

## Apply Function Point Approach To Improving The Accuracy Of Software Cost Estimation With Use Case Of IES

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### ABSTRACT

Today in the commercial world, the most important test to estimate the project cost to avoid any lose in the project and also submit the project on time .The software project cost which is based on functional point is the best practice and approach. But this is not possible for all software projects to apply this type of method to find out exact cost with in time and without delay. So the purpose of this research paper is to compute the experimental evaluation of layers based software cost and centre on type of the domain of the software projects. COCOMO and other model are based on two layer architecture of software cost estimation and that is not feasible to work out the cost or agenda the project development based on software development life cycle is not practicable and the data calm from top MNCs and education systems during my research paper are having a huge margin of real cost and the cost intended from COCOMO and Function Point models. In my research paper I have tried to present that the function point based estimation with exists deviation among actual as well as estimated effort. Here I have take use case of institute examination systems for calculating function point. Through analysis which will be supported leading different traditions users interrelate in the midst of computerized systems we will achieve this result. Also we will define to use case in the implementation research work through which we will achieve accuracy in the software development cost estimation. In my paper taking use case of IES is to make available all the services to the students interconnected with the examination system.

**KEY WORDS:** Function Point, Estimation, Database, External inputs, outputs, quires and internal files, IES, Internal logical files and Cost.

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### I. INTRODUCTION

In this paper I had added function point based software cost estimation methodology with an enhanced approach, focus on type of the area of the software projects. The assessment of a project based on three layers should be the first step for a scheme manager before going to find the cost or effort of the project. Accountability of project boss is to have perfect estimates of effort, cost, with schedule concerned in software growth. My move on the way to meets the goal of any education institution to achieve the best schedule and cost finding procedure for examination process, have accurate estimates of effort, cost also schedule involved in software expansion. The new better three layers building of software cost estimation is to tune parameters of constructive cost model and purpose point method which is mostly used in corporate for estimation of cost and schedule.

The third layer attribute schema are based on the influence factor cost driver, which are Attributes on different function such as Product, Hardware, Personnel, and Project.

### II. ESTIMATION OF SOFTWARE COST PROCESS

The declaration of this paper work is that assumption of the cost of effort necessary for the creation of a project. Estimation cost of process software is a set of events that is use to manage software cost approximation but it has much failure and causes the software crisis. A set of inputs to course and then the procedure uses these inputs to create otherwise calculate output set. The two layer structural design of software cost estimation is not feasible to cost computation and effort of any software development, so my paper is completely focused on the

three layers based software cost inference. Here we will define to use one use case in the implementation research work. Programming ventures are infamous for going past their due date, going over funds, or both.

The cost estimation is usually depends on the project size estimate, which may use metrics purpose points or code of line. There are quite a few number of techniques for performing cost of software opinion, in which expert decision and algorithmic models are also considered. Based on my survey on education system as a research scholar, I have analyzed all the process and come to know that the system will use the function point for cost estimation but have to follow the detail analysis and the process as per expert ruling and heuristic knowledge. Expert estimation judgment is a common way of effort estimating necessary for a project.

The cost estimation nature display isn't such a huge quantity of described to the original evaluation, yet rather the speed at which the assessment unites to the genuine cost of the undertaking. COCOMO is a well-known algorithmic model for cost estimation whose cost components can be adjusted to the individual improvement condition, which is imperative for the exactness of the cost gauges. More than one technique for cost estimation ought to be done as such that there is some correlation available for the evaluations.

### **III. SOFTWARE GROWTH PROJECT EVALUATION**

The four essential steps in software growth project assessment:

1. Guess the measure of growth item. This for the most part winds awake in whichever lines of code or FP, however readily available are previous likely units of calculate.
2. Approximation attempt in human resource-months and hours.
3. Analyze duration in months.
4. Analyze project cost.

#### **Software development charge mechanism:**

- Cost of hardware and software.
- Cost of journey and preparation.
- Effort charges.
- ✓ Engineers cost in development involvement.
- ✓ Costs of community and assurance.

#### **Costing:**

- To discover cost estimates of developers while generating a software system.
- The cost in a project is due to the desires for s/w and h/w.
- Price estimates mostly are precise in person-months (PM).
- The arrangement costs anything the client needs to spend on it.

### **IV. PRACTICAL IMPLEMENTATION USE CASE (IES)**

Function point for institute examination systems.

In this paper, we explain the proposed method with practical implementation by considering the Institute Examination Systems (IES). The purpose of IES is to present all the facilities to the students related with the examination. The IES is to mechanize the examination activities so that different types of the users like students, faculty, and administration can use it according to their need. Such type of systems is used to reduce the need of the paper work; and also used to reduce the wastage of the paper. With the help of the IES, students can perform the following activities:

- (i) download their hall tickets,
- (ii) submit the examination fee
- (iii) check their attendance
- (iv) check whether the students are eligible to appear in the end semester examination or not
- (v) to check the seating arrangement, etc.

