

CSCI 5722 PROBLEM SET 1

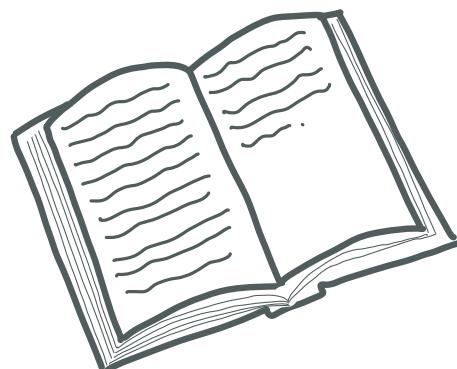
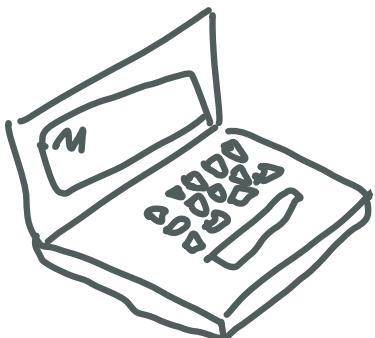
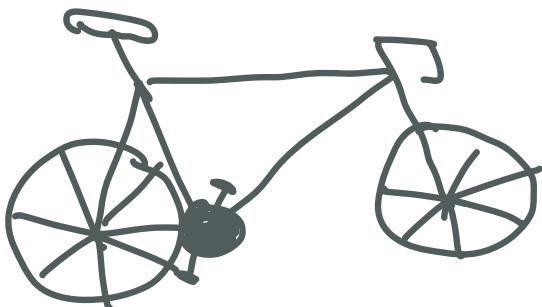
Total:
20pts
Due:
1/24/23

Name: Nikolai Lysogor

Student ID: 109446484

Q1. About Yourself (3 pts)

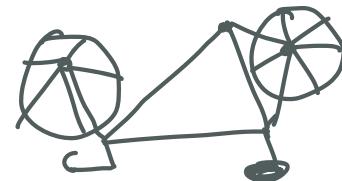
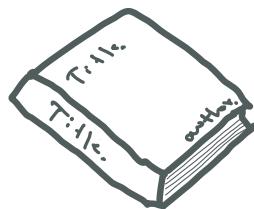
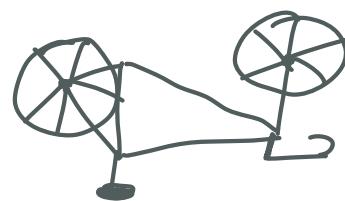
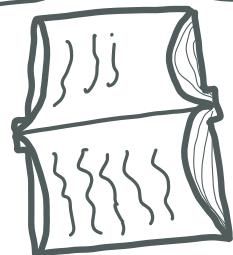
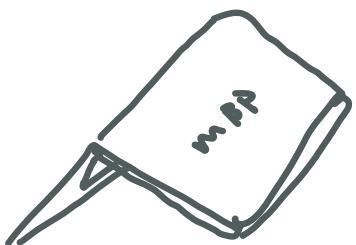
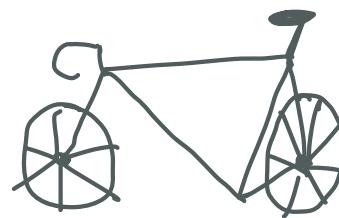
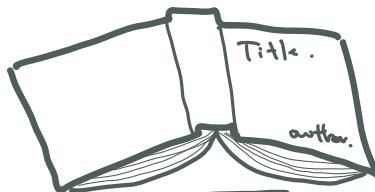
In the space below, sketch 3 objects that best represent yourself.



O2: Challenges in Computer Vision (2 pts)

