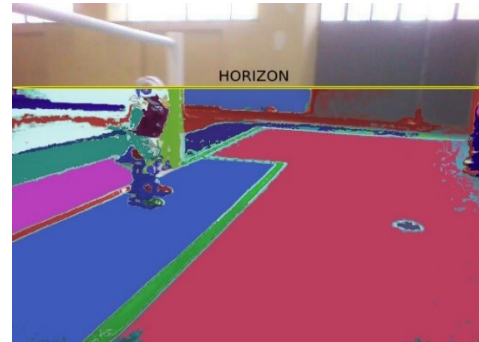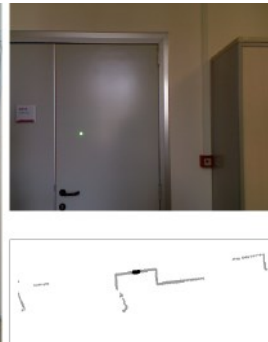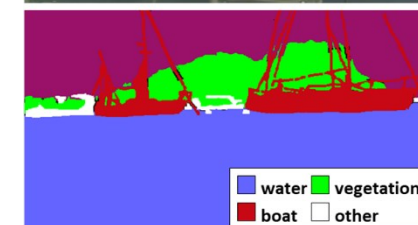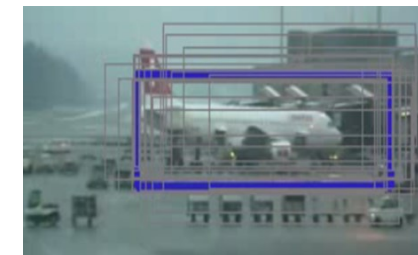**UNIVERSITÀ DEGLI STUDI DELLA BASILICATA**

Corso di Sistemi Informativi
A.A. 2018/19

Docente
Domenico Daniele Bloisi

Esercizi Parte 1

Marzo 2019

Esercizio 1.1

Aprire l'immagine JPEG
https://dbloisi.github.io/corsi/images/nao-v6-spqr.jpg
e trasformarla in PNG

Esercizio 1.1 - soluzione

```python
from PIL import Image

import matplotlib.pyplot as plt
import urllib.request

url = "https://dbloisi.github.io/corsi/images/nao-v6-spqr.jpg"

img = Image.open(urllib.request.urlopen(url))

img.save("nao.png")

!ls

img_png = Image.open("nao.png")

plt.grid(b=False)
plt.imshow(img_png)
```
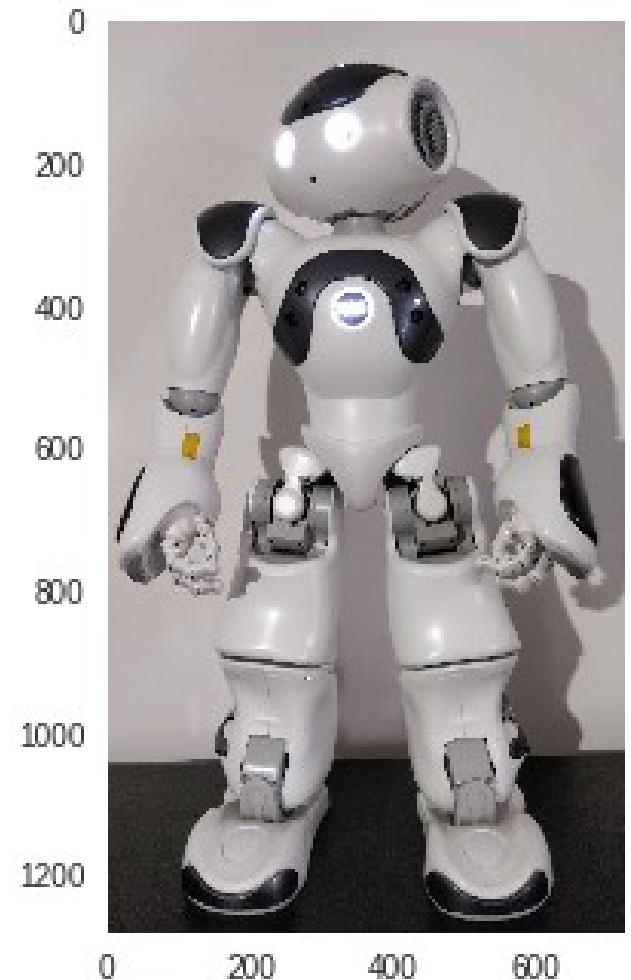
Esercizio 1.2

