

Matlab Tutorial

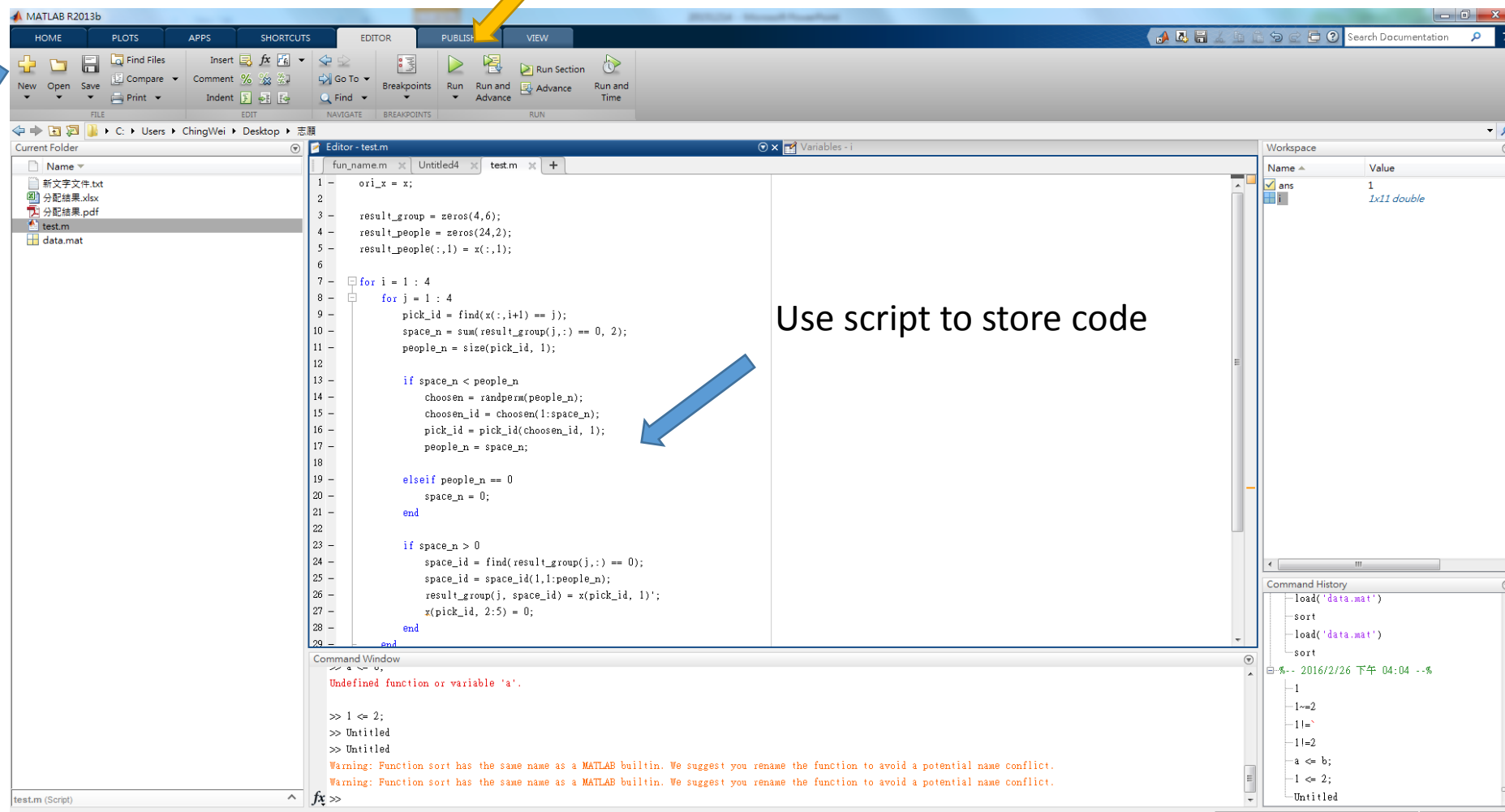
- Script
- Basic
- Control
- Matrix
- Function

