Adding Noise to an Image

(1) Take a selfie. [If you have an iPhone 12 you can take it in the dark ☺.]

(2) Save the image in JPG (*.jpg) format, which is default for most cameras, i.e. most likely you need not to change the format. Then transfer the image to your PC/ laptop and resize it to a dimension less than 240×320 (= width × height). You can use any software/app or do it via online tools such as: https://resizeimage.net/

(3) Place the image in a folder and write a MATLAB program (in the same folder) which reads the image, add noise with a SNR = −20 dB and save a noisy version of the image.

For reading the image you can use:

```
X  = imread('YourRollNo.jpg');
```

For calculating image signal power you can use:

```
%X is a 3D array with uint8 type data
sX = size(X);                %Get dimensions of X
lX = sX(1)*sX(2)*sX(3);      %lX = height x width x 3
Px = sum(X.^2,'all')/lX;     %Power
```

Next, generate Gaussian noise maintaining SNR and convert it to `uint8` type

```
Nd = ...;
Ni = uint8(Nd);
```

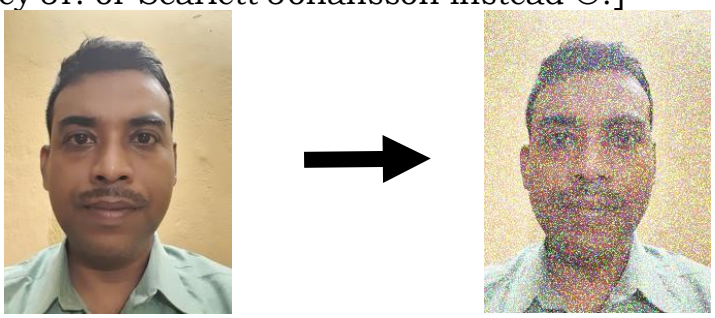
Finally, add noise to image

```
X  = X + Ni;
```

and save it (you can also see it using the function `imshow`)

```
imwrite(X,'YourRollNo_noisy.jpg');
```

You'll probably see something like this [I wish I could use a picture of Robert Downey Jr. or Scarlett Johansson instead ☹.]



(4) Put the code + input image + output image + your observations in the standard lab report format and upload a single PDF file.