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MongoDB Schema Design Challenge Solutions

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1. E-Commerce Store – Product & Orders

Users Collection:

```
db.createCollection("users", {
  validator: {
    $jsonSchema: {
      bsonType: "object",
      required: ["name", "email", "password"],
      properties: {
        name: { bsonType: "string" },
        email: {
          bsonType: "string",
          pattern: "^[a-zA-Z0-9._%+-]+@[a-zA-Z0-9.-]+\\.[a-zA-Z]{2,}$"
        },
        password: {
          bsonType: "string",
          minLength: 6
        }
      }
    }
  }
});

db.users.createIndex({ "email": 1 }, { unique: true });
```

Products Collection:

```
db.createCollection("products", {
  validator: {
    $jsonSchema: {
      bsonType: "object",
      required: ["title", "description", "price", "category", "stock"],
      properties: {
        title: { bsonType: "string" },
        description: { bsonType: "string" },
        price: {
          bsonType: "number",
          minimum: 0
        },
        category: { bsonType: "string" },
        stock: {
          bsonType: "int",
          minimum: 0
        }
      }
    }
  }
});
```

Orders Collection:

```
db.createCollection("orders", {
  validator: {
    $jsonSchema: {
      bsonType: "object",
      required: ["userId", "products", "totalAmount", "orderDate"],
      properties: {
        userId: { bsonType: "objectId" },
        products: {
          bsonType: "array",
          items: {
            bsonType: "object",
            required: ["productId", "quantity"],
            properties: {
              productId: { bsonType: "objectId" },
              quantity: {
                bsonType: "int",
                minimum: 1
              }
            }
          }
        },
        totalAmount: {
          bsonType: "number",
          minimum: 0
        },
        orderDate: { bsonType: "date" }
      }
    }
  }
});
```

Reviews Collection:

```
db.createCollection("reviews", {
  validator: {
    $jsonSchema: {
      bsonType: "object",
      required: ["userId", "productId", "rating", "comment"],
      properties: {
        userId: { bsonType: "objectId" },
        productId: { bsonType: "objectId" },
        rating: {
          bsonType: "int",
          minimum: 1,
          maximum: 5
        },
        comment: { bsonType: "string" }
      }
    }
  }
});
```

2. Online Course Platform – Instructors & Students

Users Collection:

```
db.createCollection("users", {
  validator: {
    $jsonSchema: {
      bsonType: "object",
      required: ["name", "email", "role"],
      properties: {
        name: { bsonType: "string" },
        email: {
          bsonType: "string",
          pattern: "^[a-zA-Z0-9._%+-]+@[a-zA-Z0-9.-]+\\.[a-zA-Z]{2,}$"
        },
        role: {
          bsonType: "string",
          enum: ["student", "instructor"]
        }
      }
    }
  }
});
```

Courses Collection:

```
db.createCollection("courses", {
  validator: {
    $jsonSchema: {
      bsonType: "object",
      required: ["title", "instructorId", "category", "price", "createdAt"],
      properties: {
        title: { bsonType: "string" },
        instructorId: { bsonType: "objectId" },
        category: { bsonType: "string" },
        price: {
          bsonType: "number",
          minimum: 0
        },
        createdAt: { bsonType: "date" },
        lessons: {
          bsonType: "array",
          items: {
            bsonType: "object",
            required: ["title", "videoURL", "duration"],
            properties: {
              title: { bsonType: "string" },
              videoURL: { bsonType: "string" },
              duration: {
                bsonType: "number",
                minimum: 1
              }
            }
          }
        }
      }
    }
  }
});
```

Enrollments Collection:

```
db.createCollection("enrollments", {
  validator: {
    $jsonSchema: {
      bsonType: "object",
      required: ["studentId", "courseId", "enrollmentDate"],
      properties: {
        studentId: { bsonType: "objectId" },
        courseId: { bsonType: "objectId" },
        enrollmentDate: { bsonType: "date" }
      }
    }
  }
});
```

