**MONGODB AGGREGATION OPERATIONS – SMART KNOWLEDGE HUB**

**1. Admin Collection**

**Aggregation 1: Count admins by role**

db.admin.aggregate([  
 { $group: { \_id: "$role", count: { $sum: 1 } } },  
 { $sort: { count: -1 } }  
]);

**Aggregation 2: List admins with last login in the past 7 days**

db.admin.aggregate([  
 { $match: { last\_login: { $gte: new Date(Date.now() - 7\*24\*60\*60\*1000) } } },  
 { $project: { name: 1, email: 1, last\_login: 1 } }  
]);

**2. Categories Collection**

**Aggregation 1: Calculate total products in all categories**

db.categories.aggregate([  
 { $group: { \_id: null, total\_products: { $sum: "$product\_count" } } }  
]);

**Aggregation 2: Group categories by parent category and count**

db.categories.aggregate([  
 { $group: { \_id: "$parent\_category", categoryCount: { $sum: 1 } } }  
]);

**3. Inventory Collection**

**Aggregation 1: Find inventory items below low stock threshold**

db.inventory.aggregate([  
 { $match: { $expr: { $lte: ["$quantity\_available", "$low\_stock\_threshold"] } } }  
]);

**Aggregation 2: Sum quantity available per supplier**

db.inventory.aggregate([  
 { $group: { \_id: "$supplier\_id", total\_quantity: { $sum: "$quantity\_available" } } }  
]);

**4. Orders Collection**

**Aggregation 1: Total sales amount per order status**

db.orders.aggregate([  
 { $group: { \_id: "$status", totalSales: { $sum: "$total\_amount" } } }  
]);

**Aggregation 2: Most popular products ordered**

db.orders.aggregate([  
 { $unwind: "$items" },  
 { $group: { \_id: "$items.product\_id", totalQuantity: { $sum: "$items.quantity" } } },  
 { $sort: { totalQuantity: -1 } }  
]);

**5. Payments Collection**

**Aggregation 1: Total amount collected by payment method**

db.payments.aggregate([  
 { $match: { status: "completed" } },  
 { $group: { \_id: "$method", totalAmount: { $sum: "$amount" } } }  
]);

**Aggregation 2: Count payments by status**

db.payments.aggregate([  
 { $group: { \_id: "$status", count: { $sum: 1 } } }  
]);

**6. Products Collection**

**Aggregation 1: Average rating per category**

db.products.aggregate([  
 { $group: { \_id: "$category", avgRating: { $avg: "$ratings" } } }  
]);

**Aggregation 2: Count of products per category sorted descending**

db.products.aggregate([  
 { $group: { \_id: "$category", count: { $sum: 1 } } },  
 { $sort: { count: -1 } }  
]);

**7. Review Collection**

**Aggregation 1: Average rating per product**

db.review.aggregate([  
 { $group: { \_id: "$product\_id", avgRating: { $avg: "$rating" }, reviewCount: { $sum: 1 } } }  
]);

**Aggregation 2: Find products with more than 3 reviews**

db.review.aggregate([  
 { $group: { \_id: "$product\_id", reviewCount: { $sum: 1 } } },  
 { $match: { reviewCount: { $gt: 3 } } }  
]);

**8. Shipping Collection**

**Aggregation 1: Average shipping cost by carrier**

db.shipping.aggregate([  
 { $group: { \_id: "$carrier", avgCost: { $avg: "$cost" } } }  
]);

**Aggregation 2: Count of shipments delivered late (actual\_delivery\_date after estimated\_delivery)**

db.shipping.aggregate([  
 {   
 $match: {   
 actual\_delivery\_date: { $ne: null },  
 $expr: { $gt: ["$actual\_delivery\_date", "$estimated\_delivery"] }  
 }   
 },  
 { $count: "lateShipments" }  
]);

**9. Suppliers Collection**

**Aggregation 1: Suppliers with average/highest rating**

db.suppliers.aggregate([  
 { $sort: { rating: -1 } },  
 { $limit: 5 }  
]);

**Aggregation 2: List suppliers with number of products they supply**

db.suppliers.aggregate([  
 { $project: { name: 1, productsSuppliedCount: { $size: "$products\_supplied" }, rating: 1 } }  
]);

**10. Users Collection**

**Aggregation 1: Count users registered per month**

db.users.aggregate([  
 {   
 $group: {   
 \_id: { $dateToString: { format: "%Y-%m", date: "$registration\_date" } },  
 count: { $sum: 1 }  
 }  
 },  
 { $sort: { \_id: 1 } }  
]);

**Aggregation 2: Most common user preference categories**

db.users.aggregate([  
 { $unwind: "$preferences" },  
 { $group: { \_id: "$preferences", count: { $sum: 1 } } },  
 { $sort: { count: -1 } }  
]);