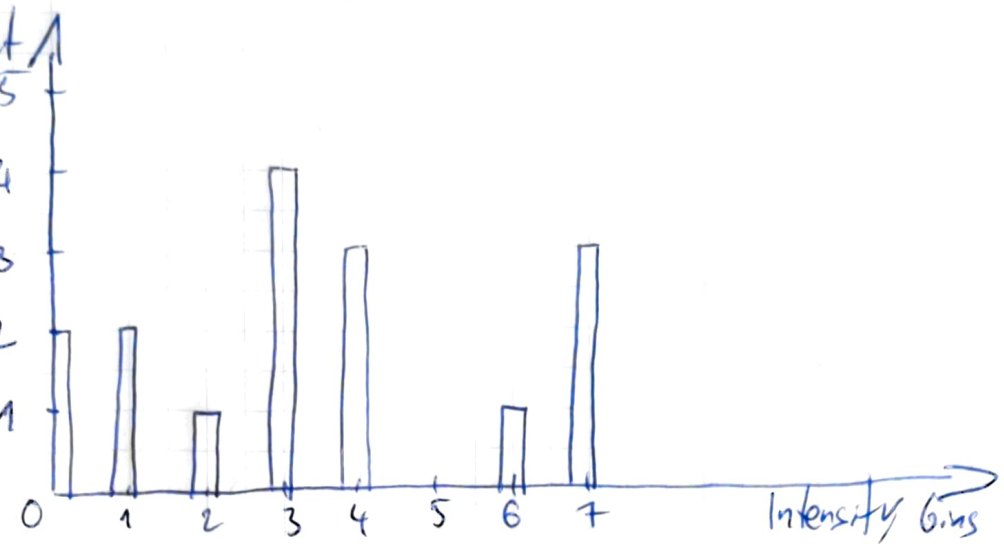
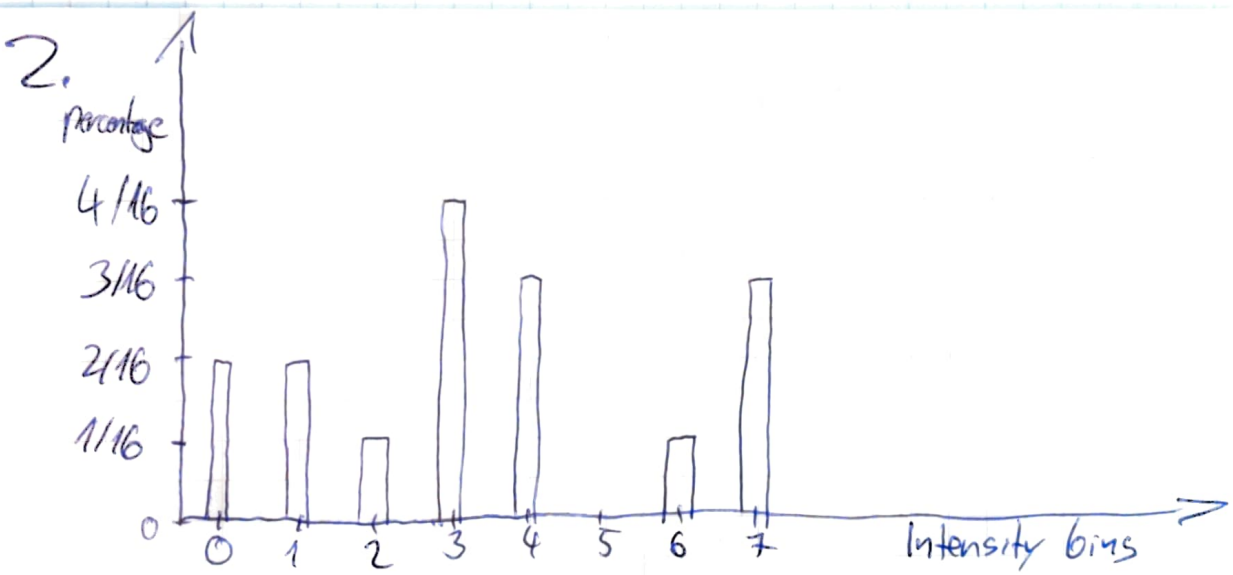
Blatt 6 - Aufgabe 1

1.



2. 0: $2/16 = 1/8$ 1: $2/16 = 1/8$ 2: $1/16 = 1/16$ 3: $4/16 = 1/4$
4: $3/16 = 3/16$ 5: $0/16 = 0$ 6: $1/16 = 1/16$ 7: $3/16 = 3/16$

2.



