LAB Manual

PART A

(PART A : TO BE REFFERED BY STUDENTS)

Experiment No.05

A.1 Aim:

Implement a program to estimate the cost of a project.

Prepare cost estimation for selected problems.

A.2 Prerequisite:

- Project Goals
- Target Audience
- Types of software
- Size of the project
- Development team size

A.3 Outcome:

After successful completion of this experiment students will be able to:

1. Estimate the productivity
2. Estimate the cost of each functionality of a project

A.4 Theory:

The Function Point Analysis technique is used to analyze the functionality delivered by software and Unadjusted Function Point (UFP) is the unit of measurement.

Objectives of FPA:

- The objective of FPA is to measure the functionality that the user requests and receives.
- The objective of FPA is to measure software development and maintenance independently of the technology used for implementation.
- It should be simple enough to minimize the overhead of the measurement process.
- It should be a consistent measure among various projects and organizations.

A.5 Procedure/Algorithm:

- Count the number of functions of each proposed type.
- Compute the Unadjusted Function Points(UFP).
- Find Total Degree of Influence (TDI).
- Compute Value Adjustment Factor (VAF).

  VAF = (TDI * 0.01) + 0.65
- Find the Function Point Count (FPC).

  FPC = UFP * VAF

PART B

(PART B : TO BE COMPLETED BY STUDENTS)

(Students must submit the soft copy as per following segments within two hours of the practical. The soft copy must be uploaded on the Blackboard or emailed to the concerned lab in charge faculties at the end of the practical in case there is no Black board access available)

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Date of Experiment: 15-02-2023	Date of Submission 15-02-2023
Grade :	

B.1 Answers of Task to be written by student:

(Paste your answers completed during the 2 hours of practical in the lab here)

Project Goals

- Develop a web-based project management tool that allows teams to collaborate and track their tasks and deadlines in real-time.
- Implement a machine learning algorithm that analyzes customer behavior and recommends personalized products for an e-commerce website.
- Build a mobile app that helps users learn and practice a new language through interactive games and exercises.

Target Audience

- The project management tool targets small to medium-sized businesses that need a streamlined way to manage their projects and teams.
- The e-commerce website targets consumers who are looking for personalized shopping experiences and recommendations.
- The language learning app targets language learners of all ages and proficiency levels who want to improve their language skills in a fun and engaging way.

Types of software

- The project management tool will be a web-based application built with technologies such as React, Node.js, and MongoDB.
- The e-commerce website will be a combination of a web-based front-end and a back-end built with technologies such as Python, Django, and PostgreSQL.
- The language learning app will be a mobile application built with technologies such as Swift for iOS and Kotlin for Android.

Size of the project

- The project management tool will have a medium-sized scope, with an estimated development time of 6-9 months.
- The e-commerce website will have a larger scope, with an estimated development time of 12-18 months.
- The language learning app will have a smaller scope, with an estimated development time of 3-6 months.

Development team size

- The project management tool will require a development team of 4-6 people, including a project manager, front-end and back-end developers, and a quality assurance specialist.
- The e-commerce website will require a development team of 8-12 people, including a project manager, front-end and back-end developers, database administrators, and quality assurance specialists.
- The language learning app will require a development team of 2-4 people, including a project manager, mobile app developers, and a quality assurance specialist.

A web-based e-commerce project has the following proposed types of functions:

1. Data Input Functions:

- Product Information Input Form

- Customer Information Input Form
- Payment Information Input Form
- Search Bar
- Filter and Sort Products

2. Data Output Functions:

- Product Catalog Display
- Shopping Cart Display
- Order Confirmation Display
- Order Tracking Display
- Recommended Products Display

3. User Inquiry Functions:

- Contact Us Form
- Frequently Asked Questions (FAQ) Display
- Product Reviews and Ratings Display
- Order History Display
- Return and Refund Form

4. External Interface Functions:

- Payment Gateway Integration
- Shipping Provider Integration
- Social Media Integration
- Third-Party Analytics Integration

Based on these proposed functions, we can calculate the Unadjusted Function Points (UFP) as follows:

1. Data Input Functions (11 functions):

- Simple: 5 x 1 = 5
- Average: 5 x 2 = 10

Complex: 1 x 3 = 3

- Total: 5 + 10 + 3 = 18

2. Data Output Functions (10 functions):

- Simple: 3 x 1 = 3
- Average: 5 x 2 = 10

Complex: 2 x 3 = 6

- Total: 3 + 10 + 6 = 19

3. User Inquiry Functions (10 functions):

- Simple: 4 x 1 = 4
- Average: 4 x 2 = 8

Complex: 2 x 3 = 6

- Total: 4 + 8 + 6 = 18

4. External Interface Functions (4 functions):

- Simple: 1 x 1 = 1
- Average: 2 x 2 = 4

Complex: 1 x 3 = 3

- Total: 1 + 4 + 3 = 8

Total Unadjusted Function Points (UFP): 18 + 19 + 18 + 8 = 63

Next, we need to calculate the Total Degree of Influence (TDI) based on 14 general system characteristics:

1. Data communication
2. Distributed data processing
3. Performance
4. Heavily used configuration
5. Transaction rate
6. Online data entry

7. End-user efficiency
8. Online update
9. Complex processing
10. Reusability
11. Installation ease
12. Operational ease
13. Multiple sites
14. Facilitation of change

For each of these characteristics, we assign a rating from 0 to 5 based on their degree of influence on the project. Let's assume the following ratings for our e-commerce project:

1. Data communication: 4
2. Distributed data processing: 3
3. Performance: 4
4. Heavily used configuration: 2
5. Transaction rate: 3
6. Online data entry: 4
7. End-user efficiency: 4
8. Online update: 3
9. Complex processing: 3
10. Reusability: 2
11. Installation ease: 3
12. Operational ease: 4
13. Multiple sites: 1
14. Facilitation of change: 3

Total Degree of Influence (TDI): 4 + 3 + 4 + 2 + 3 + 4 + 4 + 3 + 3 + 2 + 3 + 4 + 1 + 3 = 41

Using the TDI value, we can now calculate the Value Adjustment Factor (VAF) as follows:

VAF = (TDI * 0.01) + 0.65 = (41 * 0.01) + 0.65 = 0.06 + 0.65 = 0.71

FPC = UFP * VAF = 63 * 0.71 = 44.73

Therefore, the Function Point Count (FPC) for this e-commerce project is approximately 44.73. This metric can be useful for estimating the size of the project, estimating development effort, and predicting project cost and schedule. Keep in mind that this is just one of several methods for software sizing and estimation, and it's important to consider other factors such as project complexity, team experience, and technology stack when making these estimates.

B.2 Observations and learning:

> ***(Students are expected to comment on the output obtained with clear observations and learning for each task/ sub part assigned)***

Observations:

- The project had a total of 33 proposed functions across 4 different types.
- The Unadjusted Function Points (UFP) for the project was 63, which is in the range of a medium-sized project.
- The Total Degree of Influence (TDI) for the project was 41, which indicates moderate complexity across several system characteristics.
- The Value Adjustment Factor (VAF) for the project was 0.71, which is moderately high and suggests some complexity and risk factors in the project.
- The resulting Function Point Count (FPC) for the project was approximately 44.73, which can be used for estimating project size, effort, cost, and schedule.

Learning points:

- Function Point Analysis is a useful method for software sizing and estimation that helps break down a project into discrete functions and assess their complexity.
- The Unadjusted Function Points (UFP) for a project can be calculated by categorizing the functions into different types and assigning weights based on their complexity.
- The Total Degree of Influence (TDI) for a project can be calculated by assessing the impact of various system characteristics on the project.
- The Value Adjustment Factor (VAF) for a project can be calculated by combining the TDI and other risk factors to adjust the UFP for the specific project.

- The resulting Function Point Count (FPC) can be used to estimate project size, effort, cost, and schedule, but it's important to consider other factors such as project complexity, team experience, and technology stack.

B.3 Conclusion:

> ***(Students must write the conclusion as per the attainment of individual outcome listed above and learning/observation noted in section B.3)***

In conclusion, the Function Point Analysis method provides a structured approach for estimating the size, effort, cost, and schedule of software development projects. By breaking down a project into discrete functions and assessing their complexity, we can calculate the Unadjusted Function Points (UFP) and Total Degree of Influence (TDI) for the project. The Value Adjustment Factor (VAF) can then be used to adjust the UFP based on specific risk factors and other project characteristics. The resulting Function Point Count (FPC) can be a useful metric for estimating project size, effort, cost, and schedule.

However, it's important to keep in mind that the accuracy of these estimates depends on many factors, including project complexity, team experience, and technology stack. Additionally, Function Point Analysis is just one of several methods for software sizing and estimation, and different methods may be more appropriate for different types of projects. Ultimately, a combination of different estimation methods and expert judgment is often needed to develop accurate and reliable estimates for software development projects.