In the similar way, other users like faculty members and the administration have their requirements. Here we have also show the block diagram of the institute examination system.

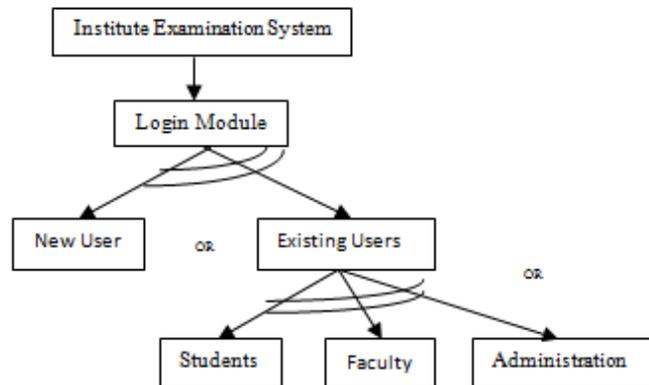


Fig. 1 IES mode graph:AND/OR

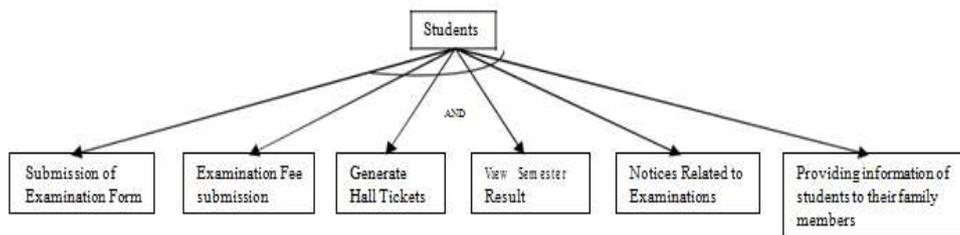


Fig. 2 Student Activities : modification and disintegration

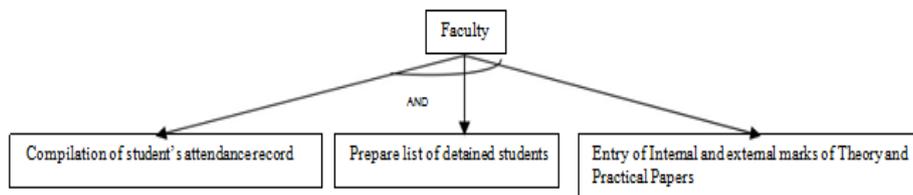


Fig. 3 Faculty Module : modification and disintegration

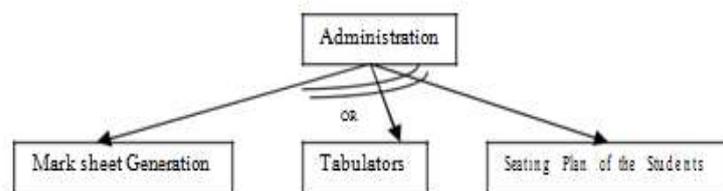


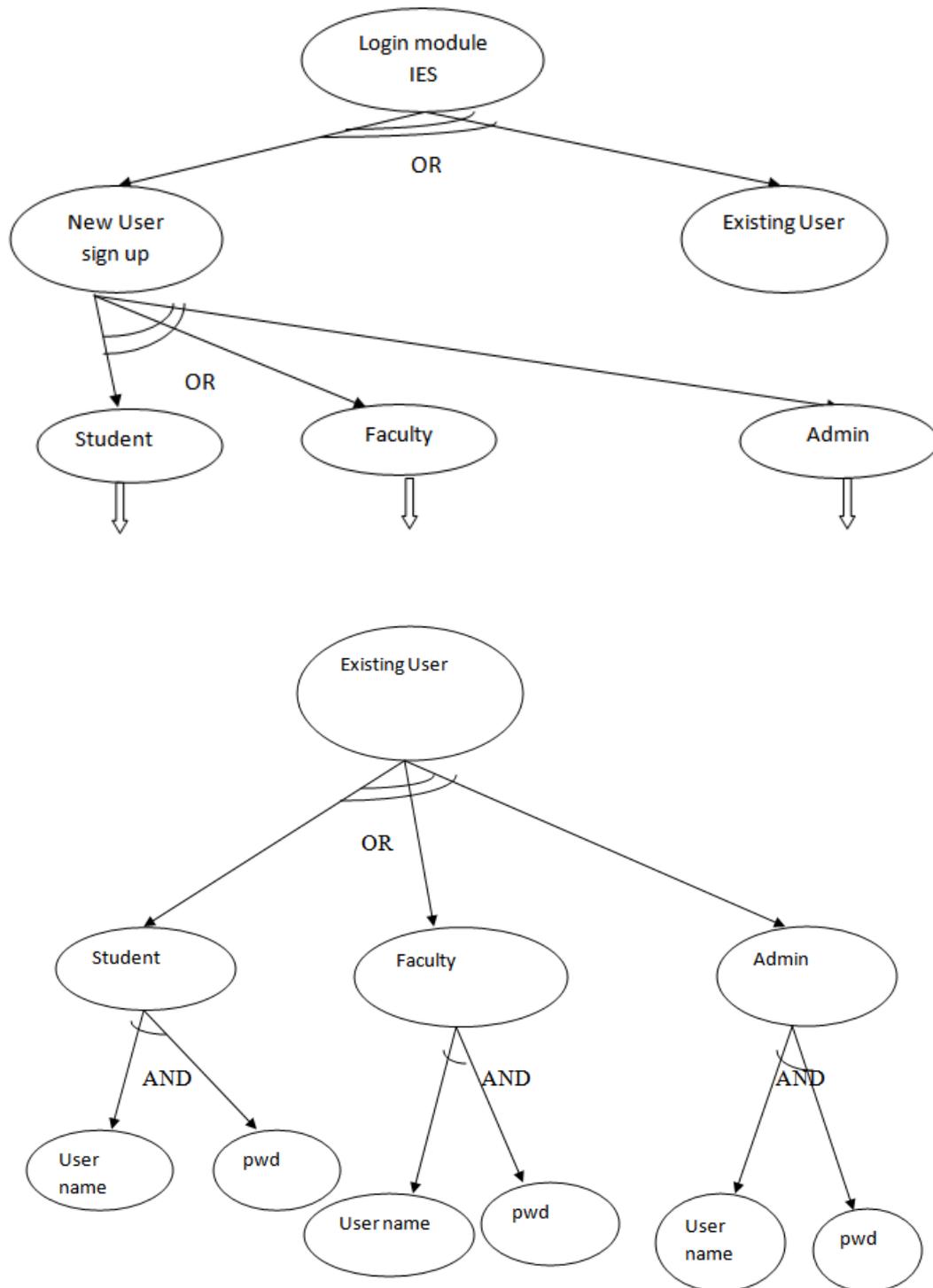
Fig. 4 Administration Module : modification and disintegration

In Fig.1, there are three sub-goals, i.e., students, faculty, and administration. These sub-goals are connected with the logically as shown in Fig. 2,3 and 4. It means that the success of all the sub-goals will lead to the success of the parent goal. We further refined and decomposed the results of Fig. 1 and extended AND/OR graph is given in Fig. 5. After refining and decomposing the sub-goals of Fig. 5, we construct the AND/OR graph for

examination activities of the students, as shown in Fig. 6. The AND/OR graph for faculty and administration module is given in Fig. 7 & Fig. 8. Finally, we have identified the functional requirements (FR) for the sub-goals.

Layer 0: In this layer, we identify the requirements of IES with the help of GOREM. Therefore, to identify the requirements, we first refine and decompose the IES into sub-goals; and as a result we have identified the sub-goals.

In the given below figures 5, 6, 7 and 8 down arrows shows continuous process up to the result.



