Exercise 2

```
type added
```

```
%Creates the function 'added'
function C = added(A,B)

%First, the function verifies whether matrices A and B have the same size.
[a1,b1] = size(A);
[a2,b2] = size(B);
C = [];

%If not, 'the matrices are not of the same size and cannot be added',
%Then assigns an empty matrix to C. After that, the program terminates.
if(a1 ~= a2 || b1 ~= b2)
    disp('the matrices are not of the same size and cannot be added');
    C = [];
    return;

%If matrix can be added, calculates sum C of A + B using for loops.
%Outputs and displays C
else
    for i = 1 : a1
    for j = 1 : b1

%Sum C - option 2
C(i,j) = A(i,j) + B(i,j);
    end
    end
end

%Logical “if” statement to verify whether the calculated matrix C matches
%the output for a built-in MATLAB function A+B.

M = A + B;
    for i = 1 : a1
    for j = 1 : b1
%If the outputs C and A+B do not match, outputs 'check your code!'
if(M(i,j) ~= C(i,j))
disp('check your code!');
return;
end
    end
    end
end
```

Part A

```
A=magic(3), B=ones(4)
```

```
A = 3×3
     8     1     6
     3     5     7
     4     9     2
B = 4×4
     1     1     1     1
     1     1     1     1
     1     1     1     1
     1     1     1     1
```

```
added(A,B)
```

```
the matrices are not of the same size and cannot be added
```

```
ans =

     []
```

Part B

```
A=ones(3,4), B=ones(3,3)
```

```
A = 3×4
     1     1     1     1
     1     1     1     1
     1     1     1     1
B = 3×3
     1     1     1
     1     1     1
     1     1     1
```

```
added(A,B)
```

```
the matrices are not of the same size and cannot be added

ans =

     []
```

Part C

```
A=randi(100,3,4), B=randi(100,3,4)
```

```
A = 3×4
    71     5    70     4
     4    10    32    44
    28    83    96    39
B = 3×4
    77    49    71    68
    80    45    76    66
    19    65    28    17
```

```
added(A,B)
```

```
ans = 3×4
   148    54   141    72
    84    55   108   110
    47   148   124    56
```

Parts 1 & 2

```
%Runs function for parts 1 and 2
C = added(A,B)
```

```
C = 3×4
   148    54   141    72
    84    55   108   110
    47   148   124    56
```

```
%Inputs the scalar to test for parts 1 and 2
k=fix(10*rand(1))+5;
```

Part 1 - Commutative property

```
%Verifies if the sum of A and B is the same as the sum of B and A.
%If it is the case, the program outputs 'commutative property holds for the given A and B'
C1 = added(B,A);
if isequal(C,C1)
    disp('commutative property holds for the given A and B');
else
    return;
end
```

```
commutative property holds for the given A and B
```

Part 2 - Distributive property

```
%Verifies that the product of a scalar k by the matrix C, kC, is the same as the sum of
%kA and kB. If this is the case, the program outputs
%'distributive property holds for the given A and B'
C1 = added(k*B,k*A);
if isequal(k*C, C1)
    disp('distributive property holds for the given A and B');
else
    return;
end
```

```
distributive property holds for the given A and B
```