Script

Run script code

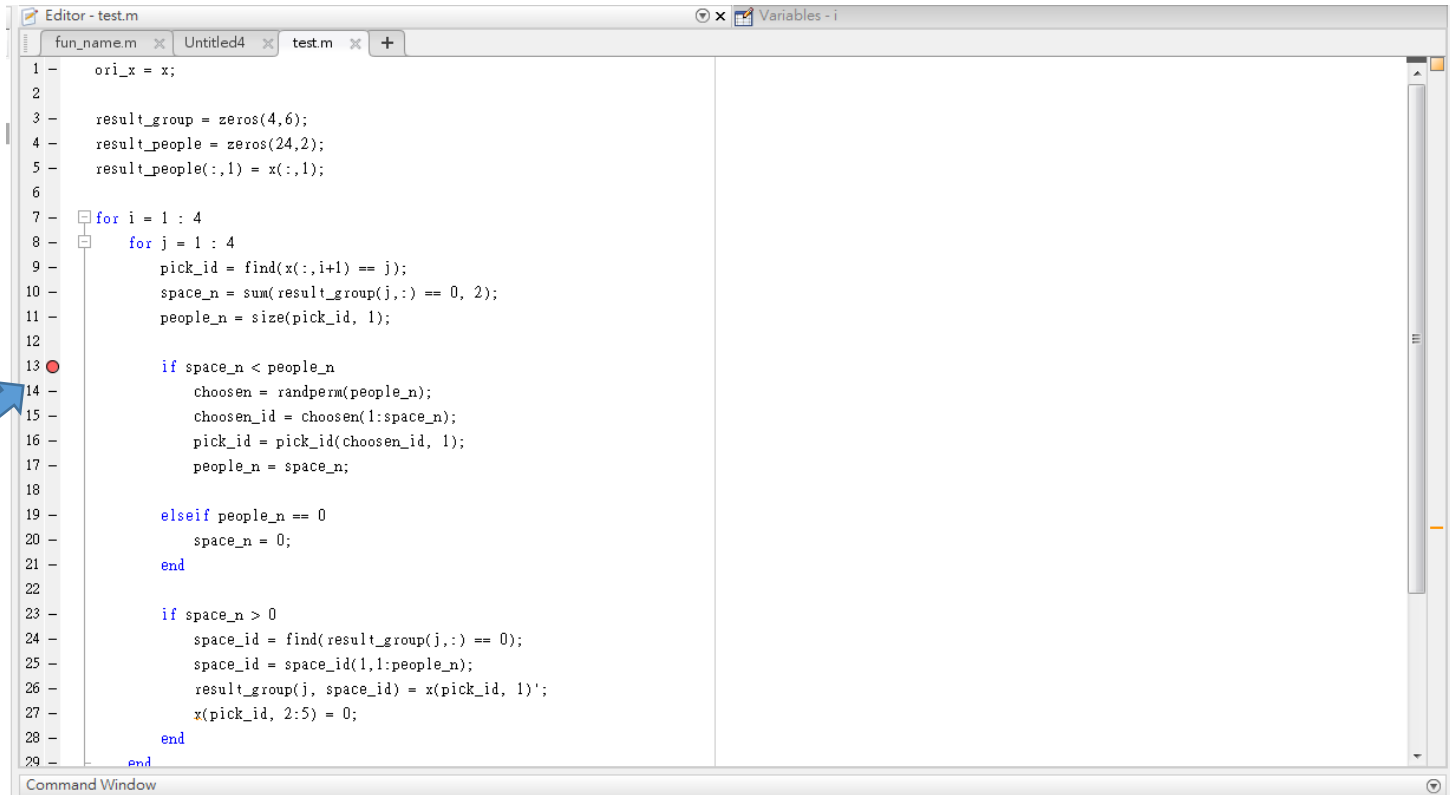
New script

Use script to store code



Script

Left clip to
add break point



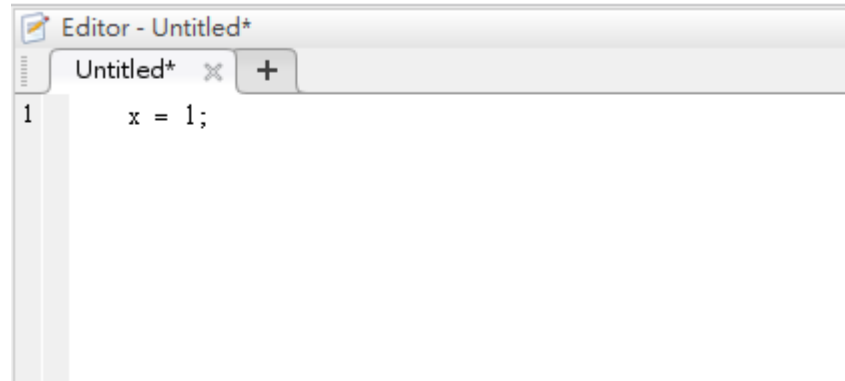
The image shows a MATLAB Editor window titled "Editor - test.m". The window contains a script with the following code:

```
1 - ori_x = x;  
2 -  
3 - result_group = zeros(4,6);  
4 - result_people = zeros(24,2);  
5 - result_people(:,1) = x(:,1);  
6 -  
7 - for i = 1 : 4  
8 -     for j = 1 : 4  
9 -         pick_id = find(x(:,i+1) == j);  
10 -        space_n = sum(result_group(j,:) == 0, 2);  
11 -        people_n = size(pick_id, 1);  
12 -  
13 -        if space_n < people_n  
14 -            choosen = randperm(people_n);  
15 -            choosen_id = choosen(1:space_n);  
16 -            pick_id = pick_id(choosen_id, 1);  
17 -            people_n = space_n;  
18 -  
19 -        elseif people_n == 0  
20 -            space_n = 0;  
21 -        end  
22 -  
23 -        if space_n > 0  
24 -            space_id = find(result_group(j,:) == 0);  
25 -            space_id = space_id(1,1:people_n);  
26 -            result_group(j, space_id) = x(pick_id, 1)';  
27 -            x(pick_id, 2:5) = 0;  
28 -        end  
29 -    end
```

A blue arrow points to the left margin of the script, specifically to the left clip of line 13, indicating where to add a break point. The Command Window is visible at the bottom of the editor.

