

Task 1

For what concern the first task, it was required to simply loads the image and shows it as I have done in the past lab lectures.

Task 2

In the second task, it was required to create a callback function reacting to the mouse click that prints the BGR color triplet of the pixel where the click occurred. For accomplishing this task, it was necessary to have a look at the documentation to understand how to work with the click of the mouse. The other requisite was like something that I have done many times for the past lab experiences.

Example of the final result:

```
Blue: 64 Green: 89 Red: 39
```

Task 3

For the third task, it was required to create a new version of the callback function that calculates the mean of the B, G and R values in a 9x9 neighborhood around the clicked pixel and prints the results. To achieve the goal of this task it was necessary to create two nested *for* cycles that scan the value of the pixels near to the clicked one, sum those values separately for each color, then to divide the sums by 81 (the number of pixels that are scanned) and finally to print the results.

Example of the final result:

```
Mean blue: 51.7654 Mean green: 162.926 Mean red: 213.938
```

Task 4

For what concern the fourth task, it was required to segment the T-shirts of the robot soccer players in the input image by creating a new image having only white and black pixels. For accomplishing this task, it was necessary some debugging activity. The output was strange: the pixels of the mask not too distance from the average calculated in Task 3 were black instead of white. In addition, I had some problem with the *clone* function: when I used it, the mask was like a black and white image of the input one in the first middle and the original input image in the second.

After some time, I realized that I have reversed x and y variable when in the call of the *at* function so I changed the codes (also of the previous tasks) and to solve the other problem, in the declaration of the mask, instead of using the clone function, I create a black image of the same size of the input one and set the pixels not too distance from the average as the pixels of the original image and finally I got the goal.

Example of the final result:



Task 5

In the last task it was required to create a new image that has the pixels corresponding to the white pixels of the mask set as a given color. To achieve the goal, I create a clone of the original image and I have used two nested *for* cycles in which I check if the pixels of the mask are white or black. In the first case I set the pixels of the new image as the given color, otherwise I leave them unchanged. In this new image the color of the T-shirts and of the ball are different respect to the original image.

Example of the final result:

