

CS 7455- Homework 1

Task 1:

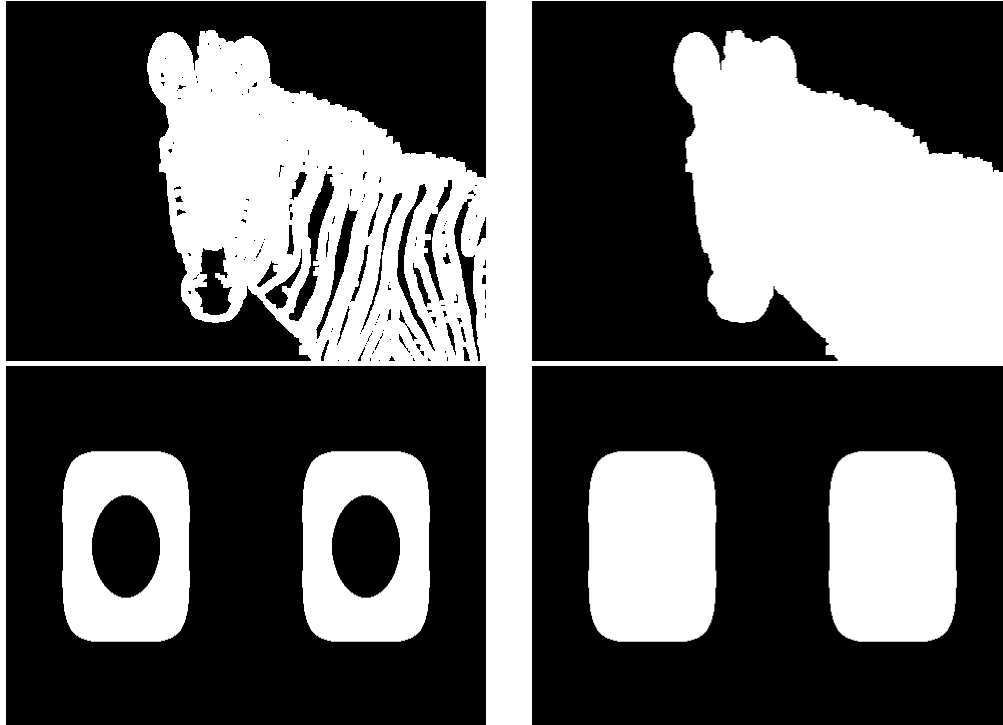


Figure 1: Example inputs and outputs of the `remove_holes` function.

Write a Matlab function that takes in as argument a binary image `A` (not a filename), and returns another binary image `B`, which is the result of removing all holes from `A`. We will use this (somewhat artificial) definition: A hole is a black 4-connected component that does not include pixel (1,1). If pixel (1,1) in `A` is black, then we use the term "background" for the connected component of all black pixels to which pixel (1, 1) belongs. If pixel (1,1) is white, then the result of your function should be an all-white image.

Your function should be named `remove_holes`, and should take a single argument, i.e., the binary image that you want to process.

```
>> remove_holes(my_image );
```

The key idea that makes it easy to identify holes is this: if `C` is the negation of `A` (`C = ~A`, in Matlab), a hole in `A` is a white connected component in `C`. The background in `A` also becomes a white connected component in `C`, but the label of the background (as returned by `bwlabel(C, 4)`) will be different than the label of any hole.

Your function should work for any image, not just the examples provided above.