Basic

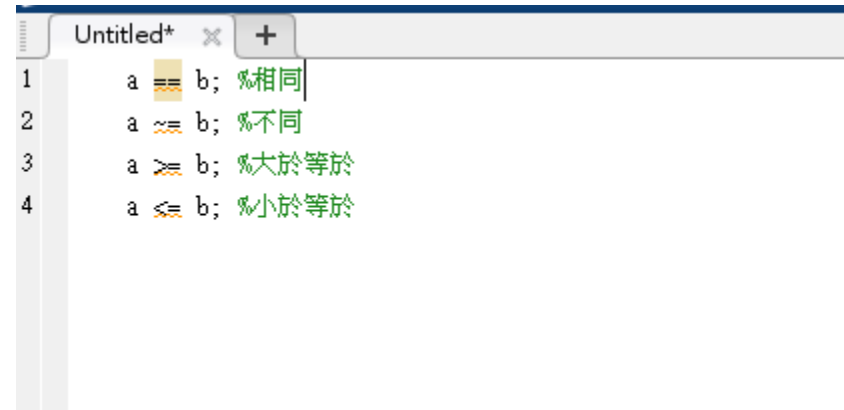
- Variable Declaration



- With ';' at end. Value won't shown on command window

Basic

- Binary Operation

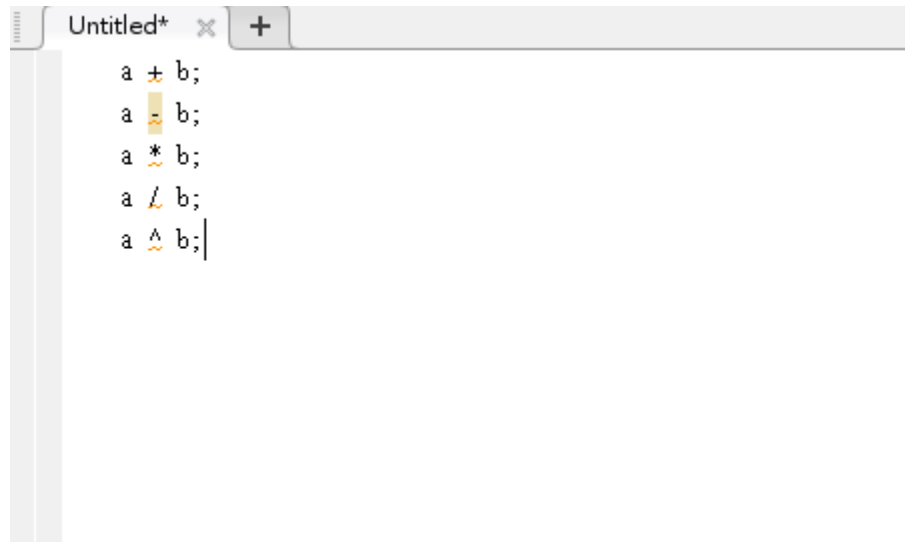


A screenshot of a code editor window titled 'Untitled*' with a tab icon and a '+' button. The editor contains four lines of code, each with a line number on the left:

```
1 a == b; %相同
2 a ~= b; %不同
3 a >= b; %大於等於
4 a <= b; %小於等於
```

Basic

- Math Operation

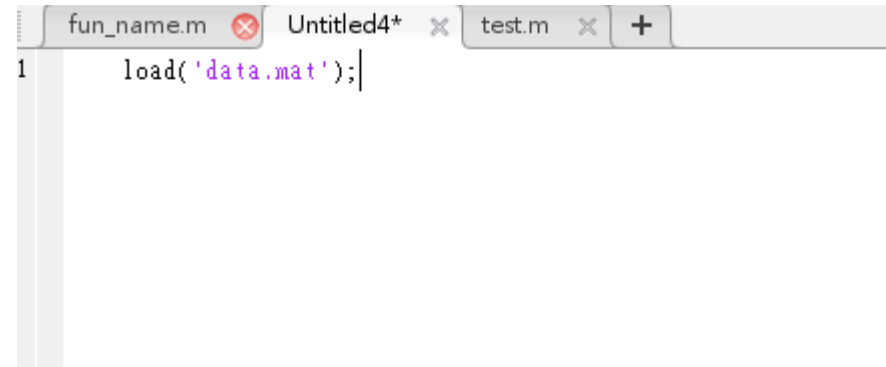


```
Untitled* x +  
a + b;  
a - b;  
a * b;  
a / b;  
a ^ b;
```

