bookmyshow

Estimation Report

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1. Size Estimation

1.1 Function Point Estimation

Based on the functional requirements described in the SRS document, we estimate the size using **Function Point Analysis (FPA)**.

Function Point Components per Module:

1.1.(a)User Registration and Authentication

- **EI (3):**
    - User input for registration (name, email, phone, password).
    - Login credentials submission.
    - Password reset or recovery.
- **EO (2):**
    - Confirmation messages (successful registration, invalid credentials).
    - Error messages for incorrect password or username.
- **EQ (1):**
    - Checking if an email or phone number is already registered.
- **ILF (2):**
    - Storing user profile data.
    - Storing authentication tokens.
- **EIF (1):**
    - External verification system (email/phone OTP).

1.1.(b)Movie and Event Browsing

- **EI (2):**
    - Searching movies/events by name, genre, language, or location.
    - Applying filters (price range, ratings, show timings).
- **EO (3):**
    - Displaying movie/event details (synopsis, cast, reviews).
    - Generating dynamic suggestions based on user preferences.
    - Showing available seating layouts.
- **EQ (2):**
    - Checking seat availability.
    - Fetching nearby theaters/events.

- **ILF (2):**
    - Movie/event database.
    - User preference database.
- **EIF (1):**
    - External APIs for movie details, reviews, and ratings.

1.1.(c)Ticket Booking and Payments

- **EI (3):**
    - Selecting movie/event, time, and seat selection.
    - Entering payment details.
    - Applying discount coupons or wallet credits.
- **EO (3):**
    - Generating booking confirmation (e-ticket, SMS, email).
    - Error handling (invalid payment, transaction failure).
    - Generating invoice and GST details.
- **EQ (2):**
    - Checking booking status.
    - Fetching available payment methods.
- **ILF (3):**
    - Booking transaction records.
    - Payment history.
    - Discount and promo code database.
- **EIF (2):**
    - External payment gateways (Credit card, Net banking, Debit-card, UPI).
    - Bank validation services.

1.1.(d) User Engagement & Reviews

- **EI (2):**
    - Writing reviews for movies/events.
    - Rating a movie/event.
- **EO (2):**
    - Displaying user-generated reviews and ratings.
    - Updating aggregated ratings.

- **EQ (1):**
    - Checking if a user has already reviewed a movie/event.
- **ILF (2):**
    - Reviews and ratings storage.
    - User interaction history.
- **EIF (1):**
    - External sentiment analysis tool for moderation.

1.1.(e) Notifications & Alerts

- **EI (3):**
    - Sending reminders for upcoming bookings.
    - Sending offers and promotions.
    - Notifying about new releases/events.
- **EO (3):**
    - Displaying notifications in the app.
    - Sending email and SMS alerts.
    - Showing in-app banners for special offers.
- **EQ (1):**
    - Checking unread notifications.
- **ILF (2):**
    - Notification log database.
    - User subscription preferences.
- **EIF (1):**
    - External notification service (Firebase, Twilio).

1.1.(f) Admin & Theater Management

- **EI (3):**
    - Adding/updating movie/event details.
    - Managing theater seating layout.
    - Generating reports on sales and occupancy.
- **EO (3):**
    - Displaying sales analytics and trends.
    - Updating seat availability in real time.

- Generating revenue reports.

- **EQ (2):**
  - Fetching revenue breakdown by category.
  - Checking active promotions/offers.
- **ILF (3):**
  - Theater/movie catalog database.
  - Booking and revenue records.
  - Admin access logs.
- **EIF (2):**
  - External analytics tool (Google Analytics, Power BI).
  - External tax/GST compliance service.

Module	EI	EO	EQ	ILF	EIF
User registration and authentication	3	2	1	2	1
Movie and event browsing	2	3	2	2	1
Ticket booking and payments	3	3	2	3	2
User Engagement & Reviews	2	2	1	2	1
Notification & Alerts	3	3	1	2	1
Admin & theatre management	3	3	2	3	2

Using FPA, the total function points can be calculated as follows
FP = ∑ (EI×3) + (EO×4) + (EQ×3) + (ILF×7) + (EIF×5)

Function Point Breakdown by Module

- **User Registration and Authentication**
  (3×3)+(2×4)+(1×3)+(2×7)+(1×5) =9+8+3+14+5=39
- **Movie and Event Browsing**
  (2×3)+(3×4)+(2×3)+(2×7)+(1×5) =6+12+6+14+5=43
- **Ticket Booking and Payments**
  (3×3)+(3×4)+(2×3)+(3×7)+(2×5)=9+12+6+21+10=58
- **User Engagement & Reviews**
  (2×3)+(2×4)+(1×3)+(2×7)+(1×5)=6+8+3+14+5=36
- **Notifications & Alerts**
  (3×3)+(3×4)+(1×3)+(2×7)+(1×5)=9+12+3+14+5=43
- **Admin & Theater Management**
  (3×3)+(3×4)+(2×3)+(3×7)+(2×5)=9+12+6+21+10=58

Total Function Points = 39+43+58+36+43+58=277

2. Effort Estimation

To estimate the effort required for your **BookMyShow** project, we use the **COCOMO** model, which provides reliable effort estimation based on the project's size and complexity.

