

## Probleme Partea 3

### Problem 1

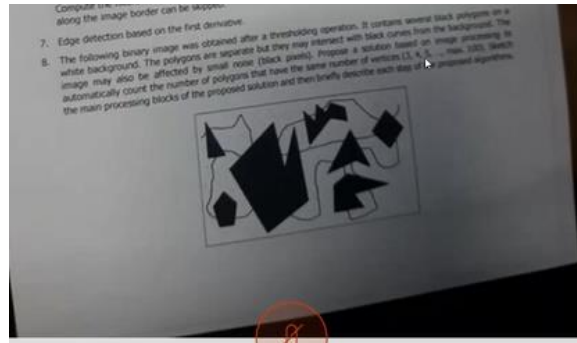
Find no of letters that enclose a blank space



- Opening to get rid of lines
- Label all letters
- Pt fiecare label , fac conturul, region filling si vad daca difera aria la regiunea umpluta fata de aria literei din poza initiala

### Problem 2

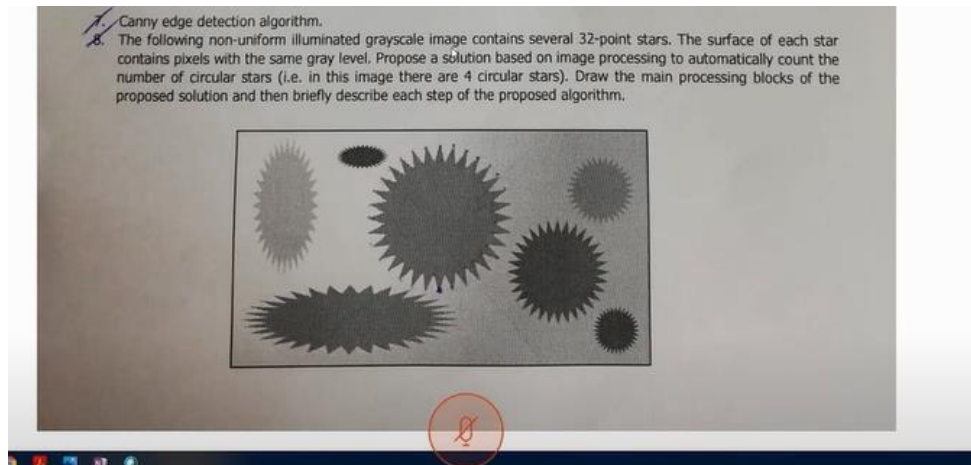
Count polygons in image with same number of vertices



- Opening to get rid of the curved lines that connect the polygons
- Polygonal approximation to count the number of edges
- Number of vertices: number of edges + 1
- Frequency array with the corresponding polygons for each vertex number

### Problem 3

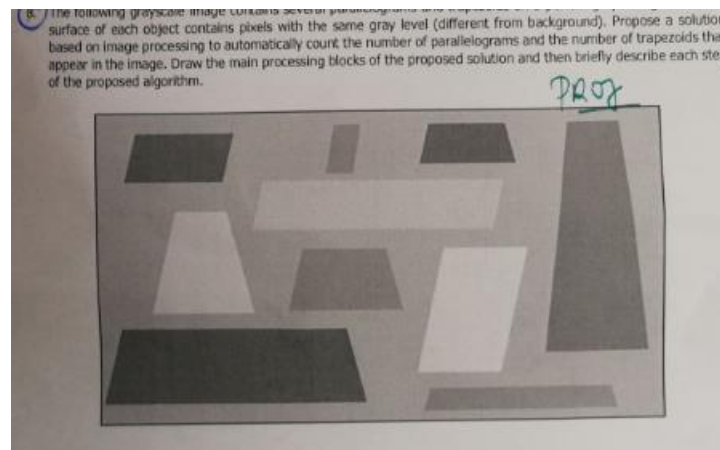
Number of perfectly round stars



- Make background uniformly coloured
- Label all stars
- Do bounding box for each star. If it is a perfect square, the star was a circular one

## Problem 4

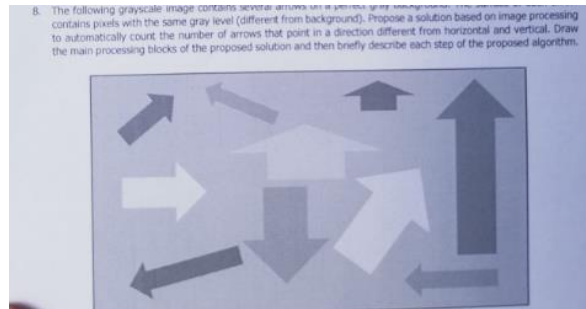
Count Parallelograms and Trapezoids



- Make background white or uniform
- Do horizontal projections. Paralelogramele o sa aiba aceeasi latime pe toata lungimea proiectiei, iar la trapez o sa arate ca un trapez dreptunghic
- La final numaram