$$a \wedge b \Rightarrow a^b$$

Basic

- Load data

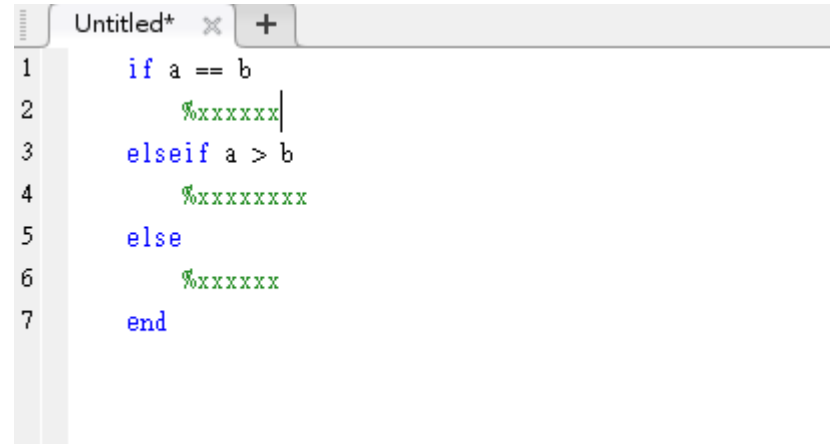


A screenshot of a MATLAB editor window. The title bar shows three tabs: 'fun_name.m' with a red close button, 'Untitled4*' with a close button, and 'test.m' with a close button, followed by a plus sign to add more tabs. The main editing area shows a single line of code on line 1: `load('data.mat');`. The code is syntax-highlighted, with the string 'data.mat' in purple. A vertical line indicates the current cursor position at the end of the line.

```
1 load('data.mat');
```


Control

- If-else

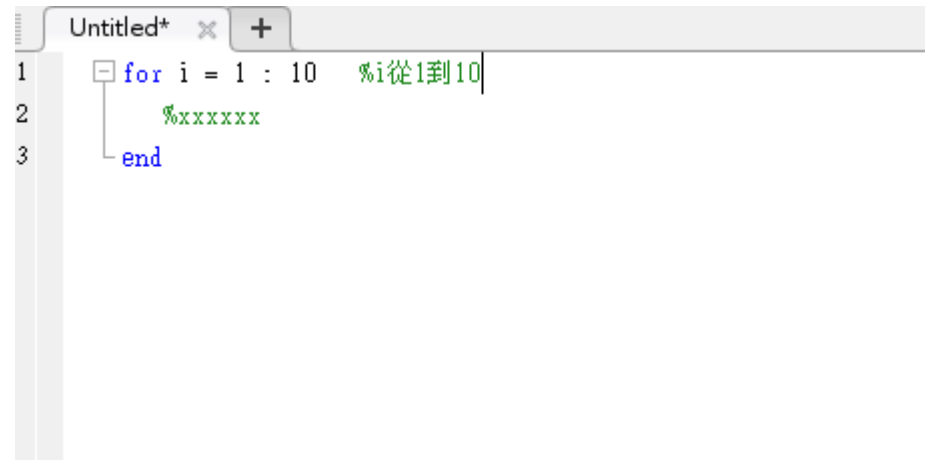


A screenshot of a MATLAB code editor window. The window has a title bar with 'Untitled*' and a '+' icon. The code is as follows:

```
1  if a == b
2      %xxxxxx|
3  elseif a > b
4      %xxxxxxxxx
5  else
6      %xxxxxx
7  end
```

Control

- For loop



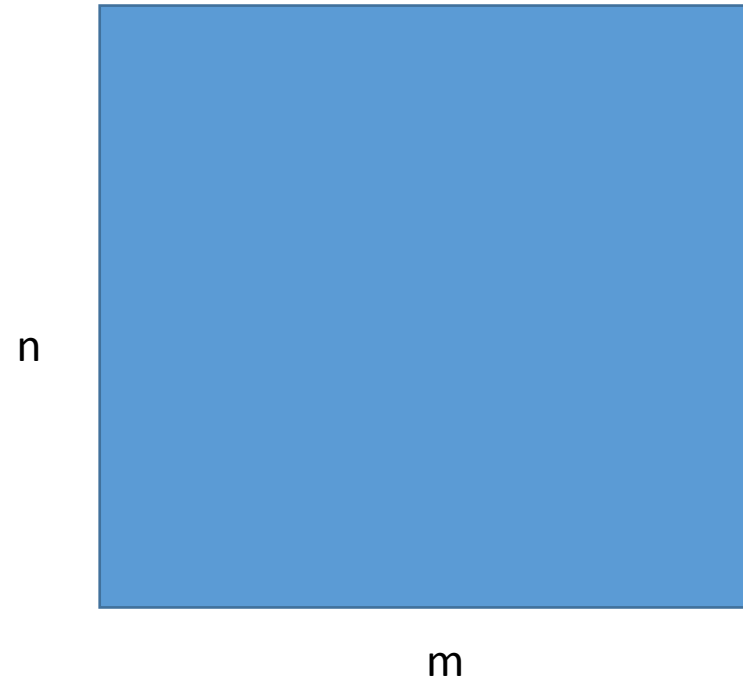
A screenshot of a MATLAB code editor window titled 'Untitled*'. The window shows a for loop structure. Line 1: `for i = 1 : 10` with a comment `%i從1到10`. Line 2: `xxxxxx`. Line 3: `end`. The code is color-coded: `for` and `end` are blue, `i` is black, `=` is black, `1` and `10` are black, `:` is black, `%i從1到10` is green, and `xxxxxx` is green. A vertical line is at the end of line 1.

```
1  for i = 1 : 10    %i從1到10
2      xxxxxx
3  end
```

