Assignment 0
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Question 1:

Part (a): Convert a video into its constituent frames

(write each frame as 1.jpg, 2.jpg etc. to a folder named images)

```
import numpy as np
import cv2
video = cv2.VideoCapture('videos/independence.mp4')
retval, frame = video.read()

i = 1
while(retval):
  out_name = 'images/' + str(i) + '.jpg'
  cv2.imwrite(out_name, frame)
  i += 1
  retval, frame = video.read()

video.release()
cv2.destroyAllWindows()
```

part (b): combine a bunch of sequential frames to a video

VideoWriter object is used for creating a video. The code is mostly commented for explanations.

```
import numpy as np
import cv2

im_dir = 'images/'

# Read the first image to set the dimensions of the video
im = cv2.imread(im_dir + '1.jpg')

# Define the codec and create VideoWriter object
fourcc = cv2.cv.CV_FOURCC('m', 'p', '4', 'v')
dim = im.shape[0:2] # (w, h, 3) we only need (w,h)
fps = 25

vid_out = cv2.VideoWriter()
success = vid_out.open('videos/output.avi', fourcc, fps, dim, True)
out = cv2.VideoWriter('videos/output.avi',fourcc, fps, dim, True)

for i in range(1,650):
  im = cv2.imread(im_dir + str(i) + '.jpg')
  vid_out.write(frame)

vid_out.release()
```

Question 2: Webcam/Camera capture

We can use *VideoCapture(0)* for accessing the webcam. In my code, if you press ‘s’ that image will be saved. If you press ‘q’, the capture will be stopped.

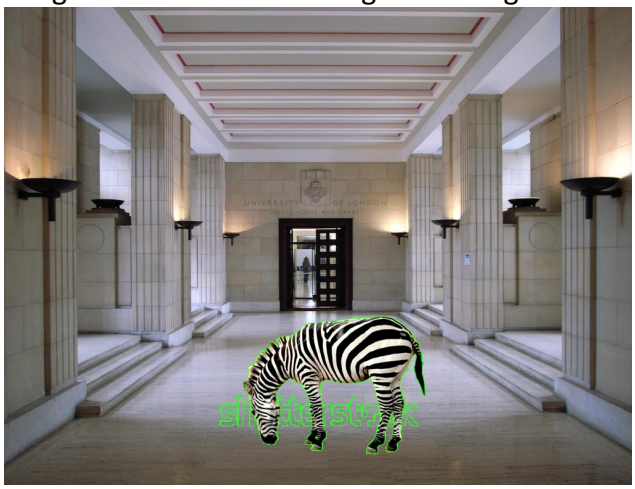
```
# Webcam capture. Press 's' to save a snap
import numpy as np
import cv2

from datetime import datetime

capture = cv2.VideoCapture(0)

while(True):
    # Capture frame-by-frame
    retval, frame = capture.read()

    # Our operations on the frame come here
    gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)

    # Display the resulting frame
    cv2.imshow('WebCam', frame)
    key_pressed = cv2.waitKey(1) & 0xFF
    if key_pressed == ord('q'):
        break

    if key_pressed == ord('s'):
        file_name = 'capture/cap' +  str(datetime.now()) + '.jpg'
        cv2.imwrite(file_name, frame)

# When everything done, release the capture
capture.release()
cv2.destroyAllWindows()
```

Output: Was able to take snaps from webcam.

Question 3: Chroma Keying. My aim is to make a zebra graze inside a room. The unblended combination is shown below for illustration.

Methods Tried

1. Simple Thresholding
   We can get rid off most of the green background by thresholding. The blended image is shown below. The green background on the edges are not gone!



2. The Solution 2 given in the Blue Screen Matting by Alvy Ray et.al. in page 3

   The technique: We assume that the foreground is mostly grey/neutral. So we take Bo = Go. We have Rf = Ro. (As we assume a constant green background Ck = [0 G 0])