

WEEK 1:

ASSIGNMENT

Event Management &

Ticketing System

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Objective

The objective of this project is to design and implement an Event Management and Ticketing System using MongoDB. The project focuses on creating well-structured collections for users, events, tickets, and categories, performing CRUD operations on all collections, generating meaningful reports using aggregation pipelines, and optimizing frequent queries using indexes. This project aims to strengthen practical understanding of MongoDB concepts such as schema design, data relationships, aggregation, and query optimization.

Database Collection Design

Users Collection

- userId
- name
- email
- phone
- role (organizer / attendee)
- createdAt

Events Collection

- eventId
- title
- description
- category
- dateTime
- venue
- organizerId
- price
- totalTickets
- availableTickets
- status (upcoming / completed / cancelled)

Tickets Collection

- ticketId
- eventId
- userId
- bookingDate
- quantity
- totalAmount
- status (booked / cancelled)

Categories Collection

- categoryId
- name
- description

Schema Definitions

USERS:

```
{  
  _id: "ObjectId",  
  userId: "String",  
  name: "String",  
  email: "String",  
  phone: "Number",  
  role: "String",  
  createdAt: "Date"  
}
```

EVENTS:

```
{  
  _id: "ObjectId",  
  eventId: "String",  
  title: "String",  
  description: "String",  
  category: "String",  
  dateTIme: "String",  
  venue: "String",  
  organizerId: "String",  
  price: "Number",  
  totalTickets: "Number",  
  availableTickets: "Number",
```

```
    status: "String"  
}  
  
TICKETS:
```

```
{  
    _id: "ObjectId",  
    ticketId: "String",  
    eventId: "String",  
    userId: "String",  
    bookingDate: "String",  
    quantity: "Number",  
    totalAmount: "Number",  
    status: "String"  
}
```

CATEGORIES:

```
{  
    _id: "ObjectId",  
    categoryId: "String",  
    nameId: "String",  
    description: "String",  
}
```

SAMPLE DATA

USERS:

```
db.users.insertMany([
  {userId: "user1", name: "Nehal", email: "nehal@gmail.com",
   phone: 9580317392, role: "organizer", createdAt: new Date()},
  {userId: "user2", name: "Aarav", email: "arav@gmail.com",
   phone: 9580355392, role: "attendee", createdAt: new Date()},
  {userId: "user3", name: "Ram", email: "ram@gmail.com",
   phone: 9580317313, role: "attendee", createdAt: new Date()},
  {userId: "user4", name: "Pooja", email: "poojal@gmail.com",
   phone: 9972759052, role: "attendee", createdAt: new Date()},
  {userId: "user5", name: "Snehal", email: "snehal@gmail.com",
   phone: 8580317392, role: "attendee", createdAt: new Date()},
  {userId: "user6", name: "Deepak", email: "deepak@gmail.com",
   phone: 9440317392, role: "attendee", createdAt: new Date()},
  {userId: "user7", name: "Roy", email: "roy@gmail.com", phone:
   9880317392, role: "attendee", createdAt: new Date()},
  {userId: "user8", name: "Sachin", email: "sachin@gmail.com",
   phone: 9580317788, role: "organizer", createdAt: new Date()},
  {userId: "user9", name: "Riya", email: "riyal@gmail.com",
   phone: 8080317392, role: "attendee", createdAt: new Date()},
  {userId: "user10", name: "Kabir", email: "kabirl@gmail.com",
   phone: 9580235692, role: "organizer", createdAt: new Date()},
  {userId: "user11", name: "Neil", email: "neil@gmail.com",
   phone: 9580317344, role: "organizer", createdAt: new Date()}])
```

```
{userId: "user12", name: "Kaira", email: "kairal@gmail.com",  
phone: 7080317392, role: "attendee", createdAt: new Date()},  
{userId: "user13", name: "Maya", email: "maya@gmail.com",  
phone: 9480317392, role: "organizer", createdAt: new Date()},  
{userId: "user14", name: "Dev", email: "dev@gmail.com",  
phone: 7729317392, role: "attendee", createdAt: new Date()},  
{userId: "user15", name: "Gaurav", email:  
"gauravl@gmail.com", phone: 9581117392, role: "attendee",  
createdAt: new Date()},  
{userId: "user16", name: "Geetika", email:  
"geetika@gmail.com", phone: 9580317421, role: "attendee",  
createdAt: new Date()},  
{userId: "user17", name: "Meera", email: "meera@gmail.com",  
phone: 7065902869, role: "attendee", createdAt: new Date()},  
{userId: "user18", name: "Tara", email: "tara@gmail.com",  
phone: 9880317392, role: "attendee", createdAt: new Date()},  
{userId: "user19", name: "Sara", email: "sara@gmail.com",  
phone: 9080317392, role: "attendee", createdAt: new Date()},  
{userId: "user20", name: "Sidharth", email:  
"sidharthl@gmail.com", phone: 9595317392, role: "organizer",  
createdAt: new Date()}  
])
```