Aprire l'immagine a colori
https://dbloisi.github.io/corsi/images/nao-v6-spqr.jpg
e trasformarla in grayscale

Esercizio 1.2 - soluzione

```python
from PIL import Image

import matplotlib.pyplot as plt
import urllib.request

url = "https://dbloisi.github.io/corsi/images/nao-v6-spqr.jpg"

img = Image.open(urllib.request.urlopen(url))

img_grayscale = img.convert("L")

plt.grid(b=False)
plt.imshow(img_grayscale)
```

Esercizio 1.3

1. Aprire l'immagine a colori
https://dbloisi.github.io/corsi/images/nao-v6-spqr.jpg

2. Estrarre la ROI (300,150,500,200)

3. Incollare la ROI al centro dell'immagine

Esercizio 1.3
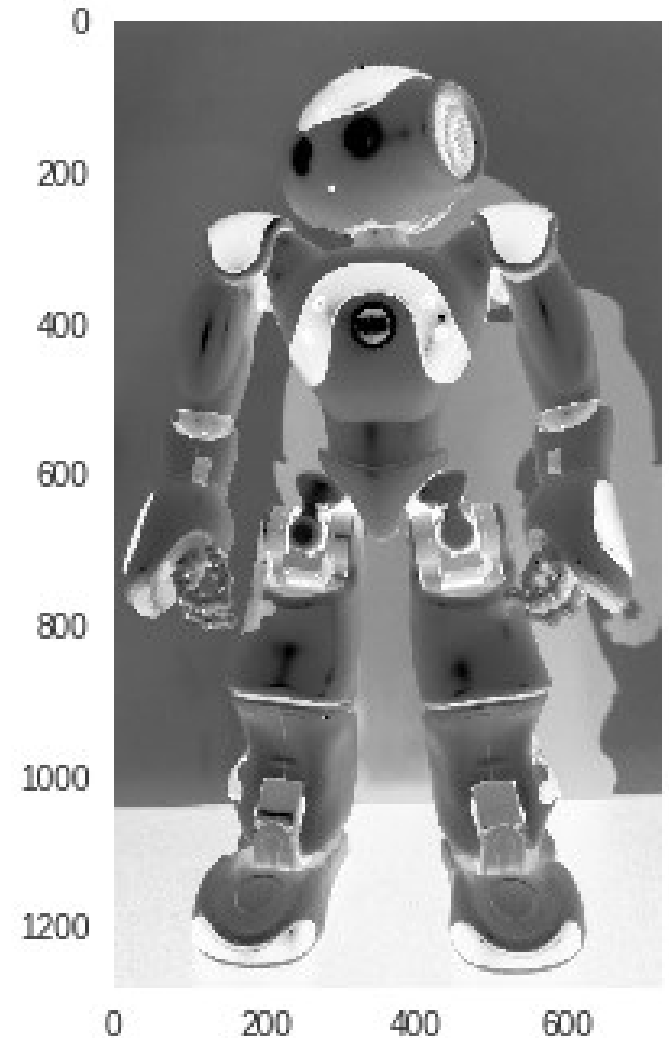
```python
from PIL import Image

import matplotlib.pyplot as plt
import urllib.request

url = "https://dbloisi.github.io/corsi/images/nao-v6-spqr.jpg"

img = Image.open(urllib.request.urlopen(url))
