Today we will implement the R-CNN algorithm in python from scratch, along the following link:
https://towardsdatascience.com/step-by-step-r-cnn-implementation-from-scratch-in-python-e971 01ccde55

1. We will use the airplane detection dataset:
   http://www.escience.cn/people/JunweiHan/NWPU-RESISC45.html
   In order to make calcualtions easier we will only predict weather an image proposal area is background or forground (airplane) and we won't predict the full object class.

2. Calculate region proposals using the following function from opencv:
   https://docs.opencv.org/master/d5/df0/group__ximgproc__segmentation.html#ga797254 90f59e23bba3c774239aa053f1

3. Calculate IOU (Intersection Over Union) with known labeled regions in order to suppress regions that are non overlapping to known labels

4. Run a CNN with the VGG16 architecture on each region proposal in oder to create a feature map (we will not use the top layer of VGG16), we will add a layer with two outputs, (forground and background). This is different than usual R-CNN in which we would usually run a SVM on the feature map instead of just adding a two neuron Fully Connected layer.

5. Run the model on an image from the test set and check results, first run the selective searh algorithm and then run the trained neural netowrk on these region proposals and check the predictions.

Good Luck!