**An Example of Three Dimensional Arrays**

Thus far, we have studied one-dimensional and two-dimensional arrays to model linear and tubular collections of elements. You can use a three-dimensional array to represent multiple facets about an object. Consider a scoring system that calculates the total score for students in a class. Suppose that for each student we will a particular exam result. Each exam has two-parts: multiple-choice part and programming part. Suppose further that there are 6 students, 5 exams and each exam has 2 parts. How many pieces of information do we store?

**Answer:** 6 X 5 X 2

The score information can be stored in a three-dimensional array as shown below:

declare scores[1:6, 1:5, 1:2]

The first index in scores refers to a student, the second refers to an exam, and the third refers to the part of the exam.



We can now show example data stored in this array using a tubular form:

scores =

{

{{7.5, 20.5}, {9.0, 22.5}, {15, 33.5}, {13, 21.5}, {15, 2.5}},

{{4.5, 21.5}, {9.0, 22.5}, {15, 34.5}, {12, 20.5}, {14, 9.5}},

{{6.5, 30.5}, {9.4, 10.5}, {11, 33.5}, {11, 23.5}, {10, 2.5}},

{{6.5, 23.5}, {9.4, 32.5}, {13, 34.5}, {11, 20.5}, {16, 7.5}},

{{8.5, 26.5}, {9.4, 52.5}, {13, 36.5}, {13, 24.5}, {16, 2.5}},

{{9.5, 20.5}, {9.4, 42.5}, {13, 31.5}, {12, 20.5}, {16, 6.5}}

}

To access and display the content of this array, the following algorithm can be written in ADL:

Procedure accessScores(IN scores[][][],

IN studentNumber,

IN examNumber,

IN partNumber

)

declare i, j, k

for i ← 1 to studentNumber

for j ← 1 to examNumber

for k ← 1 to partNumber

print(scores(i, j, k))

end

end

end

end // end of accessScores

**Problem:**

Suppose a meteorology station records the temperature and humidity at each hour of every day and stores the data for the past ten days in a text file named weather.txt. Each line of the file consists of four numbers that indicate the day, hour, temperature, and humidity. Your task is to write an algorithm in ADL that calculates the average daily temperature and humidity for the past 10 days.

Before writing the algorithm, produce example data set to show your understanding.