SRA for Library Management System

Group 14

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Context Diagram

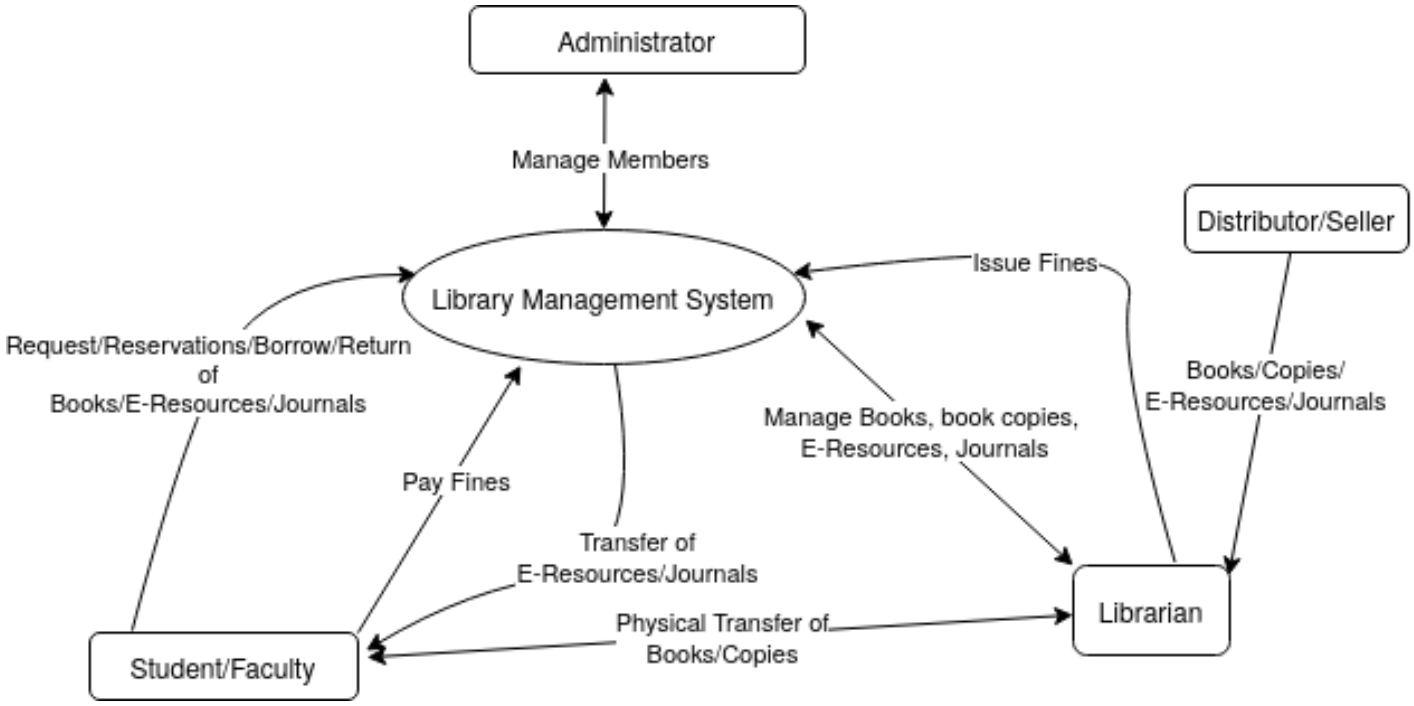

Figure 1: Context Diagram

This context diagram show an overview of the system. There are two main actors in the system: the librarian and the user.

The librarian is responsible for:

- Managing the library which includes managing the books/e-resources/journals, and fines.
- In the physical world, procuring new books, and managing the existing books and transferring them between the library and the users.
- In the digital world, managing the e-resources and journals, and managing the existing e-resources and journals and transferring them between the library and the users.

The admin is responsible for managing the users.

The user is responsible for:

- Request/Borrow/Return/Reserve books/e-resources/journals.
- Paying fines.
- In the physical world, transferring books between the library and the user.

Data Flow Diagram(s)

The below data flow diagrams show the flow of data in the system. The system is divided into two main parts: the physical world and the digital world. The physical world is the library and the digital world is the online library.

