**JAYPEE INSTITUTE OF INFORMATION TECHNOLOGY,**

**NOIDA**

**(Sec-62)**

**BTECH SEMESTER 3**

**PROJECT SYNOPSIS**

TITLE OF PROJECT

CounselLink (Online Counselling Process)

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**PROJECT SYNOPSIS**

**INTRODUCTION**

**Aim:**

To prepare an Online Counselling System.

**About the project:**

The aim of this project is to design and implement a simplified model of the counselling system using fundamental and advanced Data Structures and Algorithms (DSA). This model will focus on efficiently managing the seat allocation process, student preferences, and institute/course selection to demonstrate the application of DSA concepts in a real-world scenario.

**Objectives:**

1. **Understand the Core Concepts:**

* Analyse the counselling process and identify the key DSA concepts that can be applied to improve efficiency and fairness.
* Study various data structures such as Tries, Hash Maps, Priority Queues, and Graphs, and algorithms like Greedy Algorithms, Dynamic Programming, and Graph Traversal.

2. **Design the System:**

* Design a system architecture that simulates the key components of the counselling process, including student registration, preference submission, and seat allocation.
* Develop algorithms for seat allocation based on student ranks and preferences using Priority Queues and Greedy approaches.

3. **Implement the System:**

* Implement the designed system using appropriate programming languages and tools, integrating the identified DSA concepts.
* Simulate the seat allocation process, course prerequisite checks, and priority-based counselling sessions.

4. **Test and Evaluate:**

* Test the system for various scenarios to ensure correctness and efficiency in the seat allocation process.
* Evaluate the performance of the implemented algorithms in terms of time complexity and resource utilization.

**Features:**

1. **Efficient Seat Allocation:**

* Implement seat allocation based on student ranks and preferences using Priority Queues to ensure that the highest-ranked students receive their top choices.

2. **Dynamic Preference Management:**

* Allow students to modify their preferences during the counselling process, with real-time updates on seat availability.

3. **Course and Institute Search:**

* Implement a search functionality using Tries for fast and efficient retrieval of course and institute names based on student input.

4. **Prerequisite Verification:**

* Use Graphs to manage and verify course prerequisites, ensuring that students meet all academic requirements before seat allocation.

5. **Fair and Transparent Process:**

* Ensure that the seat allocation process is fair, transparent, and efficient, with clear documentation of how DSA concepts contribute to these outcomes.

**DSA concepts used and implemented using C++-**

* Linked list
* Queues
* Stacks
* Hash sets
* Trees
* Graphs
* Sorting algorithms
* Searching algorithms
* Shortest path algorithm

**Diagrams:**