**Fig. 5 AND/OR Graph of Institute Examination System**

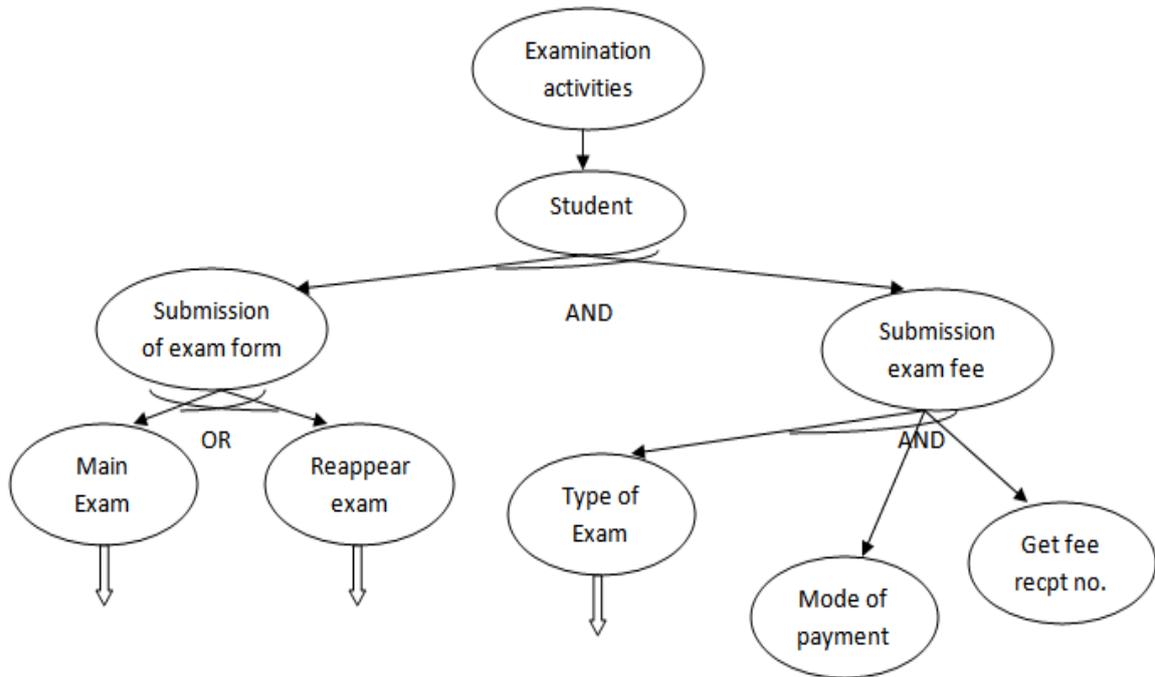


Fig. 6 AND/OR Graph for Examination Activity of Students

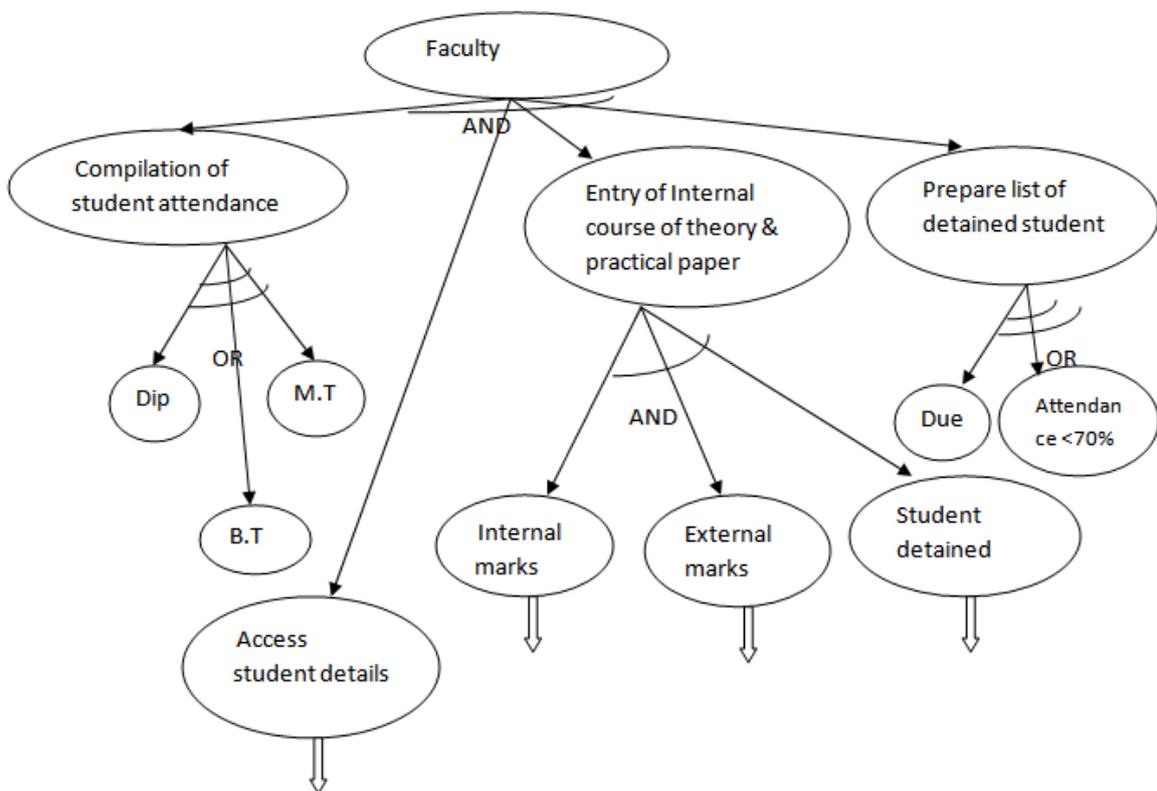


Fig. 7 AND/OR Graph of Faculty

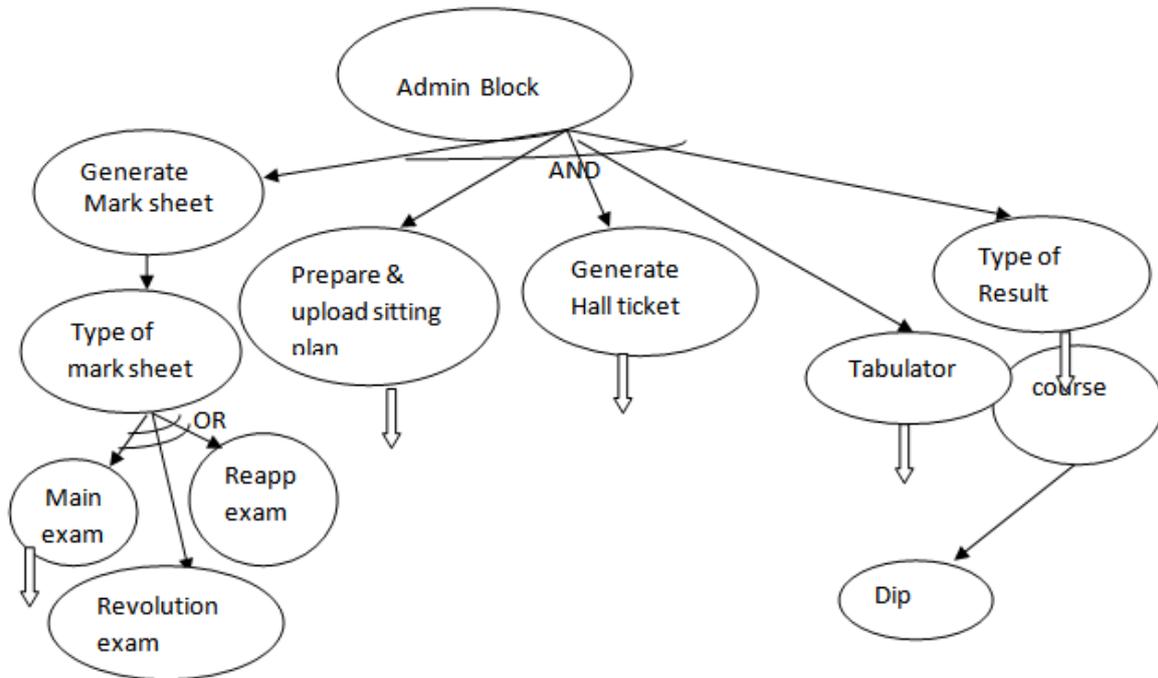


Fig. 8 AND/OR Graph of Admin Block

Table 1 Schema Design for the Requirement to make the SQL Database Structure

IES\_Authorization\_t :

Attributes:	User_Id	Password	Email	Mobile_Number	Secret_question	Secret_answer
Signature:	Integer	String	String	Integer	String	String
Constraint:	PK	Encrypted	-	-	-	-

IES\_Student\_t :

Attributes:	Roll_No	Name	Email	Mobile_Number	Address	Father_Name	Dob	Gender
Signature:	Integer	String	String	Integer	String	String	Date	String
Constraint:	PK	-	-	-	-	-	-	-

IES\_Admin\_t :

Attributes:	Admin_ID	Name	Email	Mobile_Number	Address	Father_Name	DoJ	Gender
Signature:	Integer	String	String	Integer	String	String	Date	String
Constraint:	PK	-	-	-	-	-	-	-

IES\_Exam\_t :

Attributes:	Enrollment_id	Course_code	Exam_date	Exam_time	Exam_Duration	Center_code