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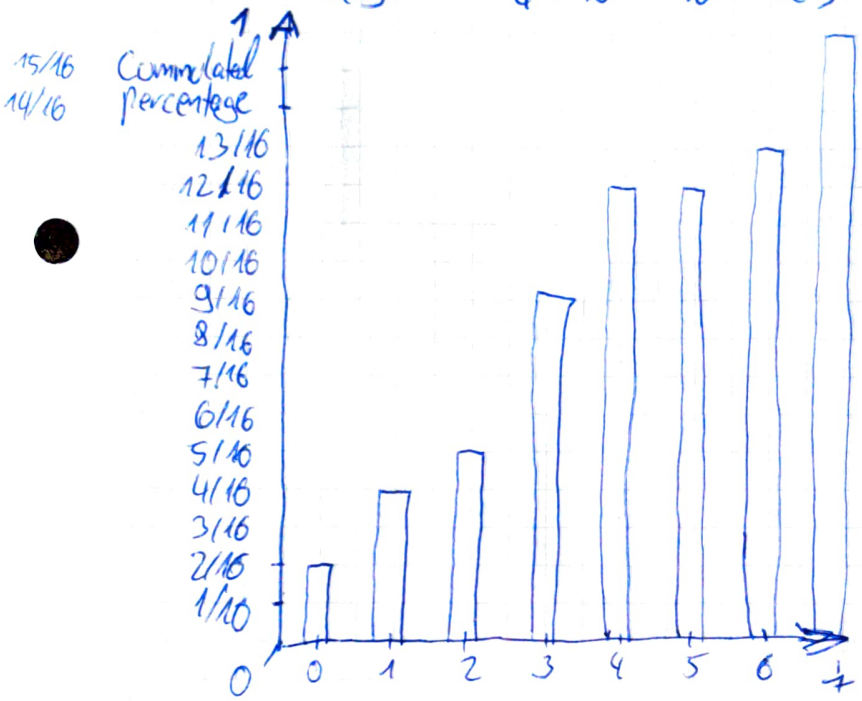
3. $c(0) = \frac{1}{8}$ $c(1) = \frac{1}{8} + \frac{1}{8} = \frac{1}{4}$ $c(2) = \frac{1}{4} + \frac{1}{16} = \frac{5}{16}$

$c(3) = \frac{5}{16} + \frac{1}{4} = \frac{9}{16}$ $c(4) = \frac{9}{16} + \frac{3}{16} = \frac{3}{4}$ $c(5) = \frac{3}{4} + 0 = \frac{3}{4}$

$c(6) = \frac{3}{4} + \frac{1}{16} = \frac{13}{16}$ $c(7) = \frac{13}{16} + \frac{3}{16} = 1$



4. $m = \sum_{i=0}^{L-1} r_i \cdot p(r_i)$

$m = 0 \cdot \frac{2}{16} + 1 \cdot \frac{2}{16} + 2 \cdot \frac{1}{16} + 3 \cdot \frac{4}{16} + 4 \cdot \frac{3}{16} +$

$5 \cdot 0 + 6 \cdot \frac{1}{16} + 7 \cdot \frac{3}{16} = \frac{55}{16}$

Der Mittelwert auf Basis des normierten Histogramms beträgt $\frac{55}{16}$.

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5.

$$\sigma^2 = \sum_{i=0}^{L-1} (r_i - m)^2 \, p(r_i)$$

$$\sigma^2 = \left(0 - \tfrac{55}{16}\right)^2 \cdot \tfrac{2}{16} + \left(1 - \tfrac{55}{16}\right)^2 \cdot \tfrac{2}{16} + \left(2 - \tfrac{55}{16}\right)^2 \cdot \tfrac{1}{16}$$
$$+ \left(3 - \tfrac{55}{16}\right)^2 \cdot \tfrac{4}{16} + \left(4 - \tfrac{55}{16}\right)^2 \cdot \tfrac{3}{16} + \left(5 - \tfrac{55}{16}\right)^2 \cdot 0$$
$$+ \left(6 - \tfrac{55}{16}\right)^2 \cdot \tfrac{1}{16} + \left(7 - \tfrac{55}{16}\right)^2 \cdot \tfrac{3}{16} \approx 5{,}68$$

Die Varianz beträgt auf Basis des normierten Histogramms ungefähr 5,68