Matrix

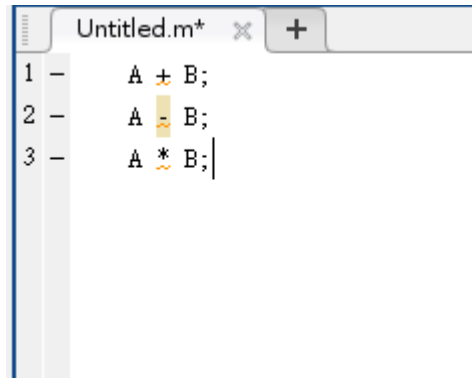
- Declare zero matrix

```
Untitled* x +  
1 x = zeros(n,m);  
2 |
```



Matrix

- Math Operation

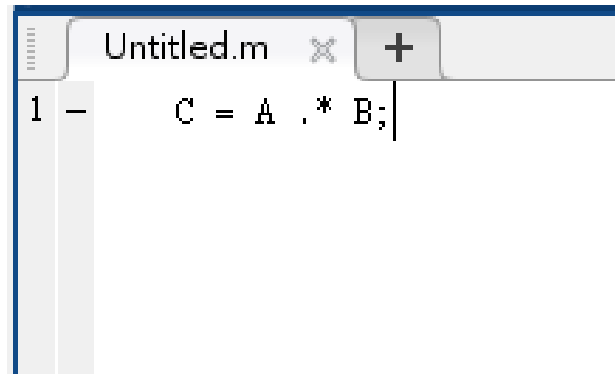


A screenshot of a MATLAB script editor window titled 'Untitled.m*'. The window shows three lines of code, each preceded by a line number (1, 2, 3) and a minus sign. The code defines three operations: addition, subtraction, and multiplication of matrices A and B. The first line is 'A + B;', the second is 'A - B;', and the third is 'A * B;'. The code is displayed in a monospaced font with syntax highlighting.

```
1 - A + B;  
2 - A - B;  
3 - A * B;
```

Matrix

- Dot Product(Element by Element Product)



```
Untitled.m x +
1 - C = A .* B;
```

