Project 9

A device monitoring a process records time, temperature, pressure, and volume and stores this data in a file like:

```
 800 34.2 32.90 199.5
 930 38.8 32.61 198.9
1045 44.8 32.43 198.4
1200 51.3 32.06 200.1
1350 58.5 31.83 202.5
1500 66.3 31.96 205.5
1600 73.1 32.39 207.7
1815 80.2 32.88 204.9
1930 80.1 32.55 200.1
2100 79.9 32.70 199.5
2200 80.3 32.70 199.3
2400 81.1 32.65 198.7
```

The first value in each line is an integer representing the time (in military time) at which the temperature, pressure, and volume measurements — the next three values in the line — were taken.

Write a program that reads the time, temperature, pressure, and volume measurements from a data file like that above; calculates the maximum, minimum, and average temperature; the maximum, minimum, and average pressure; and the maximum, minimum, and average volume; and displays the following table but with the missing rows and maximum, minimum, and average values filled in (where the ?'s are):

```
 TIME      TEMPERATURE      PRESSURE       VOLUME
==================================================
 800          34.2          32.90          199.5
 930          38.8          32.61          198.9
  ?            ?              ?              ?
  ?            ?              ?              ?
  ?            ?              ?              ?
2400          81.1          32.65          198.7
==================================================
MAXIMA        ?              ?              ?
MINIMA        ?              ?              ?
AVERAGES      ?              ?              ?
```

Note 1: To save having to type in the above data file, you can copy and paste it from the Internet — follow the link from the class schedule page.

Note 2: **Your program should work with <u>any</u> real temperature, pressure, and volume values, whether large or small, positive or negative, all (or many) equal or all (or many) different.**

Run your program twice, once with the data file given above and once with a data file that you make; yours should contain at least 15 sets of values, some negative and some positive, some small and some large, and at least one columns in random order — i.e., not increasing or decreasing. Hand in listings of the <u>source program</u> and the <u>outputs produced</u>, a <u>listing of your data file</u>, and a printout of the Output/Build window (or something similar) showing that everything compiled and linked correctly.

Extra Credit:
(1) *Convert the military times in the first column to ordinary time and display them in ordinary-time format; for example, 8:00 A.M. instead of 0800, 10:00 P.M. instead of 2200.*

(2) *Have the table output to a file instead of to the screen. Along with the program, hand in a copy of the output file.*