In the physical world, the librarian is responsible for managing the library which includes managing the books/e-resources/journals, and fines. The librarian is also responsible for procuring new books, and managing the existing books and transferring them between the library and the users.

In the digital world, the librarian is responsible for managing the e-resources and journals, and managing the existing e-resources and journals and transferring them between the library and the users. Also, the librarian is responsible for issuing fines to the users.

Data Flow Diagram: 1

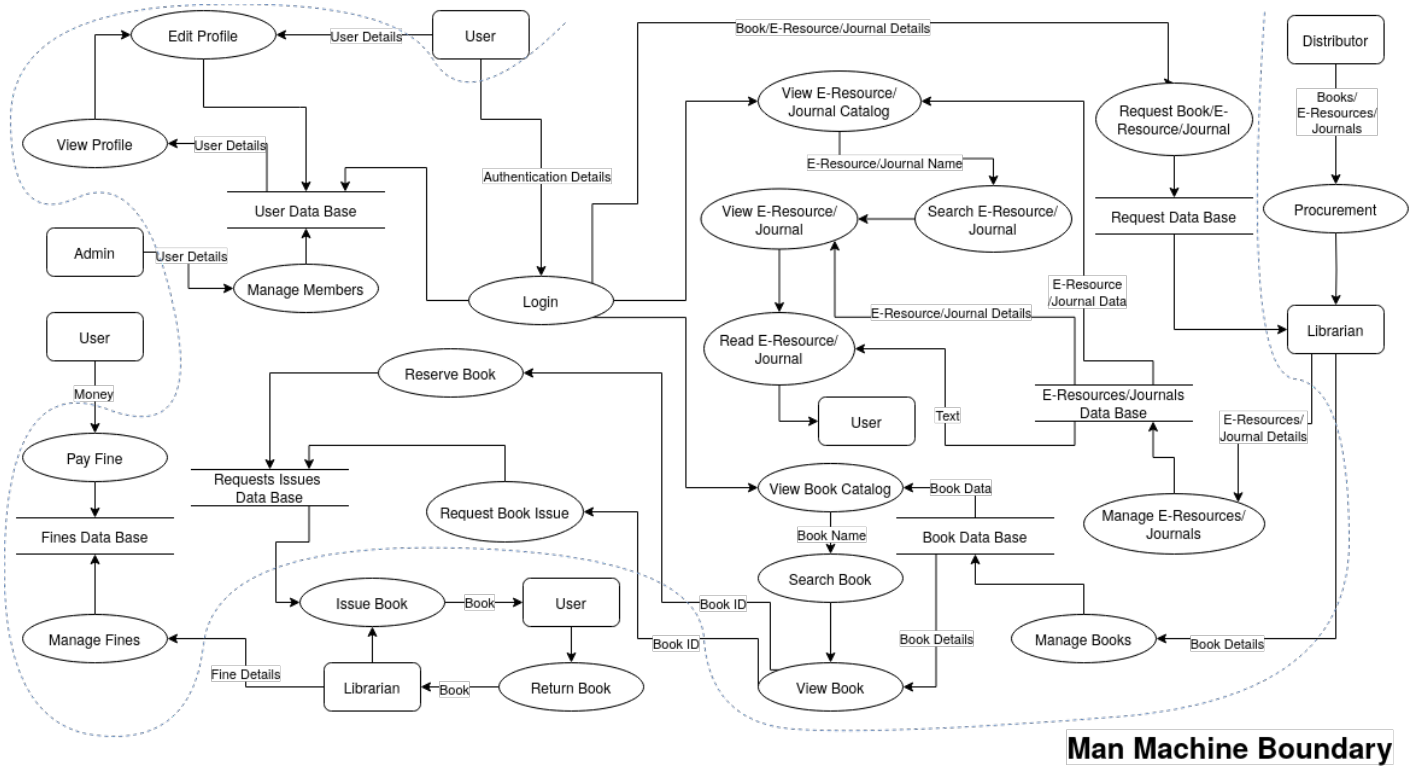