a1	a2
a3	a4

 .*

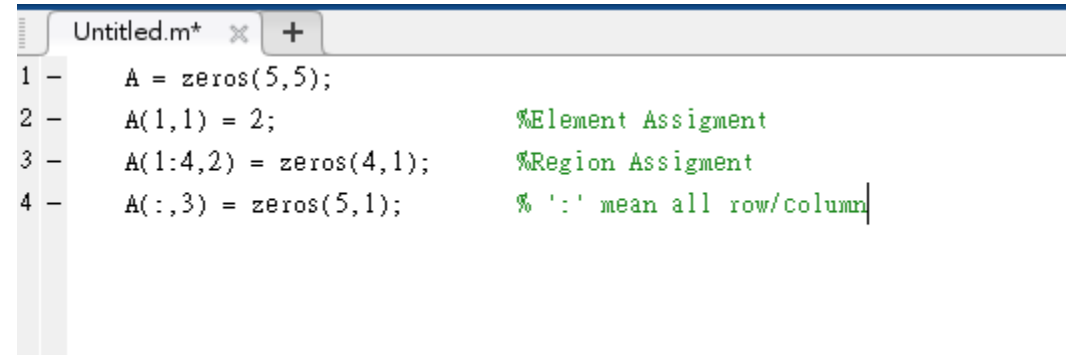
b1	b2
b3	b4

 =

a1*b1	a2*b2
a3*b3	a4*b4

Matrix

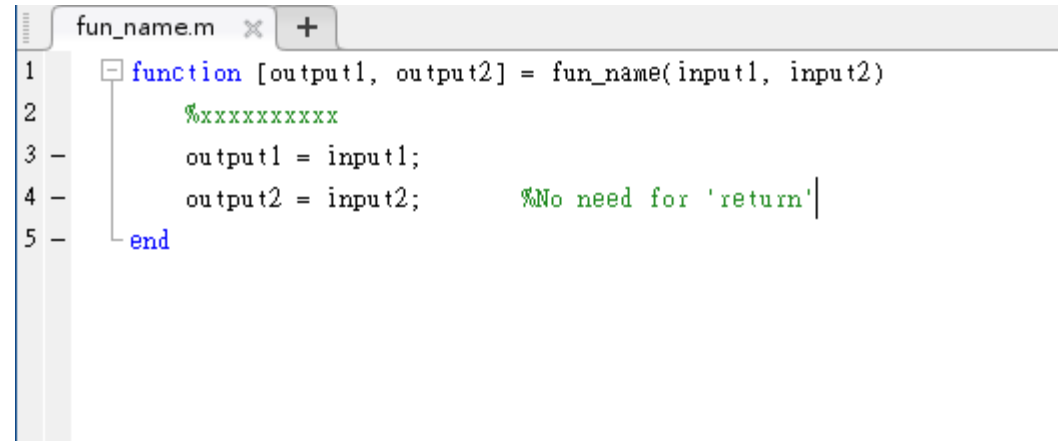
- Value Assignment



```
Untitled.m* x +
1 - A = zeros(5,5);
2 - A(1,1) = 2;           %Element Assignment
3 - A(1:4,2) = zeros(4,1); %Region Assignment
4 - A(:,3) = zeros(5,1);  % ':' mean all row/column
```

Function

- Function Declaration



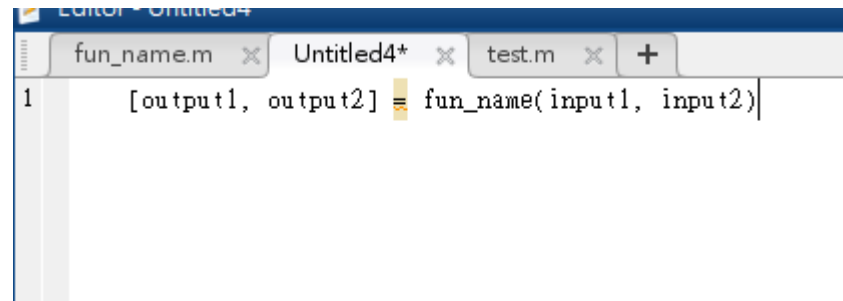
A screenshot of a MATLAB code editor window titled 'fun_name.m'. The code is as follows:

```
1 function [output1, output2] = fun_name(input1, input2)
2     %xxxxxxxxxx
3     output1 = input1;
4     output2 = input2;    %No need for 'return'
5 end
```

- Note. Filename should be same as function name
- Different from c, matlab can return multi output. Just assign value to output valuable.

Function

- Catch result



The image shows a MATLAB editor window titled 'Editor - Untitled4'. It contains three tabs: 'fun_name.m', 'Untitled4*', and 'test.m'. The 'test.m' tab is active, showing a single line of code on line 1: `[output1, output2] = fun_name(input1, input2);`. The code is written in a monospaced font, and the cursor is positioned at the end of the line.