Module 5-3 : Project 1 Milestone 3: Tree Data Structure Pseudocode

Struct Course

String courseNumber

String courseTitle

List<String> prerequisites

EndStruct

Struct Node

Course course

Node left

Node right

EndStruct

Open file at 'filename' for reading

If file cannot be opened

Output "Error: Cannot open file."

Return

Create an empty map called courseMap // To temporarily store all courses by course number

Create an empty BinarySearchTree called bst

For each line in the file

Split line by commas into tokens

If number of tokens < 2

Output "Invalid line format: less than 2 elements."

Skip line

Create new Course object

Set course.courseNumber = tokens[0]

Set course.courseTitle = tokens[1]

For i from 2 to length(tokens) - 1

Add tokens[i] to course.prerequisites

Add course to courseMap using course.courseNumber as key

For each course in courseMap

For each prereq in course.prerequisites

If prereq not in courseMap

Output "Invalid prerequisite: " + prereq + " not found in file."

Return

For each course in courseMap

bst.Insert(course)

Output "All courses loaded successfully into the Binary Search Tree."

Return bst

EndFunction

If root is NULL

Create a new Node with course

Set root = new Node

Return

Set currentNode = root

While true

If course.courseNumber < currentNode.course.courseNumber

If currentNode.left is NULL

Create new Node with course

Set currentNode.left = new Node

Break

Else

Set currentNode = currentNode.left

Else

If currentNode.right is NULL

Create new Node with course

Set currentNode.right = new Node

Break

Else

Set currentNode = currentNode.right

EndWhile

EndFunction

If node is NULL

Return

InOrderTraversal(node.left)

Output "Course Number: " + node.course.courseNumber

Output "Course Title: " + node.course.courseTitle

If node.course.prerequisites is not empty

Output "Prerequisites: " + join(node.course.prerequisites, ", ")

Else

Output "Prerequisites: None"

Output "-------------------------"

InOrderTraversal(node.right)

EndFunction

Set currentNode = root

While currentNode is not NULL

If courseNumber == currentNode.course.courseNumber

Output "Course Number: " + currentNode.course.courseNumber

Output "Course Title: " + currentNode.course.courseTitle

If currentNode.course.prerequisites is not empty

Output "Prerequisites: " + join(currentNode.course.prerequisites, ", ")

Else

Output "Prerequisites: None"

Return

Else If courseNumber < currentNode.course.courseNumber

Set currentNode = currentNode.left

Else

Set currentNode = currentNode.right

Output "Course not found."

EndFunction