**Bytexl’s Guided Project Overview**

**Title:** Interactive Graph Algorithms Visualizer

**Duration:** Approx. 2 hours

**Purpose:** This project allows students to gain hands-on experience with graph algorithms, providing a practical, interactive approach to learning BFS, DFS, and Dijkstra’s algorithm. The project is ideal for developing essential data structure and algorithm skills relevant to real-world problem-solving and interview scenarios.

**Project-Based Learning Course Overview**

**About the Project**

The Interactive Graph Algorithms Visualizer is designed to help students practice and understand core graph algorithms by creating a visualizer where they can add nodes, edges, and select different algorithms to see real-time execution. This project is especially beneficial for students looking to strengthen their data structure and algorithm knowledge in preparation for technical interviews and coding assessments.

**Prerequisites**

- Basic understanding of data structures and algorithms (particularly graph theory)

- Familiarity with programming basics

**Learning Objectives**

By the end of this project, students will:

1. Develop an understanding of fundamental graph algorithms (BFS, DFS, Dijkstra’s).

2. Visualize how these algorithms operate step-by-step on a graph structure.

3. Build confidence in practical applications of graph algorithms, useful for interviews and industry roles.

**Key Skills to Practice**

- Implementing BFS, DFS, and Dijkstra’s algorithms in an interactive environment

- Using data structures for practical problem-solving

- Enhancing visualization and debugging skills in real-time

**Learning Platform: Nimbus on Bytexl**

This project will be completed on Bytexl’s Nimbus platform, which requires no additional setup. Nimbus provides a hands-on environment tailored to learning with tools pre-configured for development, making it easy to focus on the project and real-time interactions on desktop or laptop.

**Platform Benefits:**

- Step-by-step instructor guidance

- Real-world case study application

- Access to a controlled, development-ready environment

**Step-by-Step Learning Guide**

This interactive project is structured to be completed in about 2 hours, divided into specific tasks for clarity and progress.

**Project Structure**

The Interactive Graph Algorithms Visualizer is divided into the following tasks:

**- Task 1:** Set up the graph visualizer environment.

- **Task 2**: Implement and visualize BFS and DFS.

- **Task 3**: Add Dijkstra’s algorithm and shortest-path visualization.

- **Task 4:** Test and refine the visualization tool to ensure usability.

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**Educator’s Introduction**

Hi! I’m \*Suraj Mourya\*, your instructor for this course. I have 3 years of experience in computer science engineering and specialize in teaching Data Structures and Algorithms (DSA). I’ve conducted sessions in over 10 colleges across India, consistently receiving excellent feedback from students. I hold certifications in DSA and take pride in building interactive learning experiences that enhance student understanding. Outside of teaching, I enjoy exploring advanced topics in computer science and constantly expanding my technical skillset.

**Completion and Certification**

Upon completing the Interactive Graph Algorithms Visualizer project, students will be able to take a quiz to test their knowledge. Scoring 80% or higher will earn them a completion certificate, validating their project accomplishment and skills.