0.01 \times \sum(F_i)]$

Here we are said that, complexity of web app development is average = 80,
 $\sum(F_i) = 45$

$$\begin{aligned} \text{Total unadjusted f.p.} &= 97 \times 4 + 52 \times 5 + 448 \times 4 \\ &\quad + 30 \times 7 + 60 \times 10 \\ &= 388 + 260 + 1792 + 210 + 600 \\ &= 2650 \end{aligned}$$

So from eqn (1)

$$\begin{aligned} \text{f.p.} &= 2650 \times [0.65 + 0.01 \times 45] \\ &= 2650 \times (0.65 + 0.45) \end{aligned}$$

$$= 2650 \times 1.1 = 2915 //$$

Note: if No info about Total unadjusted f.p. is given

Then f.p. = process of find $\sum(F_i)$

Low	25
Avg	45
High	52

If 3 values are given i.e. 1, 2, 5, 9, 12, 1

$\therefore \sum(F_i) = \text{sum of all value}$

Total cost = effort * Labour rate

$$= \frac{\text{f.p.}}{\text{prod}} \times \text{labour rate}$$

$$= \frac{2915}{32} \times 13000 = 117343.75 //$$

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⑦ Compute f.p = ? from the given data. Also find productivity, documentation, cost/function. For a project with the following characteristics:

No. of user input = 27

No. of output = 43

No. of external inquiries = 5

No. of external interface files = 2

No. of internal logical files = 4

Effort = 32 pm, technical document = 360 pages, user document = 729 pages, cost = 8000/month.

Complexity values = 4, 7, 7, 3, 5, 5, 4, 4, 3, 3, 2, 3, 4, 5

Here,

$$\sum(P_i) = 4 + 7 + 7 + 3 + 5 + 5 + 4 + 4 + 3 + 3 + 2 + 3 + 4 + 5 = 47$$

Here since, no any information about complexity is provided. so we consider it to be average,

$$\begin{aligned} \text{Total unadjusted fp} &= 27 \times 4 + 43 \times 5 + 5 \times 4 \\ &\quad + 2 \times 7 + 4 \times 10 \\ &= 708 + 215 + 20 + 14 + 40 \\ &= 397 \end{aligned}$$

$$\begin{aligned} \therefore \text{f.p} &= 397 \times [0.65 + 0.01 \times 47] \\ &= 397 \times [0.65 + 0.47] \\ &= 397 \times 1.12 \\ &= 444.64 // \end{aligned}$$

$$\begin{aligned} \text{prod} &= \frac{\text{f.p}}{\text{effort}} \\ &= \frac{444.64}{32} \\ &= 13.895 \text{ fp/pm} // \end{aligned}$$

Total pages of documentation = User document + technical document

$$= 360 + 129$$

$$= 489$$

$$\text{documentation} = \frac{\text{Total pages of docs}}{F.P}$$

$$= \frac{489}{444.64}$$

$$= 1.099 //$$

$$\text{cost / function} = \frac{\text{cost}}{\text{productivity}}$$

$$= \frac{8000}{13.895}$$

$$= 575.746 //$$