Basic Assumptions:

a. Activities continue throughout the lifetime of the project.

b. Project has certain budget.

c. Calculation of project duration is based on person-month.

7 techniques are used in cost estimation:

1. **Parkinson's law:** It states that work expands so as to fill the time available for its completion. This means that cost is determined by the available resources rather than by objective assessment.

2. **Experts judgement:** Final cost estimate is arrived by consensus.

3. **Algorithm cost model:** A model is developed using historical cost information which relates some s/w metric. (generally it is measured in terms of KLOC) is a common way of measuring the s/w size.

4. Estimation by analogy :

Cost of a new project is estimated by analogy with those completed projects.

5. pricing to win :

Estimated project is based on the customer's budget

6. Top-down estimation is [a "Know how - show how"] - cost ~~est~~ estimations are made on the basis of logical functions, rather than the components estimating the function

7. Bottom up estimation :

Cost of each component is estimated. Calculate total costs.

Cost Estimation :

Cost estimation means amount of effort required to build the s/w.

prime factor : size

Measuring points : LOC (Lines of code) and fp (function points)

Objective :

- To get the fundamental estimation process.
- To generate the metric for s/w productivity assessment.
- Why different methods are used in different applications.

Function Points:

Function point is one of the most widely used measure of s/w size. The basis of fp is the functionality of the system, that is what the system performs. is the measure of s/w size.

In fp, the system's functionality is calculated in terms of no of function it implements, no of i/p's, o/ps, etc

The original formulation for computing the fp uses the count of five different parameters.

1. External inputs: each unique i/p type (data/control) which is given as input to the app from outside is considered as external inputs and it is counted. The source of external inputs can be user or application programs.

Ex: input files.

2. External Outputs:

each unique o/p that leaves the system boundary is counted as external o/p.

Ex: report / message etc.

3. logical internal file:

each app maintain information internally for performing its functions. Each logical group of data or control info which is generated, used and maintained by the app is counted as logical internal file.

Ex: master file, log file etc.

4. External interface file:

files that are passed and shared between applications are counted as external interface file.

5. External Queries:

A Query is defined as an input, output combination where the i/p causes the o/p to generate almost immediately. Each unique i/p-o/p pair is counted as External inquiry types.

function point Complexity weight

	Simple	Avg	Complex
External I/p	3	4	6
External O/p	4	5	7
External Queries	3	4	6
Logical internal file	7	10	15
External interface file	5	7	10

From the above table we compute Unadjusted function points (UFP) or Unadjusted function count (UFC).

$$Uf_p = \sum_{i=1}^{5} W_i * C_i$$

W_i is the entry in the ith row of the table for given project Complexity type. C_i is the count of no of elements of type i for given project complexity type.

Computing function point / Adjustable FP

To adjust the values of function point after getting UFC / UFP, TCF (Technical Complexity factor) is generated.

The TCF has 14 components of diff characteristics

1. Does the system require reliable backup / recovery?
2. Are data ~~comp~~ communication required?
3. Are there distributed processing functions?
4. What are the performing issues?
5. Will the system run in heavily utilized environment and operation?
6. Does the system require online data entry?
7. Does the data entry operation require the ~~inp~~ input transactions to be build over multiple screens?
8. Are the master files updated online?

9. Are i/p o/p files or enquiries complex?

10. Is the internal processing complex?

11. Is the port ~~reusa~~ reusable?

12. Whether installation included in design?

13. Is the system designed for multiple installation in diff organizations?

14. Is the app designed to facilitate changes?

a The decree of influence of each of these factors is taken to be from 0-5, representing 6 diff levels.

0: no influence.
1: insignificant influence
2: moderate "
3: Avg "
4: significant "
5: strong "

The 14 degrees of influence for the system are summed up to give the total N which is used to obtain Complexity Adjustment Factor (CAF) or Technical Complexity Factor (TCF)

$$CAF = 0.65 + 0.01 * N$$

The value of CAF or TCF ranges from 0.65 to 1.35 and the delivered function point / Adjustable function point / function point is calculated as

$$FP = TCF * UFP$$