2.1 Classification

BookMyShow falls under the **Semi-Detached** category due to its **moderate complexity**, requiring expertise in web development, database management, and integration with third-party payment gateways.

- **Technology Mix:** React, Node.js, SQL/NoSQL, Payment Gateway APIs
- **Scalability:** High due to large user base and frequent transactions
- **Development Team Experience:** Mixed

2.2 Effort Calculation

Step 1: Convert Function Points to Lines of Code (LOC)

Using the total function points from the previous section:

LOC = 277 × 80 = 22,160 LOC

Step 2: Convert LOC to KLOC

KLOC = 22,160/1000 = 22.16 kLOC

Step 3: Calculate Effort Using COCOMO

Using the **COCOMO** model formula:

E = a × (KLOC) ^ b

For **Semi-Detached** projects:

- **a = 3.0**
- **b = 1.12**

Applying these values:

E = 3.0 × (22.16) ^ 1.12

E ≈ 96.42 person-months

2.3 Conclusion

The estimated effort for developing the **BookMyShow** project is **approximately 96.42 person-months** using the **COCOMO model**.

3. Cost Estimation

Assuming an average development cost of $5,000 per person-month

Total Cost = Effort (person-months) × Cost per person-month

As we calculated above:

Effort = 96.42 person-month

Cost per person-month = $5,000

Calculation:

Total Cost = 96.42 x 5000 = 482, 100

The estimated total development cost for Unbound is $482 ,100

In INR it is 482, 100 x 85 = Rs.40,978,500

4. Development Time Estimation

The development time can be calculated using the **COCOMO time estimation formula**:

T = c × (Effort) ^ d

where:

- TTT = Time in months
- c, d = project type-specific constants
- Effort=96.42 person-months

For **Semi-Detached** projects:

- c=2.5, d=0.35

Calculation:

T=2.5 × (96.42) ^ 0.35 ≈ 12.37 months

Conclusion:

The estimated development time for **BookMyShow** is **approximately 12 months and 2 weeks**.

5. PERT Chart

5.1. Tasks and Durations

Using the PERT formula to calculate the expected time: **TE = (O+4M+P) / 6**

The values in the table are rough approximations and not exact predictions. Since the PERT method relies on estimated optimistic, most likely, and pessimistic times, the expected durations may vary in reality.

Task	**Optimistic time (O)**	**Most Likely time(M)**	**Pessimistic time (P)**	**Expected Time (TE)= 0+4M+P / 6**
User Registration & Authentication	2 weeks	4 weeks	8 weeks	2+4(4)+8 / 6 =4.33 weeks
Content Management & Publishing	3 weeks	6 weeks	10 weeks	3+4(6)+10 / 6 =6.33 weeks
User Interaction (Bookings, Ratings, Reviews)	3 weeks	5 weeks	9 weeks	3+4(5)+9 / 6 =5.33 weeks
User Following & Recommendations	2 weeks	4 weeks	8 weeks	2+4(4)+8 / 6 =4.33 weeks
Notifications & Messaging	2 weeks	3 weeks	6 weeks	2+4(3)+6 / 6 =3.33 weeks
Payment Integration & Transactions	3 weeks	6 weeks	10 weeks	3+4(6)+10 / 6 =6.33 weeks
Data Storage & Indexing	3 weeks	5 weeks	8 weeks	3+4(5)+8 / 6 =5.33 weeks
Security & Moderation	3 weeks	4 weeks	7 weeks	3+4(4)+7 / 6 =4.33 weeks

PERT Calculations for bookmyshow

6. Critical Path

The **critical path** is determined by identifying the **longest sequence of dependent tasks**, which defines the overall **project duration**. These tasks **cannot be delayed** without affecting the timeline.

