

CSE 305 Programming Languages Spring, 2005

Homework 7

Maximum Points: 8

Due 9:00 am, Monday, March 28, 2005

Professor Shapiro

March 21, 2005

Write the answers to this homework set into a file named `hw7`, and submit it using the `submit` script, by the date and time shown above.

1. (5) One use of jagged arrays is to store triangular arrays without wasting space on the empty cells. Just as maps (associative arrays) are a generalization of arrays, so are jagged maps, which are maps of maps, a generalization of jagged arrays, and we could use jagged maps to store triangular maps. A common use of triangular maps is for mileage charts. For example, the following is a small mileage chart¹ showing distances between a few US cities:

	Buffalo	Chicago	Los Angeles	New York
Atlanta	859	674	2182	841
Buffalo		522	2554	372
Chicago			2054	802
Los Angeles				2786

To use this chart to find the distance between two cities, take the alphabetically smaller city, and read across its row until you find the column of the other city. The number you find there is the distance in miles between the two cities.

Write a Python program to read the names of two cities and print the distance between them. You should represent the mileage chart as a jagged dictionary (Python's name for an associative array), using strings of city names as the keys. Here's an example run of such a program, showing what your program should be able to do:

```
<wasat:Programs:2:122> mileage.py
Starting city (bye to quit): Buffalo
Destination city: New York
It is 372 miles from Buffalo to New York.
```

```
Starting city (bye to quit): Los Angeles
Destination city: Chicago
It is 2054 miles from Los Angeles to Chicago.
```

```
Starting city (bye to quit): Atlanta
Destination city: Baltimore
I don't know how far it is between Atlanta and Baltimore.
```

¹Data taken from *Rand McNally Road Atlas & Major City Guide*, 1994

```
Starting city (bye to quit): Albany
Destination city: Buffalo
I don't know anything about Albany.
```

```
Starting city (bye to quit): bye
Good bye.
```

Note that the basic structure of this program is the same as that of `echo.py`.

2. (3) Fortran 77 and earlier versions of Fortran do not have pointers. However, pointers may be simulated by parallel arrays. Edit the following program to replace the question marks (“?”) with appropriate integers so that when you compile and run the program, it prints the 12 months in the correct order starting with "January". Copy the edited program into a file named `months.f`. Compile the program with the Unix command

```
f77 -o months.fout months.f
```

and then run it with the Unix command

```
months.fout
```

Here's the program:

```
Program months

Character monName*9(12)
Integer i, firstMonth, nextMonth(12)

Data monName/"November", "April", "September", "May",
C           "December", "June", "February", "October",
C           "January", "July", "March", "August" /

Data firstMonth/?/
Data nextMonth/? , ? , ? , ? , ? , ? , ? , ? , ? , ? , ? , ? /

i = firstMonth
10 If (i .NE. 0) Then
    Print *, monName(i)
    i = nextMonth(i)
    Goto 10
EndIf
End
```