19CSCI08I

Software Project Management

Lab (5)

Topics to be covered:

- Size estimations
  - Function points
    - Albrecht II function points

Lab (5) Estimations

After specifying the detailed aspects of the project whether as tasks or deliverables, we now focus on estimating the expected effort needed for project completion as well as the project size in terms of lines of code.

In order to calculate each, we use specific algorithms that provide a clear and structured method of calculation. The Function point and Albrecht II (modified version of Function points) algorithms are used to estimate software size.

A. Function Points:

This method of calculation considers all system components to belong to one of the following 5 categories:

1. External input types (EI)
2. External output types (EO)
3. External inquiry types (Queries) (EQ)
4. Logical internal file types (ILF)
5. External interface files (UI)

Each of these components may be of low, average or high complexity. The complexity level can be determined based on the tables below:

Table 1: Complexities for External input (EI)

	Number of data types		
Number of record types	1 – 4	5 – 15	16 – *

0 – 1	Low	Low	Average
2	Low	Average	High
3 – *	Average	High	High

Table 2: Complexities for External Output (EO) and External Queries (EQ)

	Number of data types		
Number of record types	1 – 5	6 – 19	20 – *
0 – 1	Low	Low	Average
2 – 3	Low	Average	High
3 – *	Average	High	High

Table 3: Complexities for files (ILF) and User Interfaces (UI)

	Number of data types		
Number of record types	< 20	20 – 50	> 50
0 – 1	Low	Low	Average
2 – 5	Low	Average	High
5 – * (More than 5)	Average	High	High

Steps of the Function Point algorithm:

1. Count the number of components per category
2. Identify the complexity of each component (using tables 1, 2, and 3)
3. For each component, determine the multiplier (weight) that is associated with each category at each complexity level.
4. Add the newly calculated numbers to get the total number of function points

After determining the complexity of each component, use the table below to determine the corresponding multipliers:

Table 4: Multipliers for each of the 5 categories based on the complexity level

Component category	Complexity of component		
	Low	Average	High
External Input	3	4	6
External Output	4	5	7
External Queries	3	4	6
Internal Logical Files	7	10	15
User Interface	5	7	10

Note:

✓ The unit for the result is FP (function points)

- ✓ FP can be converted into lines of code (LOC) if needed
- ✓ Conversion of FP to LOC depends on the programming language that is to be used

A. Albrecht II Function points:

- ❖ This is an improved version of the above algorithm that handles data a bit differently

- ❖ This algorithm is concerned with 3 main type categories:

1. Inputs
2. Outputs
3. Entities (Storage)

- ❖ The number of elements that belongs to each calculated is calculated

- ❖ We then substitute the calculated numbers into the following equation:

$$Fp\ count = N_i * 0.58 + N_e * 1.66 + N_o * 0.26$$ Where

$N_i \rightarrow Number\ of\ input\ elements$

$N_e \rightarrow Number\ of\ entity\ elements$

$N_o \rightarrow Number\ of\ output\ elements$