Figure 2: Data Flow Diagram: 1

Data Flow Diagram: 2

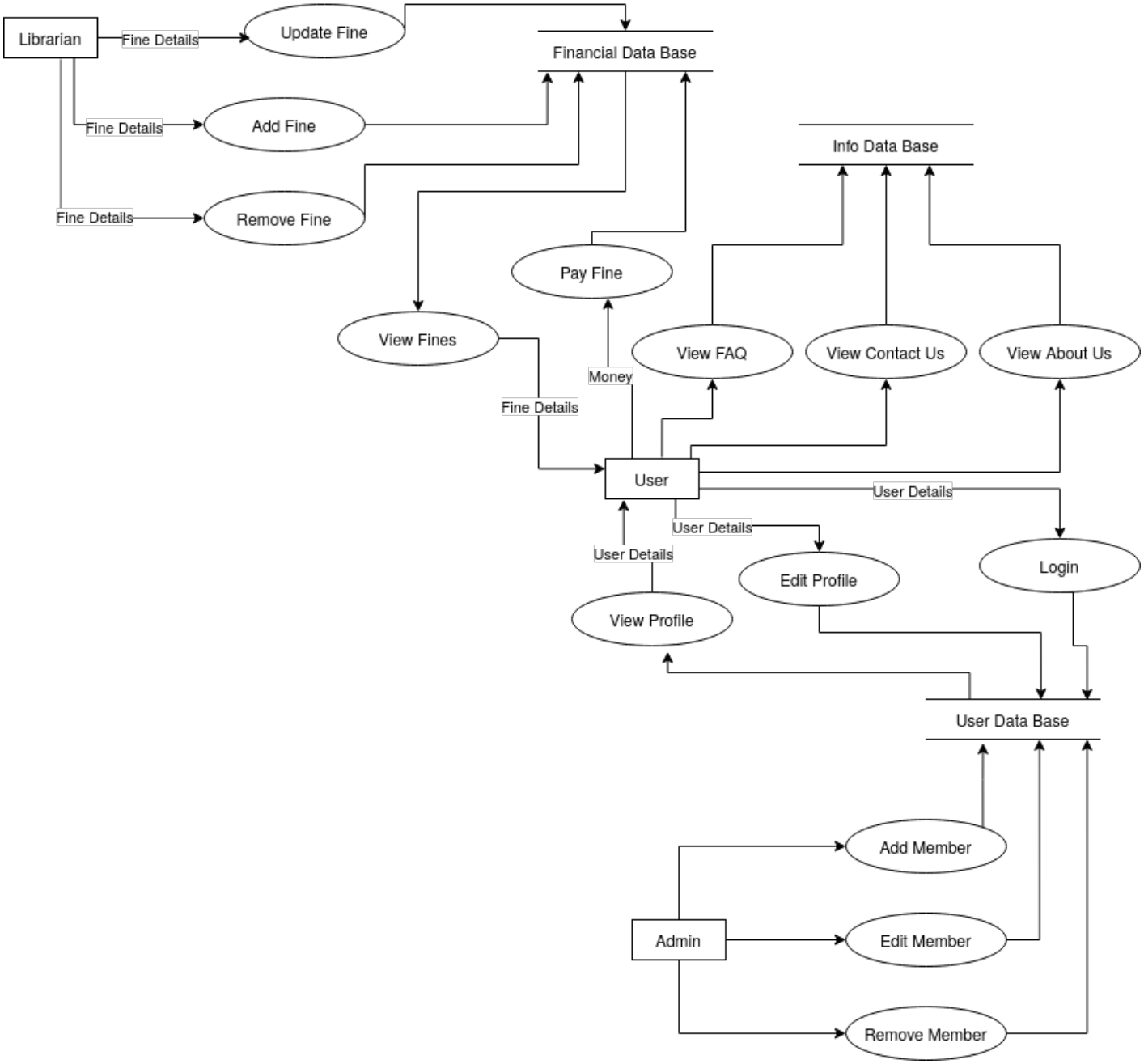

Figure 3: Data Flow Diagram: 2.1

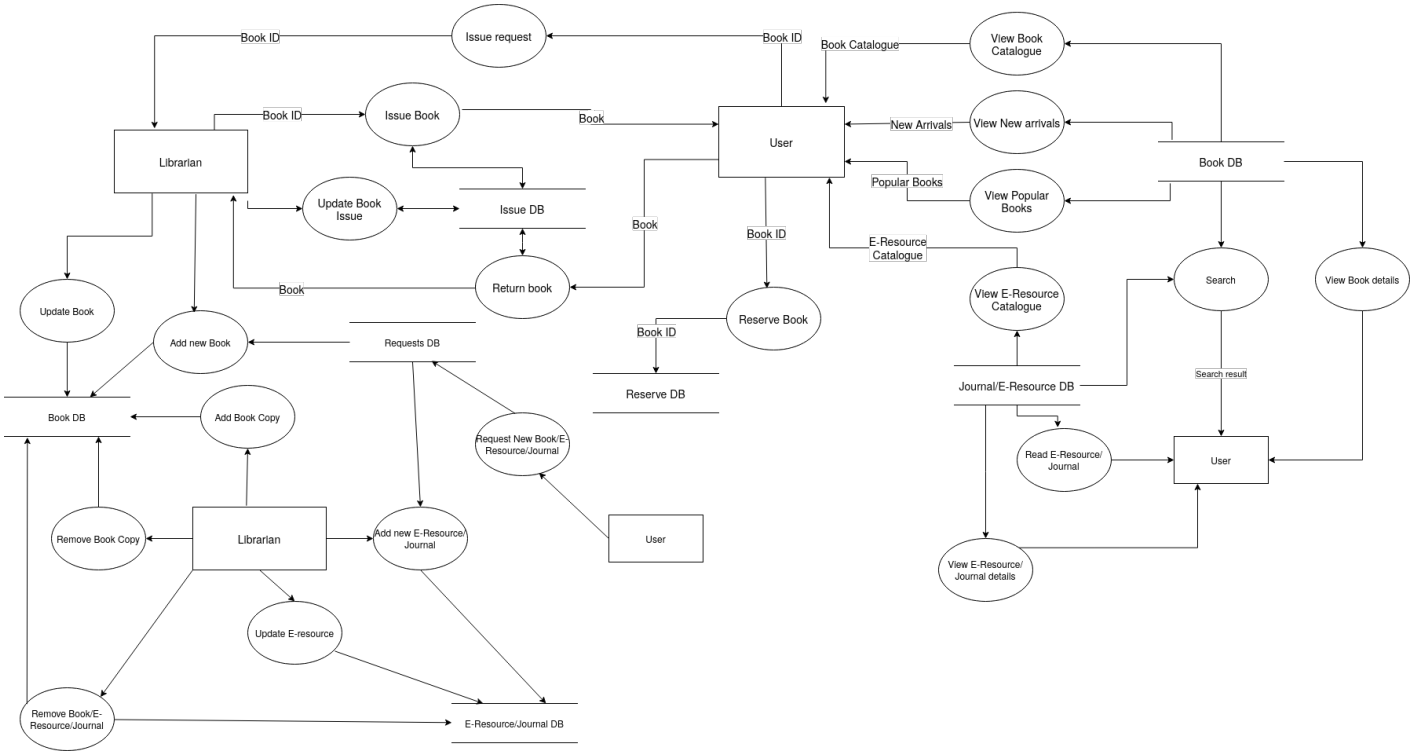

Figure 4: Data Flow Diagram: 2.2

Comparison of the two data flow diagrams

The first data flow diagram is correct because it shows the flow of data in the system. There is a clear distinction between the physical world and the digital world. From logging in to the system, searching for books/e-resources/journals, issuing a request, and paying fines, the data flow diagram shows the flow of data in the system.

The second data flow diagram is incorrect because:

- There is no clear distinction between the physical world and the digital world.
- It is just a list of actions that the user can perform in the system, since there is no clear data flow in the system.

In the first diagram, one can clear the multiple flows possible: After logging in, one can search for books, issue a request, pay fines, etc. or one can search for e-resources/journals, and then read them or instead request a new book/e-resource/journal. In the second diagram, there is no clear flow of data. It is just a list of actions that the user can perform in the system.

