

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* in the listing 1.

Listing 1. Find max code

```
% 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 larger then second, and finally when they are both the same. The results of the tests are as expected (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.

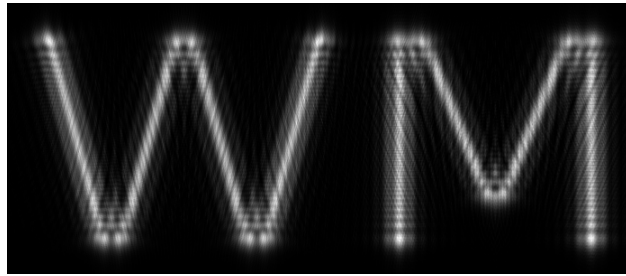


FIG. 2. Resulting diffracted image of original mask.