step one:

// Define a structure to represent a Course

Define Structure Course:

name: string

prerequisites: list of strings

// Define a hash table to store courses

Define hashTable courseHashTable

// Function to read course data from a file

Function readCourseDataFromFile(filename: string):

// Open the file

Open file with filename

// Check if file is open

If file is open:

// Read each line from the file

While not end of file:

// Split the line into tokens

tokens = split(line by comma)

// Check if there are enough tokens

If tokens.size < 2:

Print "Error: Insufficient parameters in line"

Continue to next iteration

// Extract course number, name, and prerequisites

courseNumber = tokens[0]

name = tokens[1]

prerequisites = tokens[2 to end]

// Store course information in hash table

courseHashTable[courseNumber] = Course(name, prerequisites)

// Close the file

Close file

Else:

Print "Error: Unable to open file"

// Function to validate prerequisites

Function validatePrerequisites():

// Iterate through each course in the hash table

For each entry in courseHashTable:

// Iterate through prerequisites of each course

For each prerequisite in entry.prerequisites:

// Check if prerequisite exists in hash table

If prerequisite not in courseHashTable:

Print "Error: Prerequisite not found for course"

// Function to print course information

Function printCourseInformation():

// Iterate through each course in the hash table

For each entry in courseHashTable:

// Print course number and name

Print entry.courseNumber + " " + entry.name

// If there are prerequisites, print them

If entry.prerequisites not empty:

Print "Prerequisites:"

// Print each prerequisite

For each prerequisite in entry.prerequisites:

Print prerequisite

// Main function

Function main():

// Read course data from file

Call readCourseDataFromFile with "course\_data.txt"

// Print course information

Call printCourseInformation

// Return 0 to indicate successful execution

Return 0

Step two:

// Define a structure for Course with name and prerequisites

struct Course:

name

prerequisites

// Define a hash table to store courses

courseHashTable = empty hash table

// Function to read course data from a file

function readCourseDataFromFile(filename):

open file with filename

if file is open:

while there are lines to read from file:

line = read line from file

tokens = split line by commas

if tokens size is less than 2:

print "Error: Insufficient parameters in line"

continue

courseNumber = tokens[0]

name = tokens[1]

prerequisites = empty list

for i from 2 to tokens size - 1:

prerequisites.append(tokens[i])

end for

courseHashTable[courseNumber] = Course(name, prerequisites)

end while

close file

else:

print "Error: Unable to open file"

end if

end function

// Function to validate prerequisites

function validatePrerequisites():

for each entry in courseHashTable:

for each prerequisite in entry's prerequisites:

if prerequisite is not found in courseHashTable:

print "Error: Prerequisite" + prerequisite + " not found for course " + entry key

end if

end for

end for

end function

// Function to print course information

function printCourseInformation():

for each entry in courseHashTable:

print entry key + " " + entry's name

if entry's prerequisites is not empty:

print "Prerequisites:"

for each prerequisite in entry's prerequisites:

print prerequisite

end for

end if

end for

end function

// Main function

function main():

readCourseDataFromFile("course\_data.txt")

printCourseInformation()

return 0

end function

Step Three:

COURSE: CSCI400 Large Software Development

PREREQUISITES:

CSCI301

CSCI350

COURSE: CSCI350 Operating Systems

PREREQUISITES:

CSCI300

COURSE: CSCI200 Data Structures

PREREQUISITES:

CSCI101

COURSE: CSCI101 Introduction to Programming in C++

PREREQUISITES:

CSCI100

COURSE: MATH201 Discrete Mathematics

PREREQUISITES:

None

COURSE: CSC1300 Introduction to Algorithms

PREREQUISITES:

CSCI200

MATH201

COURSE: CSCI301 Advanced Programming in C++

PREREQUISITES:

CSCI101

COURSE: CSCI100 Introduction to Computer Science

PREREQUISITES:

None