Signature:	Integer	Integer	Date	Integer	Integer	String
Constraint:	PK	-	-	-	-	-

IES\_Course\_t :

Attributes:	Enrollment_id	Course_code	Course_Name	Course_Sub
Signature:	Integer	String	String	String
Constraint:	-	PK	-	-

IES\_Account\_t :

Attributes:	Roll_No	Enrollment_id	Amount	Course_code
Signature:	Integer	Integer	Integer	String
Constraint:	-	-	-	-

**IES\_Fee\_Fine\_t:**

Attributes:	Enrollment_id	Fine Reason	Amount	Course_code
Signature:	Integer	String	Integer	String
Constraint:	-		-	-

**IES\_Exam\_Paper\_details\_t:**

Attributes:	Course_code	Paper_Code	Paper_Name	Internal_Marks	External_Marks
Signature:	String	String	Integer	Integer	Integer
Constraint:	-	-	-	-	-

**IES\_Result\_details\_t:**

Attributes:	Roll_No	Course_code	Paper_code	Internal_obtained	External_obtained
Signature:	Integer	String	String	Integer	Integer
Constraint:	-		-	-	-

**IES\_Questionbank\_t:**

Attributes:	Course_code	Question	Option_1	Option_2	Option_3	Option_4	Answer
Signature:	String	String	String	String	String	String	String
Constraint:	PK	-	-	-	-	-	-