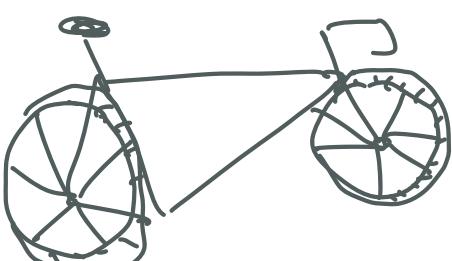
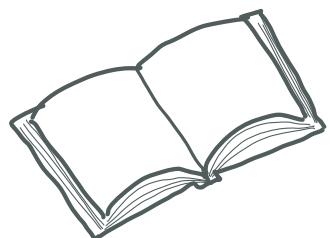
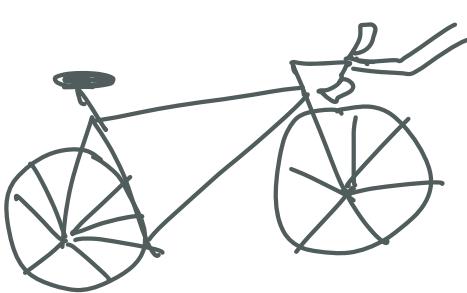
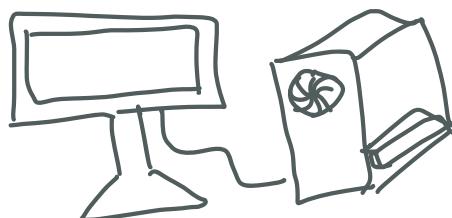
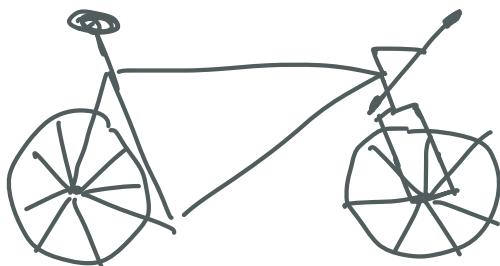
Illustrate the following with your "original" sketches.

a. VIEWPOINT VARIATIONS



b. INTRA-CLASS VARIATIONS

(3 variations per class)



Q3: Illumination Variations (2pts)

Take 4 photos of an object in your room under different lighting conditions. Paste them below. Maximize illumination variations, while keeping scale and viewpoint constant.

1.



2.



3.

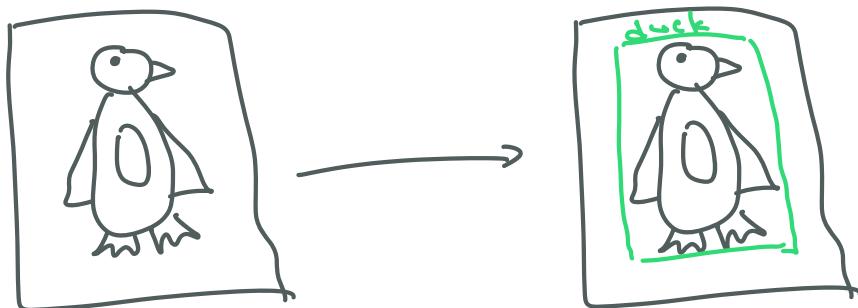
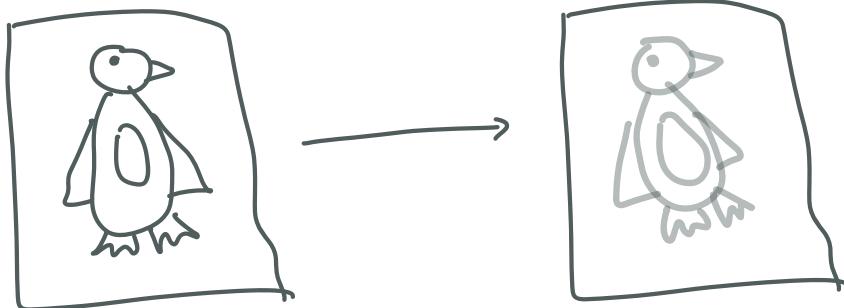
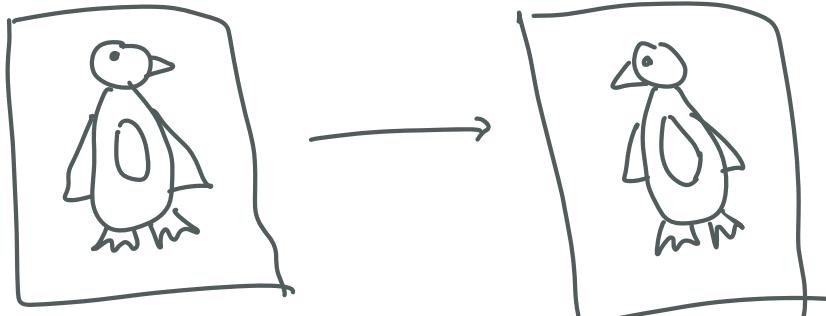


4.



