Dylan Dunagan

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CS-300 DSA: Analysis and Design

Module 4 Project 1 Milestone 2 Hash Table Data Structure

// Define Struct for Course

Struct Course {

string courseID

string courseTitle

vector<string> prerequisites

}

// Load and validate file data

hashTable<string, Course> LoadCourseData(CSV filepath) {

if file is not open {

Output “Error: could not open file.”

}

while (getline(file, line)) {

if (line is empty) {

continue

}

Split line with commas

if token size is less than 2 {

Output “Error: line does not have enough parameters”

continue

}

for (int i = 2; i < tokens.size(); ++i) {

string courseNumber = Trim(tokens[0])

string courseTitle = Trim(tokens[1])

vector<string> prerequisites

prerequisites.push\_back(Trim(tokens[i]))

}

Course course

course.number = courseNumber

course.title = courseTitle

course.prerequisites = prerequisites

courseMap[courseNumber] = course

coursenumbers.push\_back(courseNumber)

}

file.close();

// validate that all prerequisites exist in the file

for (auto pair : courseMap) {

Course course = pair.second

for (string prereq : course.prerequisites) {

if (courseMap.find(prereq) == courseMap.end()) {

output “Error: Prerequisite XXX not found for course”

// XXX being the specific prerequisite

}

}

}

return courseMap

}

// Print all courses

PrintAllCourses(hashTable<string, Course> & courseMap) {

Output “Course List: “

for (auto pair : courseMap) {

Course course = pair.second;

output course.number “: “ course.title

}

}

// Print a specific course

PrintCourse(hashTable<string, Course> & courseMap, string courseNumber) {

if (courseMap.find(courseNumber) == courseMap.end()) {

output “Course “ courseNumber “ not found.”

Return

}

Course course = courseMap[courseNumber]

output “Course number: “ course.number

output “Course title: “ course.title

if (course.prerequisites.empty()) {

output “Prerequisites: None”

}

else {

output “Prerequisites: “

for (string prereq : course.prerequisites) {

output prereq “ “

}

End line

}

}