**IES\_Center\_t:**

Attributes:	Enrollment_ID	Course_code	Center_code	Address	Invigilator
Signature:	Integer	String	Integer	String	String
Constraint:		-	PK	-	-

**V. STEP WISE FUNCTION POINT CALCULATION**

In a sequence to find out function point, the EO, EI, EQ, ILF and EIL features are measured:

**5.1 Parameter with weight in LOW AVERAGE and HIGH value**

ILF → 7 (L), 10(A), 15(H)

EIF → 5 (L), 7(A), 10(H)

EI → 3 (L), 4(A), 6(H)

EO → 4 (L), 5(A), 7(H)

EQ → 3 (L), 4(A), 6(H)

**5.2 Complexity Tables Values**

• **FOR ILF AND EIF**

1 RET → 1 to19 DET (L), 20 to50 DET (L), 51 or more DET (A)

2 to 5 RET → 1 to19 DET (L), 20 to50 DET (A), 51 or more DET (H)

6 or more RET → 1 to19 DET (A), 20 to50 DET (H), 51 or more DET (H)

• **FOR EI**

0 to 1 FTR → 1 to 4 DET (L), 5 to15 DET (L), 16 or more DET (A)

2 FTRs → 1 to 4 DET (L), 5 to15 DET (A), 16 or more DET (H)

3 or more FTRs → 1 to 4 DET (A), 5 to15 DET (H), 16 or more DET (H)

• **EO AND EQ**

0 to 1 FTR → 1 to 5 DET (L), 6 to19 DET (L), 20 or more DET (A)

2 to 3 FTRs → 1 to 5 DET (L), 6 to19 DET (A), 20 or more DET (H)

4 or more FTRs → 1 to 5 DET (A), 6 to19 DET (H), 20 or more DET (H)

**5.2.1 FR1 Print out of Bank Receipt of Students Fees**

- User will Enrol the course in the College and make the payment as admission fee and he will get the bank receipt :

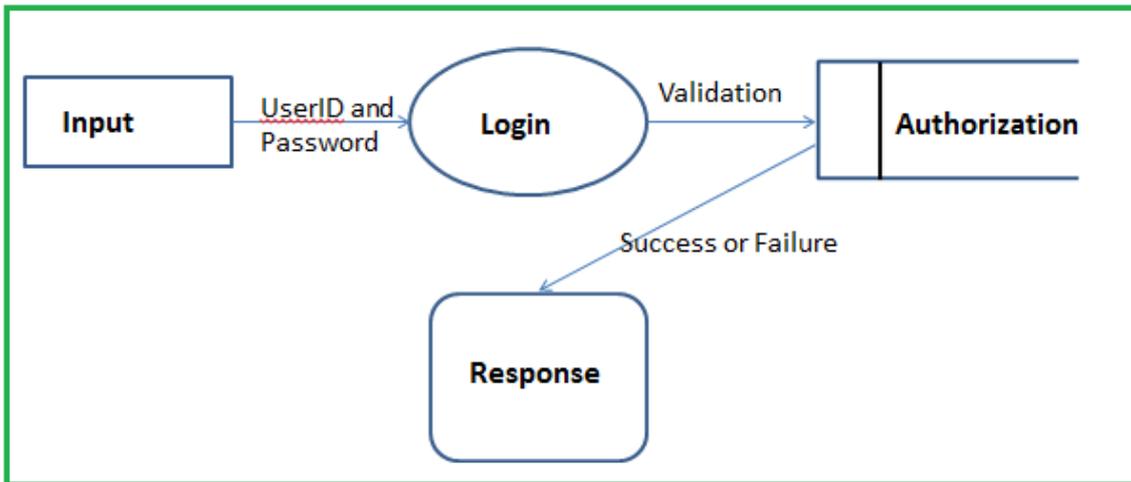
1. User will create an Login ID from the first time login, table used 'IES\_Authorization\_t':

➤ **To find EI: Login authorization:**

1 FTR : 'IES\_Authorization\_t' table is used to store the value

10 DET :6 attributes, submit button, cancel button and success or Failure responses.

**Complexity Factor:** LOW , having FP :  $1*3= 3$



**Fig. 8.1 Login Page**

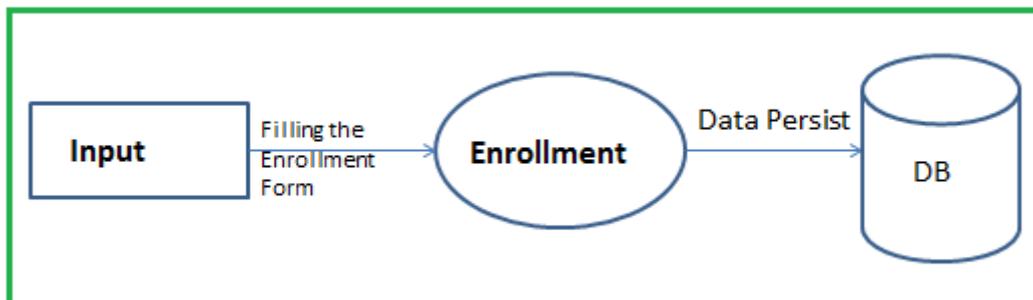
- Once Login authenticated then User will access the College Enrolment GUI to fill his own records , table used 'IES\_Student\_t':

