Case Study: Data Analysis at Global University

🏫 Background:

Global University is a large educational institution that manages multiple departments, programs, and faculty. The university maintains structured data in a `university.json` file, which includes:

- University details
- Campus location
- Departments with faculty
- Academic programs and batches
- Courses and skills

The university has hired a data analytics consultant to analyze this data using JavaScript.

📦 Data Source: `university.json`

Sample Structure:

```
{
  "universityName": "Global University",
  "campus": { "city": "New York", "state": "NY" },
  "departments": [
    {
      "name": "Computer Science",
      "budget": 3000000,
      "faculty": [
        {
          "id": "F001",
          "firstName": "Jane",
          "lastName": "Williams",
          "expertise": ["AI", "Python", "Machine Learning"],
          "courses": ["Data Structures", "AI Fundamentals"]
        },
        ...
      ]
    },
    ...
  ],
  "programs": [
    {
```

```
      "name": "B.Tech Computer Science",
      "batches": [
        { "batchYear": 2020, "graduates": 250 },
        { "batchYear": 2022, "graduates": 320 }
      ]
    },
    ...
  ]
}
```

🧪 Objective:

The goal is to:

- Identify high-performing departments
- Analyze faculty expertise
- Explore graduate trends
- Provide recommendations to the Academic Council

🔍 Filters Applied (Insights)

#	Filter Description	Insight
1	**Faculty with Python expertise**	Helps allocate them to relevant AI/ML courses or research grants.
2	**Departments with budget > $2M**	Indicates priority areas or departments with research focus.
3	**Courses taught by Jane Williams**	Useful for performance review or academic load balancing.
4	**Programs with batches after**	Shows recent educational offerings and curriculum updates.
5	**All unique faculty expertise**	Helps in identifying training needs or forming research
6	**Faculty teaching more than 1 course**	Detects overloaded or multitasking faculty.
7	**Total graduates**	Helps understand alumni base for outreach or rankings.
8	**Departments without faculty**	Flags hiring needs or inactive departments.
9	**Faculty teaching Machine**	Identifies specialists for upcoming tech programs.
10	**Programs with 300+ graduates**	Indicates successful programs with strong demand.

📈 Business Value

Area	Value
Academics	Curriculum review, faculty allocation, subject distribution

HR	Identify departments with hiring needs
Finance	Optimize department budgets
Alumni/Outreach	Use graduate numbers for building alumni networks
Strategic Planning	Focus on in-demand programs and faculty skill development

university.json


```
{
 "universityName": "National Institute of Technology",
 "establishedYear": 1985,
 "isAccredited": true,
 "campus": {
  "address": "456 Knowledge Avenue",
  "city": "TechCity",
  "state": "TX",
  "zipCode": "73301"
 },
 "departments": [
  {
   "name": "Computer Science",
   "budget": 3000000,
   "faculty": [
    {
     "id": "CS001",
     "firstName": "John",
     "lastName": "Doe",
     "expertise": ["Algorithms", "AI", "Data Structures"],
     "courses": [
      {"title": "Intro to AI", "status": "Ongoing"},
      {"title": "Data Structures", "status": "Completed"}
     ]
    },
    {
     "id": "CS002",
     "firstName": "Jane",
     "lastName": "Williams",
     "expertise": ["Machine Learning", "Python"],
     "courses": [
      {"title": "Machine Learning", "status": "Ongoing"}
     ]
    }
   ]
  },
  {
   "name": "Mechanical Engineering",
   "budget": 2500000,
   "faculty": [
    {
```

```
        "id": "ME001",
        "firstName": "Robert",
        "lastName": "Brown",
        "expertise": ["Thermodynamics", "CAD"],
        "courses": ["Heat Transfer", "CAD Design"]
       }
     ]
    },
    {
     "name": "Humanities",
     "budget": 1000000,
     "faculty": [
      {
       "id": "HU001",
       "firstName": "Emily",
       "lastName": "Davis",
       "expertise": ["English Literature", "Creative Writing"]
      }
     ]
    }
  ],
  "programs": [
    {
     "id": "PROG001",
     "name": "Bachelor of Technology",
     "batches": [
      {"batchYear": 2020, "graduates": 350},
      {"batchYear": 2023, "graduates": 400}
     ]
    },
    {
     "id": "PROG002",
     "name": "Master of Science",
     "batches": [
      {"batchYear": 2021, "graduates": 120}
     ]
    }
  ]
}
```