Q4: Low, Mid, High-level Vision (3 pts)

In the space below, create an original sketch to illustrate the 3 levels of computer vision tasks



Q5: OCR TEST (3 pts)

Hand write 50 words about yourself in your native language. Run OCR. Paste the result. Highlight errors.

a. Hand written text (2)

My name is Nikolai Lyssogov. I am a computer science student at CU Boulder. My interests are machine learning and back and engineering. My goal is to become a machine learning engineer, but I intend to work as a data engineer first. I also enjoy road cycling around Boulder

b. OCR result with errors highlighted (1)

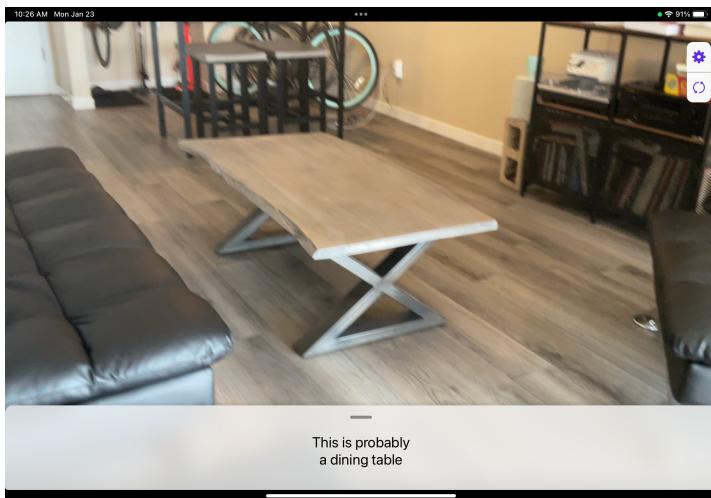
My name is Nikolai Lyssogov.i am a computer science student at CU Boulder. My interests are Machine learning and back and engineering. My goal is to became a Machine learning engineer, but I intend to work as a data engineer first. I also enjoy road cycling around Boulder

Q6. Object Recognition Test (4 pts)

Install an object recognition app and test it around your home. Find examples of the following.

Name of the app: Ivy

a. "Almost" correct



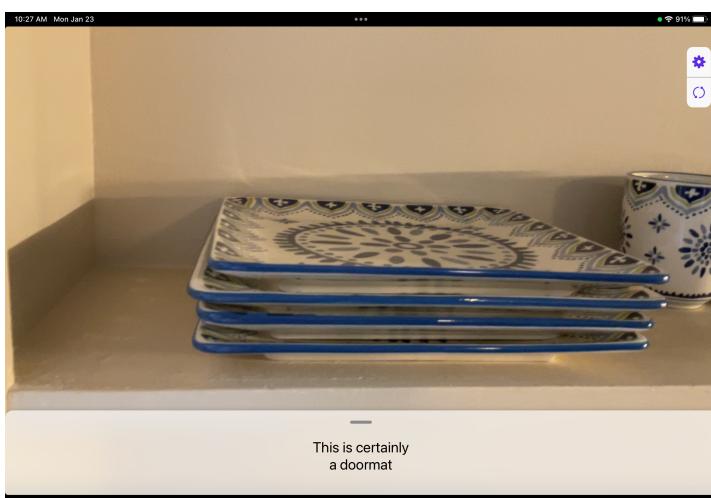
Ground Truth Label:

coffee table

Predicted Label:

dining table

b. Very wrong but funny



Ground Truth Label:

plates

Predicted Label:

doormat

Q7: Python / Numpy (3 pts)

Compute these using Numpy

$$\text{Let } A = \begin{bmatrix} 4 & 2 & 3 & 7 \\ 3 & 5 & 2 & 1 \\ 1 & 9 & 4 & 2 \end{bmatrix}, \quad B = \begin{bmatrix} 2 & 7 & 6 \\ 1 & 3 & 2 \\ 4 & 5 & 1 \end{bmatrix}$$

$$(AA^T)^5 = \begin{bmatrix} 43656666711 & 37034751209 & 59416680210 \\ 37034751209 & 31495508478 & 50577837358 \\ 59416680210 & 50577837358 & 8122370620 \end{bmatrix}$$

$$(A^TA)^2 = \begin{bmatrix} 3273 & 6717 & 3897 & 4306 \\ 6717 & 17197 & 9079 & 8736 \\ 3897 & 9079 & 4990 & 8223 \\ 4306 & 8736 & 5223 & 6333 \end{bmatrix}$$

$$(BA - (A^TB)^T)^4 = \begin{bmatrix} 20 & 418 & 20 & 10 \\ -27 & -39 & -36 & -48 \\ 1 & 11 & 0 & -11 \end{bmatrix}^4$$