EVENTS:

```
db.events.insertMany([  
{eventId: "event1", title: "Tech Conference 2026", description:  
"Annual technology conference", category:  
"Technology", dateTime: "2026-01-10, 10:00AM", venue:
```

"Delhi", organizerId: "user1", price: 500, totalTickets: 200, availableTickets: 0, status: "completed"},
{eventId: "event2", title: "Music Fest", description: "Live music concert", category: "Music", dateTime: "2026-04-05, 7:00PM", venue: "Mumbai", organizerId: "user8", price: 800, totalTickets: 300, availableTickets: 300, status: "upcoming"},
{eventId: "event3", title: "Startup Meetup", description: "Entrepreneur networking event", category: "Business", dateTime: "2026-02-02, 11:00AM", venue: "Bangalore", organizerId: "user10", price: 300, totalTickets: 150, availableTickets: 100, status: "upcoming"},
{eventId: "event4", title: "Art Exhibition", description: "Modern art display", category: "Art", dateTime: "2026-01-03, 09:00AM", venue: "Delhi", organizerId: "user11", price: 200, totalTickets: 100, availableTickets: 0, status: "completed"},
{eventId: "event5", title: "Coding Workshop", description: "Hands-on coding session", category: "Education", dateTime: "2026-02-15, 10:00AM", venue: "Pune", organizerId: "user13", price: 400, totalTickets: 120, availableTickets: 90, status: "upcoming"},
{eventId: "event6", title: "Dance Competition", description: "Inter-college dance competition", category: "Dance", dateTime: "2026-01-05, 4:00AM", venue: "Jaipur", organizerId: "user20", price: 250, totalTickets: 180, availableTickets: 0, status: "completed"},
{eventId: "event7", title: "Food Carnival", description: "Street food festival", category: "Food", dateTime: "2026-04-12, 12:00PM", venue: "Amritsar", organizerId: "user10", price: 150, totalTickets: 250, availableTickets: 150, status: "upcoming"}]

```
{eventId: "event8", title: "Photography Workshop", description: "Basics of photography", category: "Photography", dateTime: "2026-02-25, 10:00AM", venue: "Chandigarh", organizerId: "user1", price: 350, totalTickets: 90, availableTickets: 90, status: "upcoming"},  
{eventId: "event9", title: "Yoga Camp", description: "Morning yoga sessions", category: "Health", dateTime: "2026-03-01, 06:00AM", venue: "Rishikesh", organizerId: "user11", price: 200, totalTickets: 80, availableTickets: 80, status: "upcoming"},  
{ eventId: "event10",title: "Literature Fest", description: "Book readings and discussions", category: "Literature", dateTime: "2026-04-18, 11:00AM", venue: "Kolkata", organizerId: "user13", price: 300, totalTickets: 140, availableTickets: 100, status: "upcoming"},  
