

## 1 Multiples of $k$

The following program reads an integer  $k$  and outputs all the multiples of  $k$  up to 1000. Fill in the blank.

```
k = input('Please enter a positive integer smaller than 1000: ');

for j = -----
    fprintf('%d ', j);
end
fprintf('\n');
```

## 2 Approximate square root (again!)

The square root of a positive value  $A$  can be computed by building “increasingly square” rectangles with area  $A$ . Write a script to solicit a positive value  $A$  and an positive integer  $N$ . Then compute  $\sqrt{A}$  by building  $N$  increasingly square rectangles. Let the first rectangle have length  $A$  and width 1. The final square root value is the average of the length and width of the  $N$ th rectangle.

Do not use arrays, i.e., you will use scalar variables  $L$  and  $W$  for the length and width of a rectangle, respectively.

## 3 Approximate $\pi$

[Modified from *Insight* Exercise P2.1.5] For large  $n$ ,

$$T_n = 1 + \frac{1}{2^2} + \cdots + \frac{1}{n^2} = \sum_{k=1}^n \frac{1}{k^2} \approx \frac{\pi^2}{6}$$

$$R_n = 1 - \frac{1}{3} + \cdots + \frac{(-1)^{n+1}}{2n-1} = \sum_{k=1}^n \frac{(-1)^{k+1}}{2k-1} \approx \frac{\pi}{4}$$

giving two different ways to estimate  $\pi$ :

$$\begin{aligned} \tau_n &= \sqrt{6T_n} \\ \rho_n &= 4R_n \end{aligned}$$

Write a script that displays the value of  $|\pi - \rho_n|$  and  $|\pi - \tau_n|$  for  $n = 100, 200, \dots, 1000$  in one table. Do not use arrays.