

Computational Photography (CSCI 3240U) — In-class Exercise

Please hand in this paper to the instructor before the end of the lecture.

Lastname (PRINT): _____ Firstname: _____

Student number: _____ Date: _____

Q. Consider the following 8×8 grayscale image that stores each pixel using 4 bits.

0	5	7	3	14	4
1	4	8	4	15	3
2	5	9	5		
3	2	10	4		
4	4	11	3		
5	4	12	4		
6	5	13	5		

(64)

8

0	0	0	1	1	2	2	2
0	0	1	1	2	2	3	3
4	4	5	5	5	6	6	7
4	4	5	6	6	6	7	7
8	8	8	9	9	10	10	11
8	9	9	9	10	10	11	11
12	12	12	13	13	14	14	14
12	13	13	13	14	15	15	15

8

pixels = 64

Complete the following tasks:

1. **Compute the histogram:** count how many times each intensity value (0–15) appears in the image.
2. **Plot the histogram** as a bar chart (x-axis: intensity values, y-axis: frequency).
3. **Answer the following:**

- Which intensity values occur most frequently?
- Which intensity values occur least frequently?
- What is the total number of pixels? Does the sum of the histogram counts match this total?

HISTOGRAM

Is this a distribution? NO

HISTOGRAM $\div$ 64

64

∫

$$5 + 4 + 5 + 2 + 4 + 4 + 5 + 3 + 4 + 5 + 4 + 3 + 4 + 5 + 4 + 3$$

64

$$\frac{5}{64} + \frac{4}{64}$$

$$+ \frac{3}{64}$$