{eventId: "event11", title: "Film Screening", description: "Indie film showcase", category: "Film", dateTime: "2026-01-01, 18:00AM", venue: "Mumbai", organizerId: "user8", price: 250, totalTickets: 160, availableTickets: 0, status: "compeleted" },  
{eventId: "event12", title: "Robotics Expo", description: "Robotics and AI exhibition", category: "Technology", dateTime: "2026-05-01, 10:00AM", venue: "Hyderabad", organizerId: "user1", price: 600, totalTickets: 220, availableTickets: 220, status: "upcoming"},  
{eventId: "event13", title: "Career Fair", description: "Job and internship opportunities", category: "Career", dateTime: "2026-03-28, 10:00AM", venue: "Noida", organizerId: "user10", price: 100, totalTickets: 300, availableTickets: 300, status: "cancelled"},  
{eventId: "event14", title: "Fashion Show", description: "College fashion event", category: "Fashion", dateTime: "2026-04-02,
```

```
5:00PM", venue: "Delhi", organizerId: "user20", price: 700, totalTickets: 180, availableTickets: 180, status: "upcoming"}, { eventId: "event15", title: "Science Exhibition", description: "Student science projects", category: "Science", dateTime: "2026-02-18, 10:00AM", venue: "Lucknow", organizerId: "user11", price: 150, totalTickets: 130, availableTickets: 80, status: "upcoming"}, {eventId: "event16", title: "Gaming Tournament", description: "Competitive gaming event", category: "Gaming", dateTime: "2026-03-15, 6:00PM", venue: "Gurgaon", organizerId: "user13", price: 400, totalTickets: 200, availableTickets: 200, status: "cancelled"}, {eventId: "event17", title: "Marathon", description: "City marathon event", category: "Sports", dateTime: "2026-04-10, 06:00AM", venue: "Delhi", organizerId: "user1", price: 300, totalTickets: 500, availableTickets: 500, status: "upcoming"}, {eventId: "event18", title: "Drama Play", description: "Stage drama performance", category: "Drama", dateTime: "2026-03-08, 3:00PM", venue: "Bhopal", organizerId: "user8", price: 250, totalTickets: 110, availableTickets: 110, status: "cancelled"}, {eventId: "event19", title: "AI Awareness Seminar", description: "Introduction to Artificial Intelligence for students", category: "Technology", dateTime: "2026-01-20, 11:00AM", venue: "Ahmedabad", organizerId: "user10", price: 200, totalTickets: 150, availableTickets: 0, status: "completed"}, {eventId: "event20", title: "Cultural Night", description: "College cultural performances and music", category: "Cultural", dateTime: "2026-01-25, 6:30PM", venue: "Indore", organizerId: "user20", price: 300, totalTickets: 220, availableTickets: 0, status: "completed" } ])
```

TICKETS:

```
db.tickets.insertMany([
  {ticketId: "ticket1", eventId: "event1", userId: "user2",
   bookingDate: "2025-12-20", quantity: 2, totalAmount: 1000,
   status: "booked"},

  {ticketId: "ticket2", eventId: "event1", userId: "user3",
   bookingDate: "2025-12-21", quantity: 1, totalAmount: 500,
   status: "booked"},

  {ticketId: "ticket3", eventId: "event2", userId: "user4",
   bookingDate: "2026-01-10", quantity: 3, totalAmount: 2400,
   status: "booked"},

  {ticketId: "ticket4", eventId: "event2", userId: "user5",
   bookingDate: "2026-01-12", quantity: 2, totalAmount: 1600,
   status: "cancelled"},

  {ticketId: "ticket5", eventId: "event3", userId: "user6",
   bookingDate: "2026-01-15", quantity: 1, totalAmount: 300,
   status: "booked"},

  {ticketId: "ticket6", eventId: "event3", userId: "user2",
   bookingDate: "2026-01-16", quantity: 2, totalAmount: 600,
   status: "booked"},

  {ticketId: "ticket7", eventId: "event4", userId: "user7",
   bookingDate: "2025-12-28", quantity: 1, totalAmount: 200,
   status: "booked"},

  {ticketId: "ticket8", eventId: "event4", userId: "user8",
   bookingDate: "2025-12-29", quantity: 2, totalAmount: 400,
   status: "booked"}])
```

```
{ticketId: "ticket9", eventId: "event5", userId: "user9",
bookingDate: "2026-01-25", quantity: 1, totalAmount: 400,
status: "cancelled"},

{ticketId: "ticket10", eventId: "event5", userId: "user10",
bookingDate: "2026-01-26", quantity: 2, totalAmount: 800,
status: "booked"},

{ticketId: "ticket11", eventId: "event6", userId: "user11",
bookingDate: "2025-12-22", quantity: 1, totalAmount: 250,
status: "booked"},

{ticketId: "ticket12", eventId: "event6", userId: "user2",
bookingDate: "2025-12-23", quantity: 2, totalAmount: 500,
status: "booked"},

{ticketId: "ticket13", eventId: "event7", userId: "user12",
bookingDate: "2026-02-01", quantity: 3, totalAmount: 450,
status: "booked"},

{ticketId: "ticket14", eventId: "event8", userId: "user13",
bookingDate: "2026-02-05", quantity: 1, totalAmount: 350,
status: "booked"},

{ticketId: "ticket15", eventId: "event9", userId: "user14",
bookingDate: "2026-02-10", quantity: 2, totalAmount: 400,
status: "cancelled"},

{ticketId: "ticket16", eventId: "event10", userId: "user15",
bookingDate: "2026-02-15", quantity: 1, totalAmount: 300,
status: "booked"},

{ticketId: "ticket17", eventId: "event11", userId: "user16",
bookingDate: "2025-12-18", quantity: 2, totalAmount: 500,
status: "booked"},

{ticketId: "ticket18", eventId: "event12", userId: "user17",
bookingDate: "2026-03-01", quantity: 1, totalAmount: 600,
status: "booked"},
```

```
{ticketId: "ticket19", eventId: "event19", userId: "user18",
bookingDate: "2026-01-18", quantity: 2, totalAmount: 400,
status: "booked"},  

{ticketId: "ticket20", eventId: "event20", userId: "user19",
bookingDate: "2026-01-20", quantity: 1, totalAmount: 300,
status: "booked"}  
]);
```

CATEGORIES:

```
db.categories.insertMany([  

{categoryId: "cat1", name: "Technology", description: "Events  

related to technology, AI, and robotics" },  

{categoryId: "cat2", name: "Music", description: "Concerts and  

musical performances" },  

{categoryId: "cat3", name: "Business", description:  

"Entrepreneurship, startup and networking events" },  

{categoryId: "cat4", name: "Art", description: "Art exhibitions  

and creative showcases" },  

{categoryId: "cat5", name: "Education", description:  

"Workshops and educational sessions" },  

{categoryId: "cat6", name: "Dance", description: "Dance  

competitions and performances" },  

{categoryId: "cat7", name: "Food", description: "Food festivals  

and culinary events" },  

{categoryId: "cat8", name: "Photography", description:  

"Photography workshops and exhibitions" },  

{categoryId: "cat9", name: "Health", description: "Yoga camps,  

health awareness and fitness events" },  

{categoryId: "cat10", name: "Literature", description: "Book  

readings and literature festivals" },
```

```
{categoryId: "cat11", name: "Film", description: "Film screenings and indie cinema events" },  
{categoryId: "cat12", name: "Career", description: "Job fairs and career guidance events" },  
{categoryId: "cat13", name: "Fashion", description: "Fashion shows and related events" },  
{categoryId: "cat14", name: "Science", description: "Science exhibitions and student projects" },  
{categoryId: "cat15", name: "Gaming", description: "Competitive gaming tournaments and esports" },  
{categoryId: "cat16", name: "Sports", description: "Marathons, competitions, and sports events" },  
{categoryId: "cat17", name: "Drama", description: "Stage plays and theatrical performances" },  
{categoryId: "cat18", name: "Cultural", description: "Cultural nights and college events" },  
{categoryId: "cat19", name: "Photography Workshop", description: "Specialized photography skill sessions" },  
{categoryId: "cat20", name: "Dance Workshop", description: "Dance training and workshops" }  
]);
```

