Project 1 – example with solution

Write a function to determine which elements of an array are integers (i.e., ..., -2, -1, 0, 1, 2, ...), with the following specifications:

```
function I = isinteger2(A)
%ISINTEGER2 Determines which elements of an array are integers.
%     I = ISINTEGER2(A) returns a logical array, I, of the same size
%     as A, with 1s (TRUE) in the locations corresponding to integers
%     (i.e., . . . -2 -1 0 1 2 . . .) in A, and 0s (FALSE) elsewhere.
%     A must be a numeric array.

% Check the validity of A.
if ~isnumeric(A)
      error('A must be a numeric array.');
end
A = double(A);
I = A == floor(A);
```

In COMMAND WINDOW, you can check the result.

```
>> isinteger2([1 2 3 1.1 1/2])
ans =
  1×5 logical array
   1     1     1     0     0
```

Project 2

Write a function to determine which elements of an array are even numbgers (i.e., ..., -4, -2, 0, 2, 4, ...), with the following specifications:

```
function E = iseven2(A)
%ISEVEN2 Determines which elements of an array are even numbers.
%    E = ISEVEN2(A) returns a logical array, E, of the same size as A,
%    with 1s (TRUE) in the locations corresponding to even numbers
%    (i.e., . . . -4 -2 0 2 4 . . .) in A, and 0s (FALSE) elsewhere.
%    A must be a numeric array.
```

Use of while or for loops is not allowed. See Project 1 regarding numeric arrays. Hint: Become familiar with function *floor*.

In COMMAND WINDOW, you can check the result.

```
>> iseven2([1 2 3 4 5])
ans =
1×5 logical array
   0   1   0   1   0
```

Project 3

Write an M-function with the following specifications:

Function H = imcircle2(R, M, N)

%IMCIRCLE2 Generates a circle inside a rectangle.

% H = IMCIRCLE2(R, M, N) generates a circle of radius R centered

% on a rectangle of height M and width N. H is a binary image with

% 1s on the circle and 0s elsewhere. R must be an integer >=1.

Your program must check the vaility of R and also it should check to make sure that the specified circle fits in the given rectangle dimensions. Use of for or while loops is not permitted. Hint: Review function *meshgrid* and become familiar with function *floor*.

In COMMAND WINDOW, you can check the result.

```
>> imcircle2(3, 10, 16)
ans =
10×16 logical array
   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   0   1   1   1   1   1   0   0   0   0   0
   0   0   0   0   0   1   1   0   0   0   1   1   0   0   0   0
   0   0   0   0   0   1   0   0   0   0   0   1   0   0   0   0
   0   0   0   0   0   1   0   0   0   0   0   1   0   0   0   0
   0   0   0   0   0   1   0   0   0   0   0   1   0   0   0   0
   0   0   0   0   0   1   1   0   0   0   1   1   0   0   0   0
   0   0   0   0   0   0   1   1   1   1   1   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```