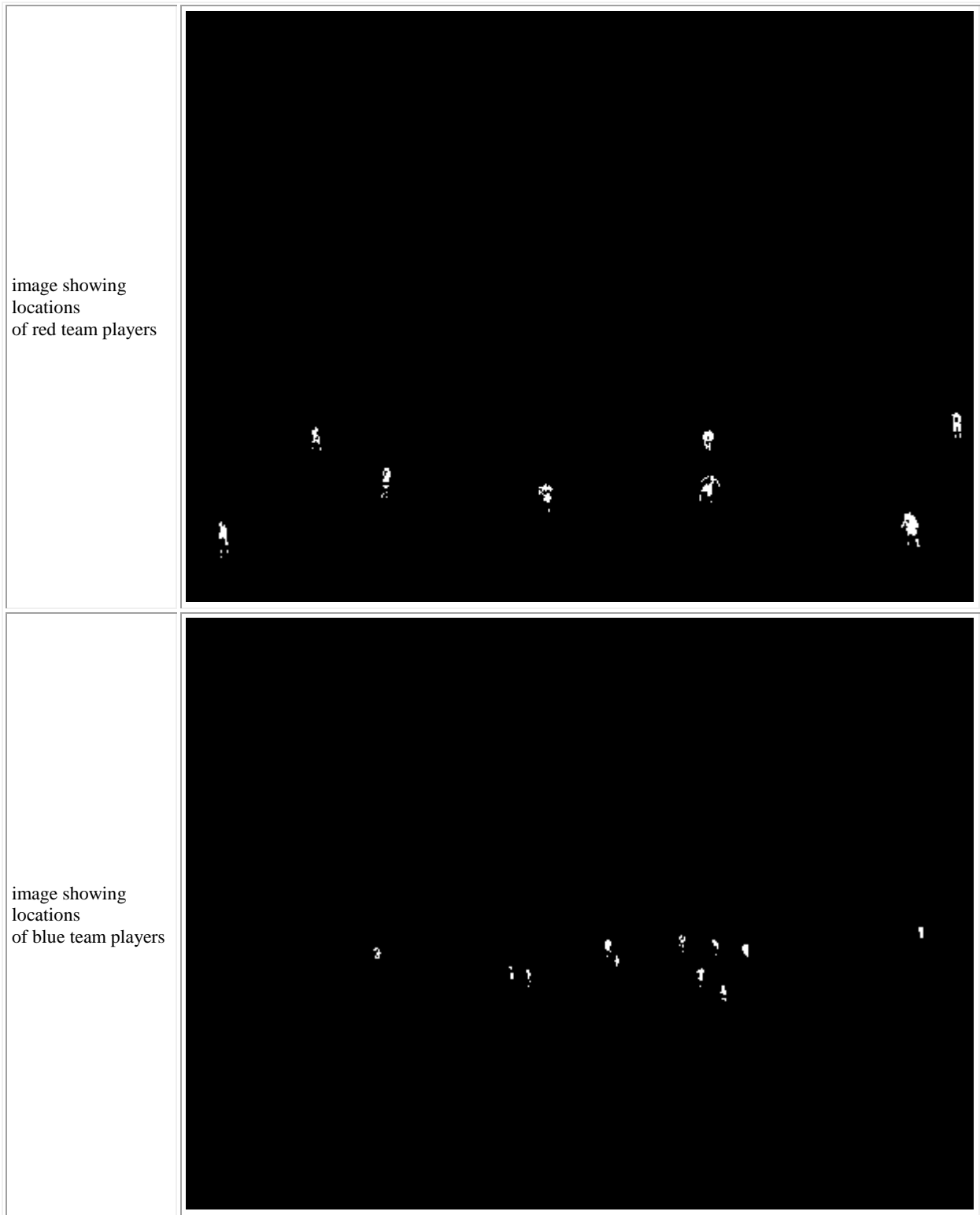
Task 2:

original image



image showing area
of soccer field





Write a Matlab script that reads as input, from a file called 'soccer_field4.jpg', the original image shown above, and produces three images (as shown in the figure above), that illustrate:

- In Figure 1: the area of the soccer field.

- In Figure 2: the locations of the red players.
- In Figure 3: the locations of the blue players.

To generate multiple figures you can use something like:

```
figure(1); imshow(field);  
figure(2); imshow(red_players);  
figure(3); imshow(green_players);
```

Your solution should just consist of images like the ones displayed above. You do not need to output anything else (such as number of players, bounding boxes, or anything like that). You're free to use any thresholds you like, and your solution only needs to work on this image.

Submission:

You have to submit the followings to D2L:

1. MS word file
 - Describe what you did for the homework assignment.
 - Include the four outputs
2. Source code file(s)
 - Matlab files
 - Must be well organized (comments, indentation, ...)

Deadline:

You have to submit HW2 by **Sunday, Feb 19, 2017**. Late assignments will be accepted up to 24 hours after the due date for 50% credit. Assignments submitted more than 24 hours late will not be accepted for credit.