Scenario-Based Java Problems

1. Online Shopping Cart (Class + Array of Objects + Scanner)

Create a class `Product` with attributes `name`, `price`, and `quantity`.

- Use a constructor to initialize values.
- Ask the user to enter details for 5 products and store them in an array.
- Print a bill showing all products with total cost.
- Use a static method `calculateTotal()` to get the total bill.

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2. Student Grade Management (2D Array + Class + Static Block)

Create a class `Student` with attributes `name`, `roll`, and a 2D array `marks` (rows = subjects, columns = tests).

- Use a static block to print: *"Grade Management System Initialized"*.
- Input marks using `Scanner`.
- Calculate the average marks per subject.
- Display the student's grade using `Math` functions.

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3. Banking System (Static + Constructors + Final Variable)

Create a class `BankAccount` with:

- Attributes: `accountNumber`, `balance`.
- A `final` variable `bankName = "ABC Bank"`.

- A static variable `totalAccounts`.
- Constructor to initialize account details.
- Methods: `deposit()`, `withdraw()`, `displayInfo()`.
  Create multiple accounts and display the total number of accounts created.

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4. Movie Ticket Booking (Class + Jagged Array + Scanner)

Design a `Movie` class with attributes `title`, `theaterName`, and a jagged array representing seat availability (rows of different lengths).

- Ask the user to book a seat by entering row and seat number.
- Update the seat availability.
- Print the updated seating chart.

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5. Employee Payroll System (Class + Static Method + Math Class)

Create an `Employee` class with attributes `name`, `id`, `salary`.

- Use a static method `calculateBonus(Employee e)` which gives 10% of salary as bonus.
- Use `Math.round()` to round values.
- Input 3 employees and print their salary + bonus.

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6. Library Management (Class + Array + Initialization Block)

Create a `Book` class with attributes `title`, `author`, `isIssued`.

- Use an initialization block to print: *"New Book Record Created"*.

- Store multiple books in an array.
- Create methods `issueBook()` and `returnBook()`.
- Demonstrate issuing and returning books.

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7. Gym Membership System (Class + Scanner + Static Block)

Create a `Member` class with attributes `name`, `age`, `planType`.

- Use a static block to print: *"Welcome to FitLife Gym"*.
- Input member details using `Scanner`.
- If age < 18, print *"Minor Membership"*. Otherwise, assign plan based on user choice (`Monthly` or `Yearly`).

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8. Weather Report (2D Array + Math Class + Class)

Store daily temperatures (7 days × 2 times: morning and evening) in a 2D array.

- Use a class `WeatherReport` with methods to calculate:
    - Average temperature of the week.
    - Maximum and minimum temperature (use `Math.max`/`Math.min`).
- Display the results.

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9. Flight Reservation System (Class + Static Variable + Array)

Create a class `Flight` with attributes `flightNumber`, `destination`, and `availableSeats`.

- Use a static variable `totalFlights`.

- Create an array of `Flight` objects.
- Allow the user to book tickets. If no seats available, show *"Flight Full"*.
- Display total flights created.

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10. Sports Tournament Scores (Jagged Array + Class + Static Method)

Create a class `Team` with attributes `name` and a jagged array `scores` (since different teams played a different number of matches).

- Use a static method `findWinner(Team[] teams)` to determine which team has the highest average score.
- Print the winner team's name.

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11. School Report Card (Class + Constructor + Array + Math Class)

Create a `Student` class with attributes `name`, `roll`, `marks[]`.

- Use a constructor to initialize details.
- Input marks for 5 subjects.
- Calculate average using `Math.floor()`.
- Print the student's grade (`A`, `B`, `C`) based on average.

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12. Online Quiz System (Class + Static + Final Variable)

Create a class `Quiz` with:

- A `final` variable `totalQuestions = 5`.

- A static variable `score`.
- Method `checkAnswer(String userAnswer, String correctAnswer)` to update score.
  Ask the user 5 questions and calculate the final score.

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13. Online Banking PIN Verification (Class + Static Block + Scanner)

Create a class `Bank` with a static block that prints *"Secure Banking System Ready"*.

- Store a PIN as a final variable.
- Ask the user to enter their PIN (using `Scanner`).
- Verify PIN and display balance if correct, otherwise show *"Access Denied"*.

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14. Hospital Management (Class + Array + Initialization Block)

Create a class `Patient` with attributes `name`, `id`, and `disease`.

- Use an initialization block to assign *"General Ward"* as default.
- Store multiple patients in an array.
- Display patient details and their ward assignment.

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15. Hotel Room Booking (2D Array + Class + Scanner)

Represent a hotel with a 2D array where `0 = available`, `1 = booked`.

- Create a `Hotel` class with methods `bookRoom(int floor, int roomNo)` and `checkAvailability()`.
- Ask the user to book a room and update the array.

- Print the updated room status.

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16. Voting System (Class + Static + Array of Objects)

Create a class `Voter` with attributes `name` and `age`.

- Use a static method `isEligible(int age)` to check if the voter is 18 or above.
- Store multiple voters in an array.
- Print whether each voter is eligible or not.

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17. Inventory Management (Class + Array + Scanner)

Create a class `Item` with attributes `id`, `name`, `quantity`.

- Input 5 items into an array.
- Allow the user to “sell” an item (decrease quantity).
- If quantity reaches 0, print *“Out of Stock”*.

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18. Parking Lot System (Static Variable + Array + Math.random)

Create a class `ParkingLot` with attributes `lotNumber` and `isOccupied`.

- Use a static variable to count total cars parked.
- Randomly assign parking slots to cars.
- Display total cars parked and available slots.

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19. Bank Interest Calculator (Class + Final + Math Class)

Create a class `BankAccount` with attributes `balance`.

- Use a final variable `INTEREST_RATE = 5.0`.
- Method `calculateInterest()` to compute yearly interest using `Math.pow()`.
- Input multiple accounts and print the interest for each.

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20. Student Hostel Management (Jagged Array + Class + Static Block)

Create a class `Hostel` with:

- Jagged array representing different hostel floors (each floor has different number of rooms).
- Static block: *"Welcome to ABC Hostel"*.
- Methods `allocateRoom(int floor, int room)` and `displayRooms()`.
- Simulate allocating rooms to students.