

Ramdeobaba University, Nagpur
Department of Computer Science and Engineering
Session: 2024-2025

Design and Analysis of Algorithms Lab

III Semester

PRACTICAL NO. 6

Aim: Construction of OBST

Problem Statement: Smart Library Search Optimization

Task 1:

Scenario:

A university digital library system stores frequently accessed books using a binary search mechanism. The library admin wants to minimize the average search time for book lookups by arranging the book IDs optimally in a binary search tree.

Each book ID has a probability of being searched successfully and an associated probability for unsuccessful searches (when a book ID does not exist between two keys).

Your task is to determine the minimum expected cost of searching using an Optimal Binary Search Tree (OBST).

Input Format

First line: integer n — number of book IDs.

Second line: n integers representing the sorted book IDs (keys).

Third line: n real numbers — probabilities of successful searches ($p[i]$).

Fourth line: $n+1$ real numbers — probabilities of unsuccessful searches ($q[i]$).

Keys: 10 20 30 40

$P[i]$: 0.1 0.2 0.4 0.3

$Q[i]$: 0.05 0.1 0.05 0.05 0.1

Output Format

Print the minimum expected cost of the Optimal Binary Search Tree, rounded to 4 decimal places.

Task 2:

<https://www.geeksforgeeks.org/problems/optimal-binary-search-tree2214/1>