Sample of homework report

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PROBLEM 1

Problem statement

Write a function which finds a maximum out of two user supplied numbers.

Solution

First we need to compare two numbers which leads to the straightforward if-else construct which selects the proper answer. However there is one special case when both inputs are the same. The comparison should have $\geq$ comparison operator to include this case into decision tree. See the resulting function find_max_output in the listing 1.

Listing 1. Find max code

```matlab
% Simple   function   to find  maximum
% out  of  two  user  supplied  numbers  x1  and  x2
% by  Eugeniy  Mikhailov
% 08/15/2010
%
% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% x1  and  x2   are  user  supplied  inputs
% ret  is  return  value  which  hold  the  lagest  of  two  input  values
% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
function  ret=find_max(x1,x2)
  % first  we  compare  2  numbers
  if (x1 >= x2)
```

```
    % notice greater or equal comparison
    % otherwise 'ret' value will not be assigned
    % for the case when x1 equals to x2
    ret = x1;
  else
    ret = x2;
  end
end
```

Test cases

To check the validity of the code I tried 3 possible combination of the input parameters. When first argument is smaller then second, when first argument is lager then second, and finally when they are both the same. The results of the tests are as expected, since out of two numbers 10 and 1, 10 is larger, it is returned by the function find_max_output (see listing 2).

Listing 2. Find max code tests

```
>> find_max(1,10)
ans =   10
>> find_max(10,1)
ans =   10
>> find_max(10,10)
ans =   10
```

VERY SIMPLE EXAMPLE OF A FIGURE USE

Let's consider a diffraction of light on a mask. We will use a mask depicted in the figure 1. The parameters of this mask are: resolution 1386×600 pixels, physical size 2.8×1.2 cm.

FIG. 1. Mask with WM letters.

The resulting light (with wavelength $\lambda = 670$ nm) diffraction image at distance 1.1 m is shown in the figure 2. The formed image has the following parameters 693×300 pixels, with physical size 3×1.4 cm.
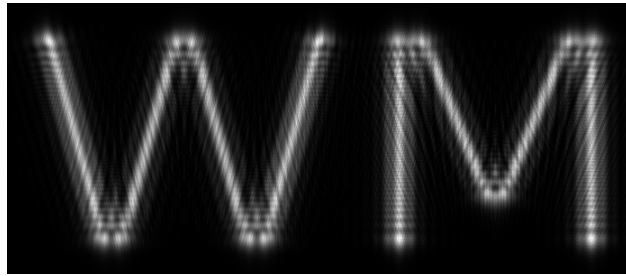

FIG. 2. Resulting diffracted image of original mask.