6.1 Dependency Table

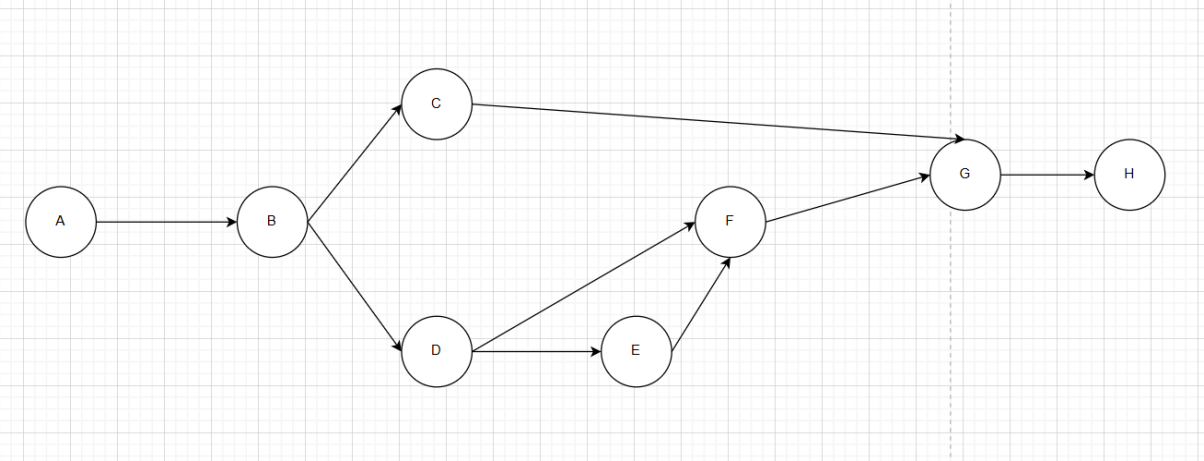
The table below outlines the **dependencies** between various tasks in the **BookMyShow** project. Each task has an **estimated completion time** based on the **PERT analysis**, and the dependencies indicate which tasks must be **completed before others** can begin.

Task	Task Description	Expected Time (TE)	Dependencies
A	Initial Planning & Requirement Analysis	2.5 weeks	-
B	System Design & Architecture	4.0 weeks	A
C	Frontend Development (User Interface)	5.3 weeks	B
D	Backend Development (APIs, Logic)	6.3 weeks	B
E	Database Setup & Integration	5.3 weeks	D
F	Payment Gateway & Security Implementation	6.3 weeks	D, E
G	Testing & Debugging	4.5 weeks	C, F
H	Deployment & Final Review	2.5 weeks	G

Project Task Breakdown with Dependencies

6.2 Critical Path Diagram

The **Critical Path Diagram** represents the **longest sequence of dependent tasks**, ensuring the project progresses efficiently from start to finish.



Explanation of the Critical Path:

Step-by-Step Breakdown of the Critical Path:

1. A (Initial Planning & Requirement Analysis) → The starting point.
2. B (System Design & Architecture) → Establishes the project's structural design.
3. D (Backend Development) → Core for APIs and logic.
4. E (Database Setup & Integration) → Required before security implementation.
5. F (Payment Gateway & Security Implementation) → Ensures secure transactions.
6. G (Testing & Debugging) → Ensures system correctness.
7. H (Deployment & Final Review) → Finalizes the project.

6.3 Critical Path Calculations

The Critical Path Method (CPM) is used to find the longest path in a project. To achieve this, we calculate the following factors:

- **Earliest Start (ES):** The earliest time a task can begin, considering its dependencies.
- **Earliest Finish (EF):** The earliest time a task can be completed, calculated as EF = ES + TE.
- **Latest Finish (LF):** The latest time a task can be completed without delaying the project.
- **Latest Start (LS):** The latest time a task can begin without delaying the project, calculated as LS = LF - TE.
- **Slack:** The amount of time a task can be delayed without affecting the project's completion time, calculated as Slack = LF - EF.

Earliest Start and Earliest Finish Times

Task	Duration (weeks)	Dependencies	Earliest Start (ES)	Earliest Finish (EF)
A	2.5	—	0	2.5
B	4	A	2.5	6.5
C	5.3	B	6.5	11.8
D	6.3	B	6.5	12.8
E	5.3	D	12.8	18.1
F	6.3	D, E	12.8	19.1
G	4.5	C, F	19.1	23.6
H	2.5	G	23.6	26.1

Latest Start and Latest Finish Times with Slack

Task	Duration (weeks)	Latest Start (LS)	Latest Finish (LF)	Slack
A	2.5	0	2.5	0
B	4	2.5	6.5	0
C	5.3	6.5	11.8	0
D	6.3	6.5	12.8	0
E	5.3	12.8	18.1	0
F	6.3	12.8	19.1	0
G	4.5	19.1	23.6	0
H	2.5	23.6	26.1	0

6.4 Critical Path Results

The tasks with zero slack form the Critical Path. Based on the calculations above, the Critical Path for BookMyShow is:

A -> B -> D -> E -> F -> G -> H

To find the total duration of the project, we sum the Expected Time (TE) of all tasks in the Critical Path:

Total Duration = $\sum_{(i \in CP)} TE_i$

Where:

- CP = Set of tasks in the Critical Path
- TE_i is the expected time for each task on the critical path

Using the expected times from our calculations:

2.5+4.0+6.3+5.3+6.3+4.5+2.5=31.4 weeks

Thus, the estimated total project duration for BookMyShow is 31.4 weeks (7.8 months)

Reasons:

- COCOMO accounts for effort, not just task scheduling, meaning if multiple developers work in parallel, the timeline can be shorter.
- PERT assumes strict sequential dependencies, while in reality, some tasks might overlap or be done in parallel.
- The difference might also indicate underestimated task durations or unaccounted overheads (e.g., training, delays, iterations).