print(img.size)

roi = img.crop((300,150,500,200))
print(roi.size)

x = (img.size[0] - roi.size[0]) // 2
y = (img.size[1] - roi.size[1]) // 2

position = (x, y)

img_copy = img.copy()
img_copy.paste(roi, position)

plt.grid(b=False)
plt.imshow(img_copy)
```
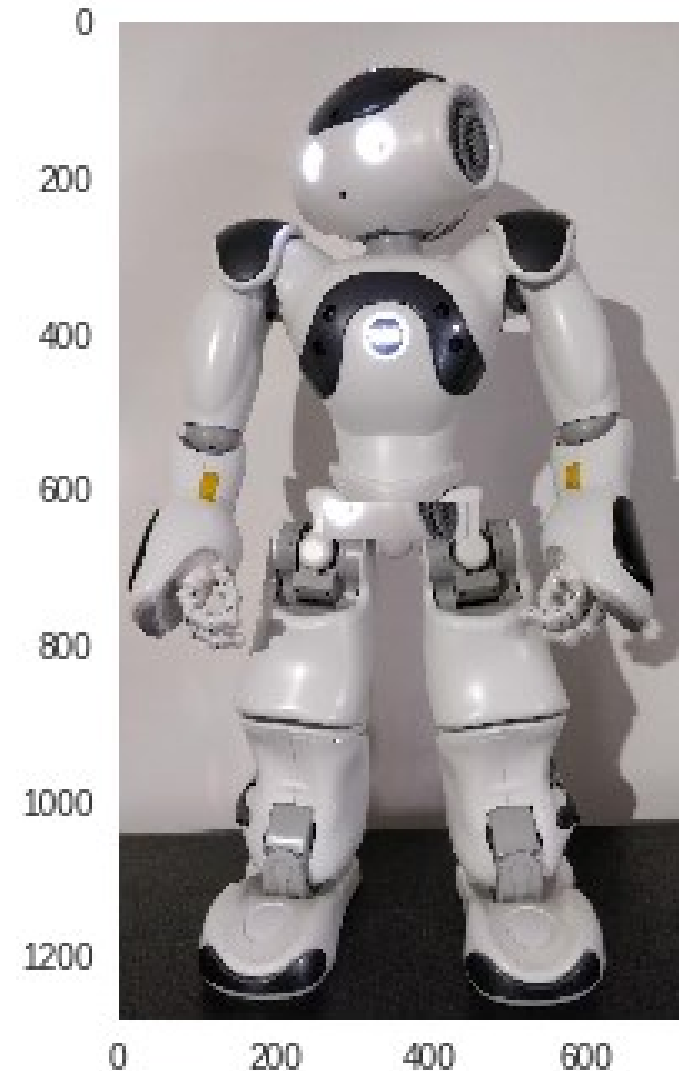
Esercizio 1.3

```python
from PIL import Image

import matplotlib.pyplot as plt
import urllib.request

url = "https://dbloisi.github.io/corsi/images/nao-v6-spqr.jpg"

img = Image.open(urllib.request.urlopen(url))
print(img.size)

roi = img.crop((300,150,500,200))
print(roi.size)

x = (img.size[0] - roi.size[0]) // 2
y = (img.size[1] - roi.size[1]) // 2

position = (x, y)

img_copy = img.copy()
img_copy.paste(roi, position)

plt.grid(b=False)
plt.imshow(img_copy)
```
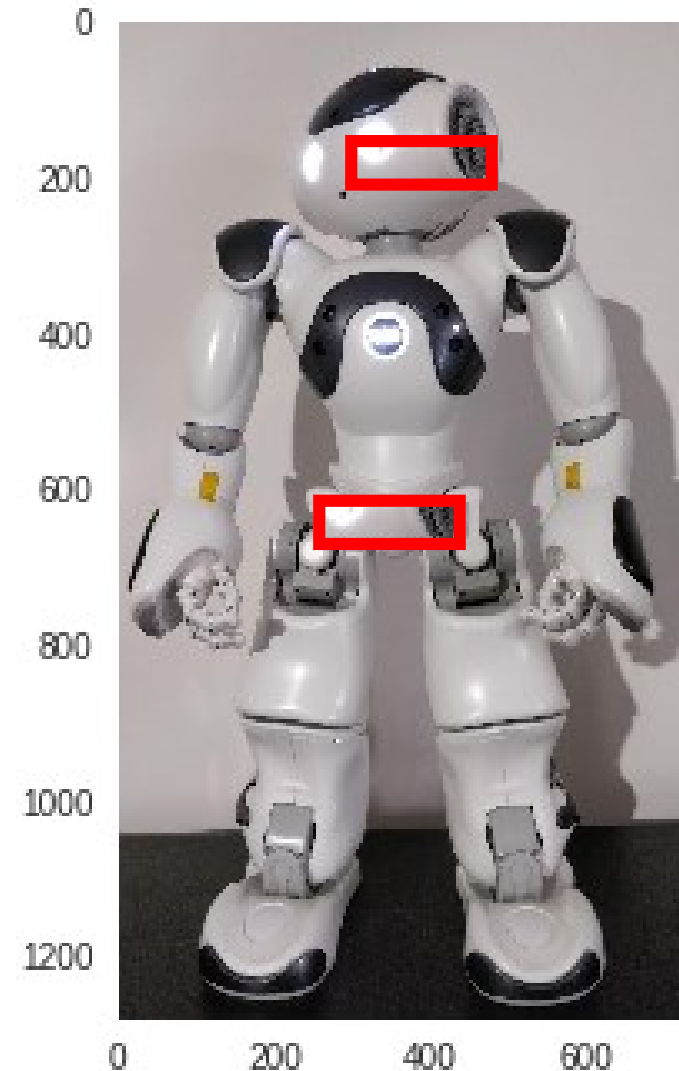
Esercizio 1.4