3. Event Booking System – Organizers & Attendees

Users Collection:

```
db.createCollection("users", {
  validator: {
    $jsonSchema: {
      bsonType: "object",
      required: ["name", "email", "role"],
      properties: {
        name: { bsonType: "string" },
        email: {
          bsonType: "string",
          pattern: "^[a-zA-Z0-9._%+-]+@[a-zA-Z0-9.-]+\\.[a-zA-Z]{2,}$"
        },
        role: {
          bsonType: "string",
          enum: ["organizer", "attendee"]
        }
      }
    }
  }
});

db.users.createIndex({ "email": 1 }, { unique: true });
```

Events Collection:

```
db.createCollection("events", {
  validator: {
    $jsonSchema: {
      bsonType: "object",
      required: ["title", "organizerId", "location", "startTime", "endTime", "capacity"],
      properties: {
        title: { bsonType: "string" },
        organizerId: { bsonType: "objectId" },
        location: { bsonType: "string" },
        startTime: { bsonType: "date" },
        endTime: { bsonType: "date" },
        capacity: {
          bsonType: "int",
          minimum: 1
        }
      }
    }
  }
});
```

Bookings Collection:

```
db.createCollection("bookings", {
  validator: {
    $jsonSchema: {
      bsonType: "object",
      required: ["eventId", "attendeeId", "bookingDate"],
      properties: {
        eventId: { bsonType: "objectId" },
        attendeeId: { bsonType: "objectId" },
        bookingDate: { bsonType: "date" }
      }
    }
  }
});
```

4. Blogging Platform – Authors & Articles

Authors Collection:

```
db.createCollection("authors", {
  validator: {
    $jsonSchema: {
      bsonType: "object",
      required: ["name", "email", "bio"],
      properties: {
        name: { bsonType: "string" },
        email: {
          bsonType: "string",
          pattern: "^[a-zA-Z0-9._%+-]+@[a-zA-Z0-9.-]+\\.[a-zA-Z]{2,}$"
        },
        bio: { bsonType: "string" }
      }
    }
  }
});
```

Articles Collection:

```
db.createCollection("articles", {
  validator: {
    $jsonSchema: {
      bsonType: "object",
      required: ["title", "content", "authorId", "published", "createdAt"],
      properties: {
        title: { bsonType: "string" },
        content: { bsonType: "string" },
        authorId: { bsonType: "objectId" },
        tags: {
          bsonType: "array",
          items: { bsonType: "string" }
        },
        published: { bsonType: "bool" },
        createdAt: { bsonType: "date" }
      }
    }
  }
});
```

Comments Collection:

```
db.createCollection("comments", {
  validator: {
    $jsonSchema: {
      bsonType: "object",
      required: ["articleId", "userName", "commentText", "postedAt"],
      properties: {
        articleId: { bsonType: "objectId" },
        userName: { bsonType: "string" },
        commentText: { bsonType: "string" },
        postedAt: { bsonType: "date" }
      }
    }
  }
});
```

5. Subscription App – Users & Plans

Users Collection:

```
db.createCollection("users", {
  validator: {
    $jsonSchema: {
      bsonType: "object",
      required: ["email", "name", "signupDate"],
      properties: {
        email: {
          bsonType: "string",
          pattern: "^[a-zA-Z0-9._%+-]+@[a-zA-Z0-9.-]+\\.[a-zA-Z]{2,}$"
        },
        name: { bsonType: "string" },
        signupDate: { bsonType: "date" }
      }
    }
  }
});
```

Plans Collection:

```
db.createCollection("plans", {
  validator: {
    $jsonSchema: {
      bsonType: "object",
      required: ["name", "price", "features", "billingCycle"],
      properties: {
        name: { bsonType: "string" },
        price: {
          bsonType: "number",
          minimum: 0
        },
        features: {
          bsonType: "array",
          items: { bsonType: "string" }
        },
        billingCycle: {
          bsonType: "string",
          enum: ["monthly", "yearly"]
        }
      }
    }
  }
});
```

Subscriptions Collection:

```
db.createCollection("subscriptions", {
  validator: {
    $jsonSchema: {
      bsonType: "object",
      required: ["userId", "planId", "startDate", "isActive"],
      properties: {
        userId: { bsonType: "objectId" },
        planId: { bsonType: "objectId" },
        startDate: { bsonType: "date" },
        isActive: { bsonType: "bool" }
      }
    }
  }
});
```

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