# VOPA AI/ML Intern Assignment

## 1. REST API Endpoints Design for V-School Feature

Below are the designed endpoints to implement the feature where teachers can assign specific lessons to students, track completion, and students can mark lessons as complete.

### API Endpoints:

1. Assign lesson to a student (Teacher action)  
 Method: POST  
 Path: /api/assignments  
 Request Body (JSON):  
{  
 "teacher\_id": "T12345",  
 "student\_id": "S67890",  
 "lesson\_id": "L54321",  
 "due\_date": "2025-08-20"  
}  
 Successful Response (JSON):  
{  
 "status": "success",  
 "assignment\_id": "A98765",  
 "message": "Lesson assigned successfully",  
 "assigned\_at": "2025-08-14T10:30:00Z"  
}

2. View assigned incomplete lessons (Student action)  
 Method: GET  
 Path: /api/students/{student\_id}/assignments?status=incomplete  
 Response (JSON):  
{  
 "student\_id": "S67890",  
 "incomplete\_lessons": [  
 {  
 "assignment\_id": "A98765",  
 "lesson\_id": "L54321",  
 "lesson\_title": "Introduction to Fractions",  
 "due\_date": "2025-08-20"  
 }  
 ]  
}

3. Mark lesson as complete (Student action)  
 Method: PATCH  
 Path: /api/assignments/{assignment\_id}/complete  
 Response (JSON):  
{  
 "status": "success",  
 "message": "Assignment marked as complete",  
 "completed\_at": "2025-08-14T12:45:00Z"  
}

4. (Optional) Teacher view completion status  
 Method: GET  
 Path: /api/teachers/{teacher\_id}/assignments  
 Query Parameters: lesson\_id (optional), status (optional)  
 Response (JSON):  
{  
 "teacher\_id": "T12345",  
 "assignments": [  
 {  
 "assignment\_id": "A98765",  
 "student\_name": "Amit Sharma",  
 "lesson\_title": "Introduction to Fractions",  
 "status": "completed"  
 }  
 ]  
}

### System Design Considerations:

- Data validation: Ensure lesson\_id exists and is not duplicated for the same student.  
- Permissions/Authorization: Teachers can assign, students can only update their own assignments.  
- Performance: Indexing database tables on student\_id, teacher\_id, lesson\_id for faster queries.

## 2. 144 Horses – Find the 11 Fastest

Constraints:  
- 12 horses per race.  
- No stopwatch (only rankings known per race).

Step-by-Step Solution:  
1. First Stage – Group races:  
 - 144 ÷ 12 = 12 races.  
 - We know rankings in each group.  
2. Second Stage – Race winners:  
 - Take 1st place from each race → 12 horses.  
 - Race them → 1 race.  
 - This finds fastest horse & ranks winners.  
3. Key insight:  
 - 2nd–11th fastest could be from top groups in winners race.  
4. Filtering candidates:  
 - From fastest group: take 2nd & 3rd.  
 - From 2nd place group: take top 3.  
 - From 3rd place group: take top 2.  
 - From 4th place group: take only winner.  
5. Final determination:  
 - Fastest (already known) + contenders (~10–12 horses).  
 - Race to decide 2nd–11th.  
Total Races = 12 + 1 + 1 = 14.

Pitfalls/Assumptions:  
- No ties.  
- Horses perform consistently.  
- Weather/track conditions same.

## 3. Why I am Interested in the AI/ML Intern Role at VOPA

I am deeply motivated by the opportunity to use AI/ML to address real-world challenges, especially in education and mental healthcare, which aligns perfectly with VOPA’s mission. My technical expertise in data science, machine learning, and data-driven problem-solving enables me to design impactful, scalable solutions for such domains.  
  
VOPA’s vision of creating free, accessible, and inclusive platforms resonates with my belief that technology should reduce inequality. I am particularly excited about contributing to V-School, where adaptive learning models and personalized recommendations can transform student engagement.  
  
I value that VOPA focuses on social impact over commercial gain. Working in a mission-driven team with the goal of uplifting communities through technology strongly appeals to me, and I believe my combination of technical skill and mission-driven mindset makes me well-suited for this role.