1. Aprire l'immagine a colori
https://dbloisi.github.io/corsi/images/nao-v6-spqr.jpg

2. Salvare una nuova immagine che abbia dimensioni pari ad ¼ dell'originale

Esercizio 1.4 - soluzione

```python
from PIL import Image

import matplotlib.pyplot as plt
import urllib.request

url = "https://dbloisi.github.io/corsi/images/nao-v6-spqr.jpg"

img = Image.open(urllib.request.urlopen(url))


plt.grid(b=False)
plt.imshow(img_copy)

resized_img = img.resize((img.size[0] // 4, img.size[1] // 4))
resized_img.save('resized.jpg')

print(img.size)
print(resized_img.size)

plt.grid(b=False)
plt.imshow(resized_img)
```
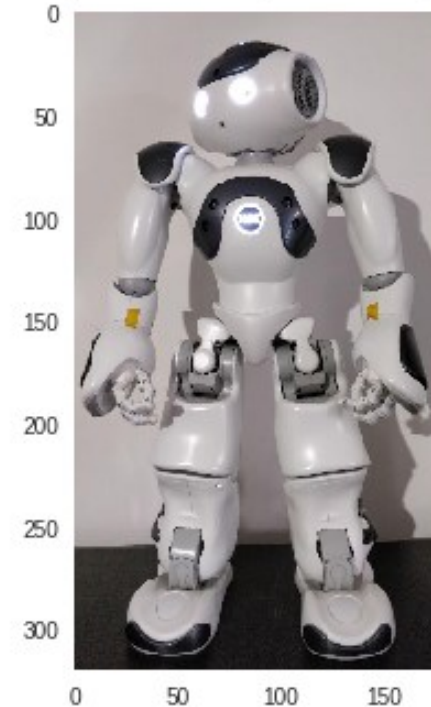
```
(720, 1280)
(180, 320)
<matplotlib.image.AxesImage at 0x7fc05bf212e8>
```

