

1. You have an image of the size  $256 \times 408$  pixels and you want to compute dense features consisting of pixel intensities collected from  $9 \times 9$  patches centered around each pixel, where such patch is valid. You want to store the extracted features in a 3D array. What is the total number of elements (a product height  $\times$  width  $\times$  depth) of the array you would choose to store the features?
2. You are approaching a 3-label segmentation as explained in the exercise 3.2. You choose to cluster the features extracted from the training image in 1000 clusters. It turns out, that cluster number 5 contains 120 image features. In the training image, the features from cluster 5 are represented with 90, 20, and 10 features in labels 1, 2, and, 3, respectively. What is  $p_5(1) + p_5(2)$ ?
3. You are segmenting an image into labels 1, 2, and 3. You represent the probability image using an  $r \times c \times 3$  array. The first three rows, five columns and two layers of the probability image are shown below. Which label is dominant in the segmentation of this  $3 \times 5$  window?

0.11	0.16	0.21	0.26	0.31	0.67	0.55	0.43	0.31	0.19
0.09	0.14	0.19	0.24	0.29	0.59	0.47	0.35	0.23	0.11
0.07	0.12	0.17	0.22	0.27	0.51	0.39	0.27	0.15	0.03

Submit your answers in a text file with the first four lines formatted as below:

```
features_size: 55  
cluster_probability: 55  
dominant_segmentation: 55  
display_name: AndersAnd
```