

# Java Project Ideas

## Library Management System

OOP Concepts:

- Classes: Book, Member, Librarian
- Inheritance: AdultMember, StudentMember
- Encapsulation: Private book/member details with getters/setters
- Polymorphism: Overriding borrow policies for member types

Exception Handling:

- OverdueBookException and BookNotAvailableException

File I/O:

- Read book/member data from CSV files and update transaction logs.

## Inventory Management System

OOP Concepts:

- Classes: Product, Supplier, Order
- Inheritance: PerishableProduct, NonPerishableProduct
- Polymorphism: Different pricing calculations based on product type

Exception Handling:

- OutOfStockException and InvalidOrderException

File I/O:

- Track stock levels and export updated inventory lists.

## Hotel Reservation System

OOP Concepts:

- Classes: Room, Reservation, Guest
- Inheritance: SingleRoom, DoubleRoom, SuiteRoom
- Polymorphism: Room pricing based on type and season

Exception Handling:

- RoomNotAvailableException and InvalidReservationException

File I/O:

- Manage guest and room booking details.

## **Student Management System**

OOP Concepts:

- Abstract class: Person
- Subclasses: Student, Teacher
- Interface: GradingSystem
- Polymorphism: Grading and attendance tracking methods

Exception Handling:

- InvalidGradeException and StudentNotFoundException

File I/O:

- Maintain student records and course registrations.

## **Online Shopping System**

OOP Concepts:

- Classes: Product, Cart, Customer
- Inheritance: RegisteredUser, GuestUser
- Polymorphism: Discount calculations for different user types

Exception Handling:

- PaymentFailedException and ProductUnavailableException

File I/O:

- Save transaction logs and user details.

## **Payroll Management System**

OOP Concepts:

- Classes: Employee, Salary
- Inheritance: PermanentEmployee, ContractEmployee
- Polymorphism: Tax and bonus calculation

Exception Handling:

- InvalidSalaryException and TaxCalculationException

File I/O:

- Store payroll history and salary slips.

## **University Enrollment System**

OOP Concepts:

- Classes: Course, Student, Professor

- Inheritance: UndergraduateStudent, GraduateStudent
- Polymorphism: Enrollment limits and fee calculation

Exception Handling:

- CourseFullException and InvalidEnrollmentException

File I/O:

- Manage student enrollments and schedules.

## **Healthcare Management System**

OOP Concepts:

- Classes: Patient, Doctor, Appointment
- Inheritance: InPatient, OutPatient
- Polymorphism: Different billing systems

Exception Handling:

- AppointmentFullException and InvalidPatientDataException

File I/O:

- Record patient history and appointments.

## **Movie Ticket Booking System**

OOP Concepts:

- Classes: Movie, Theater, Ticket
- Inheritance: StandardSeat, VIPSeat
- Polymorphism: Seat pricing based on type and time

Exception Handling:

- SeatUnavailableException and InvalidBookingException

File I/O:

- Manage showtimes and booking history.

## **Bank Loan Management System**

OOP Concepts:

- Classes: Loan, Customer, BankOfficer
- Inheritance: HomeLoan, PersonalLoan, CarLoan
- Polymorphism: Interest calculation for different loan types

Exception Handling:

- LoanApprovalException and InvalidLoanAmountException

File I/O:

- Manage loan applications and repayment records.