

STA Online Computer Programming Contest (DWITE)
February 2003

Problem 4

Estimating Pi

The following theoretical basis can be used to estimate the value of Pi:

Given any pair of whole numbers chosen from a large, random collection of numbers, the probability that the two numbers have no common factor other than one (1) is:

$$\frac{6}{\pi^2}$$

For example, using the *small* collection of numbers: 2, 3, 4, 5, 6; there are 10 pairs that can be formed: (2,3), (2,4), (2,5) etc. Six of the 10 pairs: (2,3), (2,5), (3,4), (3,5), (4,5) and (5,6) have no common factor other than one. Using the ratio of the counts as the probability, we have:

$$\frac{6}{\pi^2} \cong \frac{6}{10}$$

$$\pi \cong 3.16228$$

The input file (DATA4) will contain five sets of data. Each set of data will contain two lines. The first line will contain a positive integer N ($1 < N \leq 50$), indicating the number whole numbers in the collection. The second line will contain N whole numbers each separated by a single space. These whole numbers are each greater than 0 (zero) and less than 32768.

The output file (OUT4) will contain five lines of data corresponding to each of the five sets of data. Each line will contain the estimate of Pi rounded to five decimal places.

Note: There will always be at least one pair of numbers with no common factor other than one.

Sample Input (Three sets of data only)

```
5
2 3 4 5 6
6
19 8 14 12 10 5
7
2 24 17 13 18 16 100
```

Sample Output

```
3.16228
3.35410
3.38446
```