KEYWORDS *break* and *continue*

The keywords break and continue are used in loop statements to provide additional controls. The two keywords can be used to simplify programming in some cases.

break

The `break` keyword is used to immediately terminate the execution of a `for` or `while` loop. Statements in the loop after the break statement do not execute. In nested loops, `break` exits only from the loop in which it occurs. Control passes to the statement that follows the end of that loop.

Example: Write a code that uses a while loop to find the value of *n* at which sum of the series 1 + 2 + 3 + 4 + … + *n* is greater than or equal to 100. The code should output the value of *n* and the sum of the series.

continue

The `continue` keyword is used to pass control to next iteration of a `for` or `while` loop. When it is encountered, it ends the current iteration of the loop and program control goes to the end of the loop body.

Examples: (a) Write a program that uses a while loop to find the value of *n* at which sum of the series `1 + 2 + 3 + 4 + 7 + 9 + … + n` is greater than or equal to 100. The code should output the value of *n* and the sum of the series.

(b) Write a program that uses for loops to find the sum of the following arrays, excluding all elements which are even:

(i) `v = [2,3,4,5,6,7,8,9,10,11,12]`

(ii) `A = [2,3,4,5;6,7,8,9;10,11,12,13]`

Your code should display on the screen the sum of the arrays.

Further Programming Examples

1. Write a MATLAB function that computes the absolute value of a real number. Develop a script that uses the function to compute the absolute values of the numbers in the set y = [2, -3, -5, 6, -7, -8, 9, -10].

2. Write a function M-file that implements the signum function

$$\text{signum}(x) = \begin{cases} 1, x > 0 \\ 0, x = 0 \\ -1, x < 0 \end{cases}$$

3. Write a MATLAB function that computes and returns the number of days in a year.

4. Write a MATLAB function that computes the following series:

$$series(n) = \frac{1}{2} + \frac{2}{3} + \cdots + \frac{n}{n+1}$$

Write a test script M-file that computes the sum of the series for various values of n and displays the following table:

n	series(n)
1	0.5000
2	1.1667
.	.
.	.
.	.
19	16.4023
20	17.3546

5. Write a function M-file that prints an m by n matrix.

6. Write a script M-file that uses a while loop to numerically compute the sum of the infinite series

$$\frac{1}{1^4} + \frac{1}{2^4} + \frac{1}{3^4} + \cdots$$

7. The value of π can be computed using the following series:

$$pi(n) = 4\left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \cdots + \frac{(-1)^{n+1}}{2n+1}\right)$$

Write a function that computes and returns `pi(n)` for a given value of n. Develop a test program or script M-file that displays the following table:

n	pi(n)
1	4.0000
101	3.1515
201	3.1466
301	3.1449
401	3.1441
501	3.1436
601	3.1433
701	3.1430
801	3.1428
901	3.1417

8. A pentagonal number is defined as n(3n-1)/2 for n = 1, 2, …, and so on. Therefore, the first few numbers are 1, 5, 12, 22, …. Write a function that computes and returns a pentagonal number. Write a test program (script M-file) that uses the function to display the first 100 pentagonal numbers with 10 numbers on each line.

9. Write a function that uses a while loop to implement the following values:
(a) Sum of the first n counting numbers: $1 + 2 + 3 + \ldots + n$
(b) Sum of the first n odd numbers: $1 + 3 + 5 + \ldots + 2n - 1$
(d) Sum of a series of numbers entered by the user until the value 999 is entered. Note: 999 should not be part of the sum.

10. The Fibonacci sequence starts as 1, 1, 2, 3, 5, 8, …. Each number in the sequence (after the first two) is the sum of the previous two. Write a function that computes and returns the nth Fibonacci number, where *n* is a value input to the function.