CRUD OPERATION

CREATE:

Refer to the sample section for create

READ:

// View all users

```
db.users.find()
```

// View all events

```
db.events.find()
```

// View all tickets

```
db.tickets.find()
```

// View all categories

```
db.categories.find()
```

UPDATE:

// Updating role

```
db.users.updateOne(
```

```
  { userId: "user20" },
```

```
  { $set: { role: "organizer" } }
```

```
)
```

```
//Updating event status
db.events.updateOne(
  { eventId: "event18" },
  { $set: { status: "upcoming" } }
)
```

```
//Updating ticket status
db.tickets.updateOne(
  { ticketId: "ticket7" },
  { $set: { status: "cancelled" } }
)
```

```
//Updating categories description
db.categories.updateOne(
  { categoryId: "cat18" },
  { $set: { description: "Cultural college events" } }
)
```

DELETE:

```
//Deleting userId user14
db.users.deleteOne({ userId: "user14" });
```

```
//Deleting eventId event2
db.events.deleteOne({ eventId: "event2" });
```

```
//Deleting ticketId ticket10
db.tickets.deleteOne({ ticketId: "ticket10" });
```

```
//Deleting categoryId cat9
db.categories.deleteOne({ categoryId: "cat9" });
```

AGGREGATION PIPELINES

//Top 5 events by ticket sales

```
db.tickets.aggregate([
  {
    $group: {
      _id: "$eventId",
      totalTicketsSold: { $sum: "$quantity" }
    }
  },
  {
    $sort: { totalTicketsSold: -1 }
  },
  {
    $limit: 5
  }
])
```

//Total revenue earned by an organizer

```
db.events.aggregate([
  {
    $lookup: {
      from: "tickets",
      localField: "eventId",
      foreignField: "eventId",
      as: "ticketInfo"
    }
  }
])
```

```
        }
    },
    {
        $unwind: "$ticketInfo"
    },
    {
        $group: {
            _id: "$organizerId",
            totalRevenue: { $sum: "$ticketInfo.totalAmount" }
        }
    }
])
])
```

//Number of attendees per event

```
db.tickets.aggregate([
{
    $group: {
        _id: "$eventId",
        totalAttendees: { $sum: "$quantity" }
    }
}
])
```

//Events grouped by category and status

```
db.events.aggregate([
{
```

```
$group: {  
    _id: {  
        category: "$category",  
        status: "$status"  
    },  
    totalEvents: { $sum: 1 }  
}  
}  
])
```

INDEXES

// Index to search events by category

```
db.events.createIndex({ category: 1 })
```

// Index to search events by date and time

```
db.events.createIndex({ dateTime: 1 })
```

// Index to filter events by status

```
db.events.createIndex({ status: 1 })
```

// Index to find events by organizer

```
db.events.createIndex({ organizerId: 1 })
```

// Index to quickly find tickets of a user

```
db.tickets.createIndex({ userId: 1 })
```

// Index to find tickets for a specific event

```
db.tickets.createIndex({ eventId: 1 })
```

Conclusion

In this project, an Event Management and Ticketing System was successfully implemented using MongoDB. Collections for users, events, tickets, and categories were designed to represent real-world relationships. CRUD operations were performed on all collections to manage data effectively.

Aggregation pipelines were used to generate reports such as top events by ticket sales, total revenue earned by organizers, number of attendees per event, and events grouped by category and status. Indexes were applied to improve the performance of frequent queries. Overall, this project enhanced practical knowledge of MongoDB and demonstrated how NoSQL databases can efficiently manage and analyze event-based data.