➤ **To find EI: Enrolment in the College:**

1 FTR : 'IES\_Student\_t' table is used to store the value

20 DET : 8 attributes (validation will also apply on the mandatory fields i.e. 8), submit button, cancel button and success or Failure responses.

**Complexity Factor :** Average , having FP :  $1*4= 4$



**Fig. 8.2 Enrolment System**

➤ **To find EO: Print of Fee including Due:**

1FTR : 'IES\_Account\_t' tables are used to store the value

20 DET :8 attributes (validation will also apply on the mandatory fields i.e. 8), submit button, cancel button and success or Failure responses.

**Complexity Factor:** Average , having FP :  $1*5= 5$

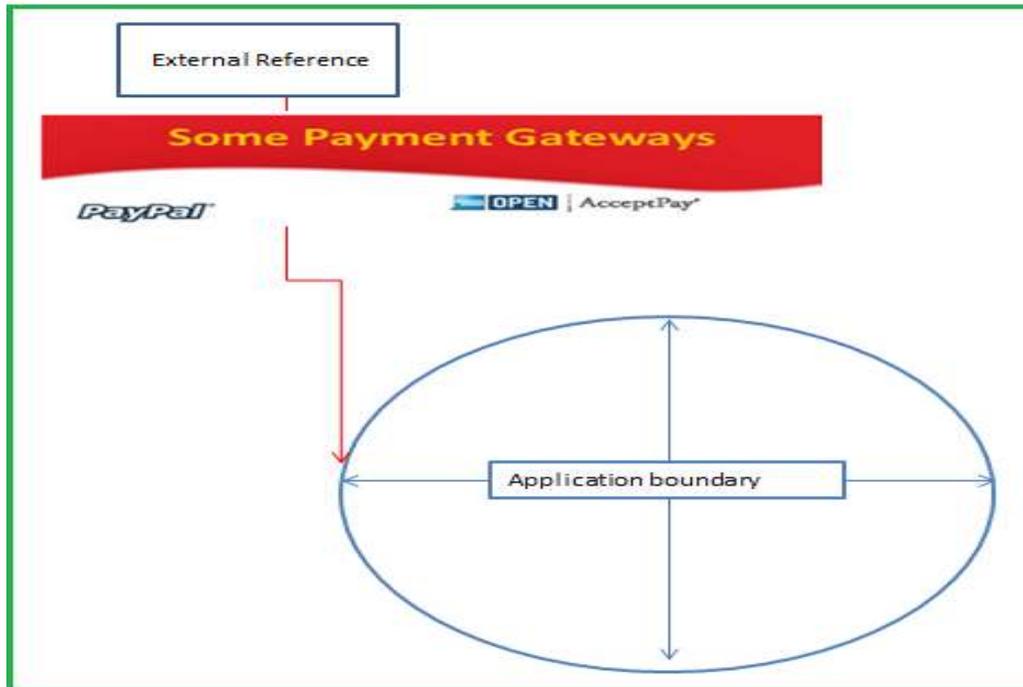


Fig. 8.3 Payment System

#### 5.2.2 FR2 Entry of Internal & External Marks

➤ To find EI: Administrator Login to set the Marks based on course code and course papers:

1 FTR : 'IES\_Exam\_Paper\_details\_t' table is used to store the value which will be setup by the Admin / Examination controller team.

9 DET : 5 attributes, submit button, cancel button and success or Failure responses.

**Complexity Factor:** LOW , having FP :  $1*3=3$

#### 5.2.3 FR3 View Semester Result

➤ To find EO: User will login to Examination Portal and check the Result:

3 FTR : 'IES\_Exam\_Paper\_details\_t', 'IES\_Result\_details\_t' and 'IES\_Student\_t' tables are used to get the values.

