The **function point** is a "unit of measurement" to express the amount of business **functionality** an information system (as a product) provides to a user. **Function points** are used to compute a **functional** size measurement (FSM) of software. The cost (in dollars or hours) of a single unit is calculated from past projects.

Estimation techniques are of utmost importance in software development life cycle, where the time required to complete a particular task is estimated before a project begins. Estimation is the process of finding an estimate, or approximation, which is a value that can be used for some purpose even if input data may be incomplete, uncertain, or unstable. This tutorial discusses various estimation techniques such as estimation using Function Points, Use-Case Points, Wideband Delphi technique, PERT, Analogy, etc.

A **Function Point** (FP) is a unit of measurement to express the amount of business functionality, an information system (as a product) provides to a user. FPs measure software size. They are widely accepted as an industry standard for functional sizing.

**Function Point Analysis (FPA) technique** quantifies the functions contained within software in terms that are meaningful to the software users. FPs consider the number of functions being developed based on the requirements specification.

**Function Points (FP) Counting** is governed by a standard set of rules, processes and guidelines as defined by the International Function Point Users Group (IFPUG). These are published in Counting Practices Manual (CPM).

Elementary Process (EP)

Elementary Process is the smallest unit of functional user requirement that −

* Is meaningful to the user.
* Constitutes a complete transaction.
* Is self-contained and leaves the business of the application being counted in a consistent state.

Functions

There are two types of functions −

* Data Functions
* Transaction Functions

Data Functions

There are two types of data functions −

* Internal Logical Files
* External Interface Files

Data Functions are made up of internal and external resources that affect the system.

## Definition of RETs, DETs, FTRs

### Record Element Type

A Record Element Type (RET) is the largest user identifiable subgroup of elements within an ILF or an EIF. It is best to look at logical groupings of data to help identify them.

### Data Element Type

Data Element Type (DET) is the data subgroup within an FTR. They are unique and user identifiable.

### File Type Referenced

File Type Referenced (FTR) is the largest user identifiable subgroup within the EI, EO, or EQ that is referenced to.

**Estimation in a project**

* Manually key in each use case and calculate the time consumed.
* Prepare a list of scenarios and calculate a rough estimate with keyed in sample time.

# **Estimation Techniques - FP Counting Process**

FP Counting Process involves the following steps −

* **Step 1** − Determine the type of count.
* **Step 2** − Determine the boundary of the count.
* **Step 3** − Identify each Elementary Process (EP) required by the user.
* **Step 4** − Determine the unique EPs.
* **Step 5** − Measure data functions.
* **Step 6** − Measure transactional functions.
* **Step 7** − Calculate functional size (unadjusted function point count).
* **Step 8** − Determine Value Adjustment Factor (VAF).
* **Step 9** − Calculate adjusted function point count.

Step 1: Determine the Type of Count

There are three types of function point counts −

* Development Function Point Count
* Application Function Point Count
* Enhancement Function Point Count

Step 2: Determine the Boundary of the Count

The boundary indicates the border between the application being measured and the external applications or the user domain. (Refer Figure 1)

To determine the boundary, understand −

* The purpose of the function point count
* Scope of the application being measured
* How and which applications maintain what data
* The business areas that support the applications

Step 3: Identify Each Elementary Process Required by the User

Compose and/or decompose the functional user requirements into the smallest unit of activity, which satisfies all of the following criteria −

* Is meaningful to the user.
* Constitutes a complete transaction.
* Is self-contained.
* Leaves the business of the application being counted in a consistent state.

For example, the Functional User Requirement − “Maintain Employee information” can be decomposed into smaller activities such as add employee, change employee, delete employee, and inquire about employee.

Each unit of activity thus identified is an Elementary Process (EP).

## Benefits of Function Points

Function points are useful −

* In measuring the size of the solution instead of the size of the problem.
* As requirements are the only thing needed for function points count.
* As it is independent of technology.
* As it is independent of programming languages.
* In estimating testing projects.
* In estimating overall project costs, schedule and effort.
* In contract negotiations as it provides a method of easier communication with business groups.
* As it quantifies and assigns a value to the actual uses, interfaces, and purposes of the functions in the software.
* In creating ratios with other metrics such as hours, cost, headcount, duration, and other application metrics.

Advantages and Disadvantages of Wideband Delphi Technique

Advantages

* Wideband Delphi Technique is a consensus-based estimation technique for estimating effort.
* Useful when estimating time to do a task.
* Participation of experienced people and they individually estimating would lead to reliable results.
* People who would do the work are making estimates thus making valid estimates.
* Anonymity maintained throughout makes it possible for everyone to express their results confidently.
* A very simple technique.
* Assumptions are documented, discussed and agreed.

Disadvantages

* Management support is required.
* The estimation results may not be what the management wants to hear.

Three-point Estimation looks at three values −

* the most optimistic estimate (O),
* a most likely estimate (M), and
* a pessimistic estimate (least likely estimate (L)).