Case Study: "Campus Connect" Mobile Application Development

Objective: To estimate the effort, duration, and staffing required for a new software project using the Basic COCOMO model.

Background:
You are a project manager at "EduTech Solutions." Your company has won a contract to develop a comprehensive mobile application called **"Campus Connect"** for a large university.

The app will be a one-stop-shop for students, faculty, and staff, with modules for authentication, academic records, campus navigation, communication, and campus services.

Project Estimation Input

After reviewing the requirements, your lead architect has provided an initial estimate of **50,000 Lines of Code (LOC)**. The team will be developing in **JavaScript** (React Native and Node.js).

The project has mixed requirements: some are well-understood (like user profiles), while others are new and complex (like integrating with the university's existing databases and providing indoor navigation). Your team has experience with similar projects but has not built an app with this exact feature set before.

Tasks:

Based on the case study above, please answer the following questions using the **Basic COCOMO model**.

1. Determine the **mode** of the project (Organic, Semi-Detached, or Embedded). Justify your choice in 1-2 sentences.
2. Using the appropriate coefficients for the mode, calculate:
    - **Effort (E)** in person-months (PM)
    - **Development Time (T)** in months (D)
    - **Average Staffing (S)** in number of people (FSP - Full-time Equivalent Staff)

Basic COCOMO Equations:

- **Effort (E) = a * (KLOC)^b**
- **Development Time (T) = c * (E)^d**
- **Average Staffing (S) = E / T**

Coefficient Table:

Project Mode	a	b	c	d
Organic	2.4	1.05	2.5	0.38
Semi-Detached	3.0	1.12	2.5	0.35
Embedded	3.6	1.20	2.5	0.32