20 DET : 15 attributes from above 3 tables, submit button, cancel button and details page or Failure responses.

**Complexity Factor :** High , having FP :  $1*7=7$

#### 5.2.4 FR4 Generating seating arrangement

➤ To find EO: User will login to Examination Portal and check the centre details:

3 FTR : 'IES\_Center\_t', 'IES\_Exam\_t' and 'IES\_Course\_t' tables are used to get the values.

16 DET : 12 attributes from above 3 tables, submit button, cancel button and success or Failure responses.

**Complexity Factor:** Average , having FP :  $1*5=5$

#### 5.2.5 FR5 Online conduct of examination

➤ To find EI: Admin will login to Examination Portal and set the questions with options:

4 FTR : 'IES\_Exam\_t', 'IES\_Course\_t' and 'IES\_Exam\_Paper\_details\_t', 'IES\_Questionbank\_t' tables are used to get the values.

22 DET : 18 attributes from above 4 tables, submit button, cancel button and success or Failure responses.

**Complexity Factor:** High , having FP :  $1*6=6$

➤ To find ILF: User will login to Portal and proceed with the exam GUI page and then SUBMIT the page:

2 RET : 'IES\_Exam\_t', 'IES\_Course\_t' and 'IES\_Exam\_Paper\_details\_t', 'IES\_Questionbank\_t' tables are used to get the values.

22 DET : 22 attributes from above 4 tables

**Complexity Factor:** Average , having FP :  $1*10=10$

#### 5.2.6 FR6 Filling examination form and generating dependent things

➤ To find EI: User will login to Examination Portal fill the form:

(Account table will validate as users Fee is paid for that semester or not)

3 FTR : 'IES\_Exam\_t', 'IES\_Course\_t' and 'IES\_Account\_t' tables are used to get the values.

12 DET : 8 attributes from above 4 tables, submit button, cancel button and success or Failure responses.

**Complexity Factor:** High , having FP :  $1*6=6$

#### **5.2.7 FR7 Upload any exam related activities**

➤ **To find EI: Admin will login to Examination Portal and will upload for the Examination details based on the Course code , upload Examination Result:**

3 FTR : 'IES\_Course\_t' , 'IES\_Exam\_Paper\_details\_t' and 'IES\_Exam\_t' tables are used to get the values.

16 DET : 12 attributes from above 4 tables, submit button, cancel button and success or Failure responses.

**Complexity Factor :**High , having FP :  $1*6=6$

#### **5.2.8 FR8 Generating examination hall ticket**

➤ **To find EO: User will login to Examination Portal and check the enrollment details based on Roll number:**

4 FTR : 'IES\_Center\_t', 'IES\_Exam\_t', 'IES\_Student\_t' and 'IES\_Course\_t' tables are used to get the values.

16 DET : 12 attributes from above 4 tables, submit button, cancel button and Details of the Hall Ticket or Failure responses.

**Complexity Factor :**High , having FP :  $1*7= 7$

#### **5.2.9 FR9 Approval of examination form**

➤ **To find EI: Administrator will validate the account table for students to validate fee payment, registration completed; course selection is valid or not based of filling of the form and etc.**

3 FTR : 'IES\_account\_t', 'IES\_Student\_t' and 'IES\_Course\_t' tables are used to get the values.

12 DET : 8 attributes from above 4 tables, submit button, cancel button and Details of the Hall Ticket or Failure responses.

**Complexity Factor :**Average , having FP :  $1*6= 6$

#### **5.2.10 FR10 Online payment of examination fees**

➤ **To find EIF: Payment gateway**

1 RET: external system will update the account table based on payment gate way response

8 DET : 4 attributes from above 4 tables, submit button, cancel button and success or Failure responses.

**Complexity Factor :**Low , having FP :  $1*5= 5$

**6. Total Function Point =Addition of Complexity Factors**

$$\text{TFP} = 3+4+5+3+7+5+6+10+6+6+7+6+5 = 73$$

## **VI. ACHIEVED RESULTS**

After find out exact function point, then multiply by currency we can calculated the fairly software cost in the easily way. It was firm that the superlative method to expand an accepting of the users wants was to come within reach of their problem as of the perception of how they analysis the results an automatic system produces and all the connected system or application boundaries should be recorded or documents so that the requirement and cost with time line of the development effort will not deviate.

As a result FPA, the primary goals is to assess capabilities of a system from user's understanding.

To complete this purpose, the analysis is based in the lead the diverse ways users interrelate with computerized systems.

Now we have completed the experimental research calculation of cost estimation based on functional point for the educational system using functional requirement with sub goals.

## **VII.FUTURE DEVELOPMENT AND CONCLUSION**

The following recommendations are suggested for research work that can be undertaken in future:

It is necessary to apply the developed methodologies in several case studies to generalize the obtained results.

Future research or scope shall focus on revamping the use case model. The original FP method proposed in this paper has been trained with a minimal set of keywords and parameters and uses three degrees of complexity.

The proposed result shows that the three layers approach is the best compare to other methods. Furthermore, the other advanced technique such as machine learning could also be applied for finding the accurate result in estimation.

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