Function Point Analysis

Introduction

Consider the following table for function point analysis:

Function Type	Low Complexity	Average Complexity	High Complexity
Internal Logic Files(ILF)	7	10	15
External Interface Files(EIF)	5	7	10
External Inputs(EI)	3	4	6
External Outputs(EO)	4	5	7
External Inquiries(EQ)	3	4	6

Unadjusted Function Point Count

Complexity of functions here is estimated based on the number of inputs, outputs, and the number of files. Experience of the team members is also taken into consideration.

Function	Type	Complexity	FP
Login	EI	Average	4
Logout	EI	Low	3
View Profile	EQ	High	6
Edit Profile	EI	Average	4
Add new Member	EI	Average	4
Edit Member	EI	Average	4
Delete Member	EI	Average	4
Add a fine	EI	Average	4
Edit a fine	EI	Average	4
Delete a fine	EI	Low	3
Pay a fine	EI	High	6
View Fines	EQ	Low	3
Add new book	EI	Average	4
Edit a book	EI	Average	4
Delete a book	EI	Average	4
Add new book copy	EI	Low	3
Remove a book copy	EI	Low	3
Add new e-resource	EI	Average	4
Edit an e-resource	EI	Average	4
Delete an e-resource	EI	Average	4

Function	Type	Complexity	FP
View Book Catalog	EQ	High	6
View E-Resource Catalog	EQ	High	6
Search for a book/E-Resource/Journal	EQ	High	6
View Book/E-Resource/Journal	EQ	Average	4
Request a book/E-Resource/Journal	EI	High	6
Reserve a book	EI	Average	4
Request Issue a book	EI	Average	4
Return a book	EI	Average	4
Issue a book	EI	Average	4
View All Issues/Requests/Returns/Reservations of a Member	EQ	High	6
View All Requests	EQ	Average	4
Update Request	EI	Average	4
View All Unresolved ssues/Requests/Returns/Reservations	EQ	High	6
View FAQs	EQ	Low	3
View Contact Us	EQ	Low	3
View About Us	EQ	Low	3
Total	-	-	152

Extra Screen	Type	Complexity	FP
Home	EO	High	7
Read E-Resource/Journal	EO	High	7
Forgot Password	EO	Average	5
Total	-	-	19

Database	Type	Complexity	FP
User Data	ILF	Low	7
Book Data	ILF	Average	10
E-Resource/Journal Data	ILF	Average	10
Fine Data	ILF	Low	7
Request Data	ILF	Average	10
Issue Data	ILF	Average	10
Total	-	-	54

Integrations	Type	Complexity	FP
Payment Gateway	EIF	High	10
GMails	EIF	Average	7
Google Authentication	EIF	Average	7
Total	-	-	24

Total Unadjusted Function Point Count(Total UFP): $\boxed{249}$

Complexity Adjustment Factor

Complexity Adjustment Factor(CAF) $= 0.65 + (0.01 * \sum_{i=1}^{i=14} F_i)$

where F_i is the value adjusted for each of the 14 general system characteristics.

General System Characteristics	Value
Data communications	1
Distributed data processing	0
Performance	2
Heavily used configuration	0
Transaction role	2
Online data entry	3
End-user efficiency	1
Online update	2
Complex processing	0
Reusability	1
Installation ease	1
Operational ease	2
Multiple sites	1
Facilitate change	2
Total	18

Thus, CAF $= 0.65 + (0.01 * \sum_{i=1}^{i=14} F_i) = 0.65 + 0.18 = 0.83$

Total Adjusted Function Point Count

Total Adjusted Function Point Count(Total AFP) = Total UFP _ CAF $= 249_0.83 = 206.67 \approx \boxed{207}$

Considering that 1 FP = 50-60 LOC, the estimated LOC $= 207 * 50$ to $207 * 60 = 10350$ to $12420 \approx$ $\boxed{\text{10000 to 12500 LOC}}$

References

Note that:

- The links below are clickable.
- The images used in this document are created using draw.io.

References:

- Library Management System
- Concepts of Function Point Analysis