Esercizio 1.5

1. Aprire l'immagine a colori
https://dbloisi.github.io/corsi/images/nao-v6-spqr.jpg

2. Inserire la stringa 'Unibas' così come mostrata sotto sull'immagine

Unibas

Esercizio 1.5 - soluzione

```python
from PIL import Image, ImageDraw, ImageFont

import matplotlib.pyplot as plt
import urllib.request

url = "https://dbloisi.github.io/corsi/images/nao-v6-spqr.jpg"

img = Image.open(urllib.request.urlopen(url))

img_draw = ImageDraw.Draw(img)

img_draw.rectangle((50, 30, 250, 100), fill='blue')

!ls '/usr/share/fonts/truetype/liberation'

font = ImageFont.truetype(font="LiberationSans-Regular.ttf",size=60)

img_draw.text((60, 40), 'Unibas', fill='white', font=font)

plt.grid(b=False)
plt.imshow(img)
```
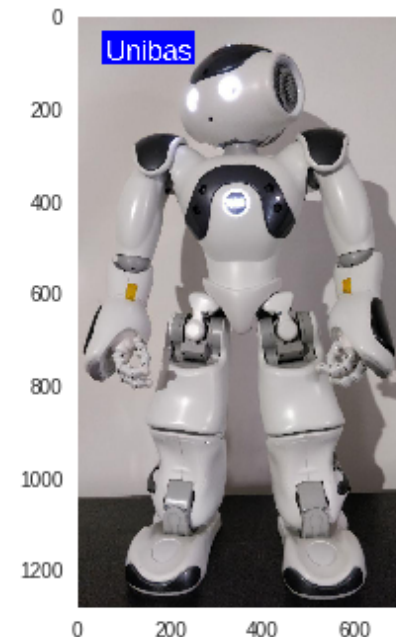
```
LiberationMono-BoldItalic.ttf          LiberationSansNarrow-Bold.ttf
LiberationMono-Bold.ttf                LiberationSansNarrow-Italic.ttf
LiberationMono-Italic.ttf              LiberationSansNarrow-Regular.ttf
LiberationMono-Regular.ttf             LiberationSans-Regular.ttf
LiberationSans-BoldItalic.ttf          LiberationSerif-BoldItalic.ttf
LiberationSans-Bold.ttf                LiberationSerif-Bold.ttf
LiberationSans-Italic.ttf              LiberationSerif-Italic.ttf
LiberationSansNarrow-BoldItalic.ttf    LiberationSerif-Regular.ttf
<matplotlib.image.AxesImage at 0x7fc5aa4a9b38>
```
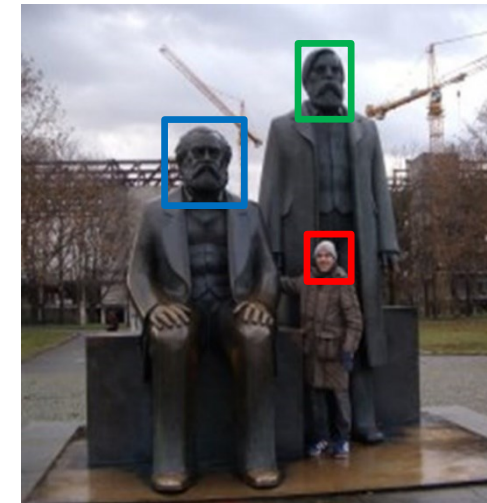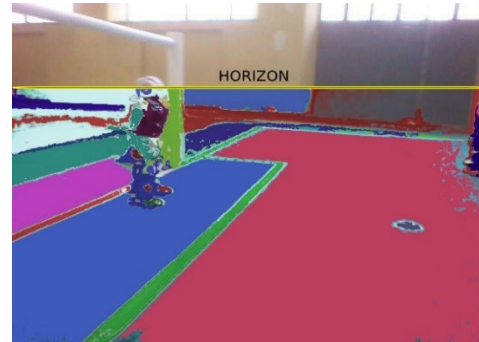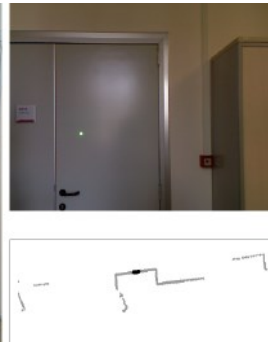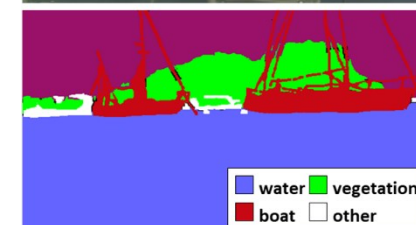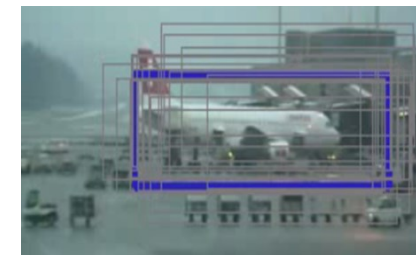
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Parte 1

Marzo 2019