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CMPSC 412: Data Structures Lab

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### **Lab 6 Report: Binary Search Tree**

In this lab, I performed one exercise using Binary Search Trees (BSTs). The goal was to create a Binary Search Tree data structure to store students' PSU IDs and details, such as their names and majors. A BST organizes data so that smaller ID values are placed on the left side of the tree, and larger values are placed on the right. Once the tree was created, I implemented three main functions: inserting a new student with their ID and details, searching for a student by PSU ID, and printing all students and their details in order. In my program, these functions are called insert, search, and inorder. To demonstrate the BST, I started with two students already in the tree, then inserted a new student and printed all the details to confirm the update. Overall, I learned how Binary Search Trees can efficiently store and organize data, such as student records, in a structured and hierarchical way.

#### **Zoom Link:**

[https://psu.zoom.us/rec/share/8HgCPrlzln0LSiNQy0Lb8ueyX\\_UgM2-pYhvui\\_ZqE\\_07H8aD\\_C1GrigJfrKbtbtv.T\\_QpiNuDL23IU9gP](https://psu.zoom.us/rec/share/8HgCPrlzln0LSiNQy0Lb8ueyX_UgM2-pYhvui_ZqE_07H8aD_C1GrigJfrKbtbtv.T_QpiNuDL23IU9gP)

**Screenshot:**

main.py	Run	Output
<pre>6 #Class for Binary Tree 7 class Tree: 8     def __init__(self, id, details): 9         self.id = id 10        self.details = details 11        self.right = None 12        self.left = None 13 14 #Function to insert a new Student in BST 15 def insert(root, id, details): 16     if root is None: 17         return Tree(id, details) 18     if id == root.id: 19         print("No Duplicates") 20         return root 21     elif id &lt; root.id: 22         root.left = insert(root.left, id, details) 23     else:</pre>	<div>Run</div>	<div>Clear</div> <p>Current Tree: PSU ID: 012345678. Name: Faahil Amer, Major: CS PSU ID: 123456789. Name: Wilson Quilli, Major: CS</p> <p>All Students: PSU ID: 001234567. Name: Nick S., Major: CS PSU ID: 012345678. Name: Faahil Amer, Major: CS PSU ID: 123456789. Name: Wilson Quilli, Major: CS</p> <p>Student Found: PSU ID 123456789, Name: Wilson Quilli</p> <p>=== Code Execution Successful ===</p>