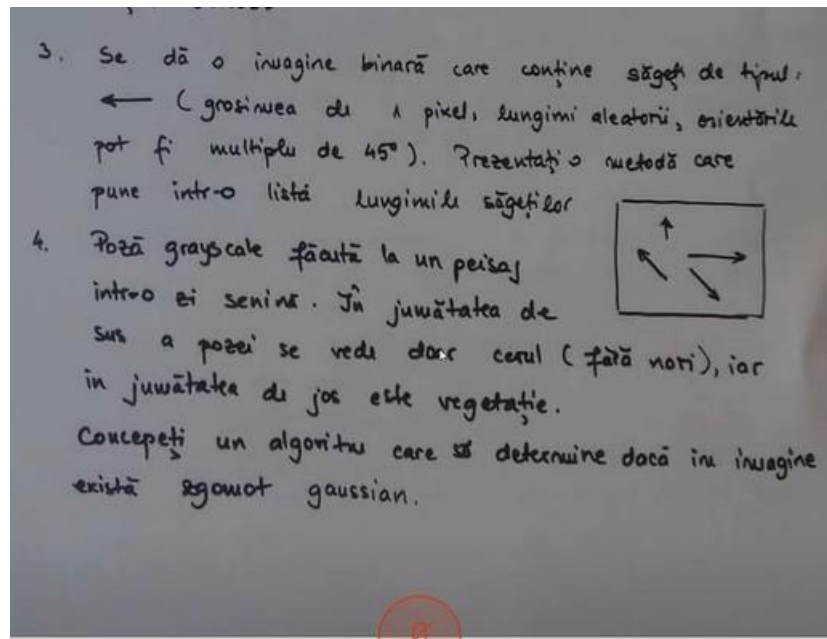
## Problem 5

Count arrows which are not vertical or horizontal



- Background uniform
- punem labels
- calculam pt fiecare obiect axa de elongare
- numaram toate unghiurile ce nu sunt multiplu de 90 grade

## Problems 6 & 7



### 6) Bounding box, 3 reguli:

- dr-st daca e orizontala
- jos – sus daca e verticala
- pitagora daca e diagonala
- lista cu lungimile

### 7) Gaussian noise

- lau coltul din st sus din cer sau ceva din cer
- vad daca e distributie gaussiană pe portiunea respectiva

## Problem 8

### Coin Diameters

4. The following grayscale image shows several coins on a white paper. The coins are not overlapped but they can touch one each other. Propose a solution based on image processing for automatically find the diameter of each coin. Briefly describe each step of the proposed algorithms.

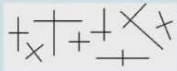


- 1 or 2 erosions to separate coins
- binarize
- Label all coins
- Do bounding box
- Compute difference + add 2 or 4 depending on number of erosions (2\*erosions)

## Problem 9

### Numarul de cruci simetrice

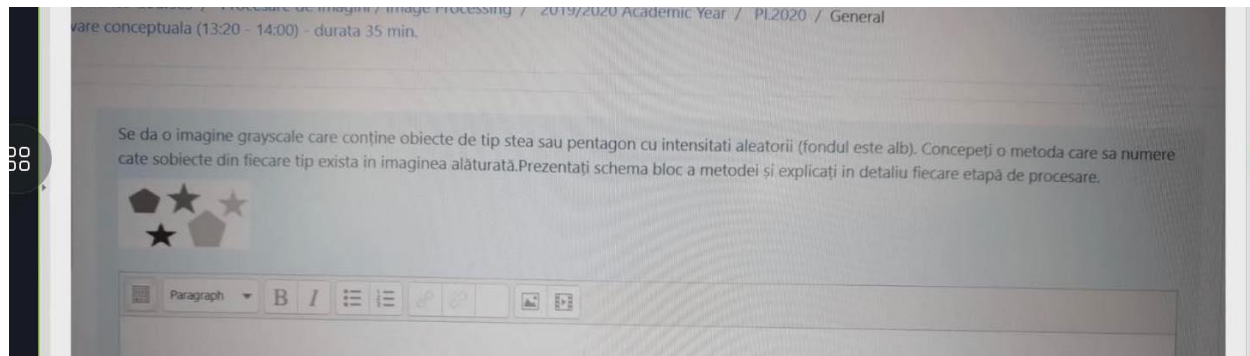
Se da o imagine binară care conține simboluri de tip cruce (obținute din segmente de dreaptă cu grosimea de 1 pixel, ca și în figura alăturată). Simbolurile pot fi simetrice sau asimetrice în raport cu cele două brate/axe ale crucii. Concepeți o metodă care pune într-o listă valorile rapoartelor dintre cele 2 lungimi ale bratelor, doar pt. crucile simetrice. Prezentați schema bloc a metodei și explicați în detaliu fiecare etapă de procesare.



- Labeling
- Bfs pt fiecare obiect, merg in jos pana la capatul obiectului pt lungime
- Daca am intersectia cu cealalta latura la mijloc, e simetric si fac iar bfs in cealalta directie pt ca sa aflu raportul

## Problem 10

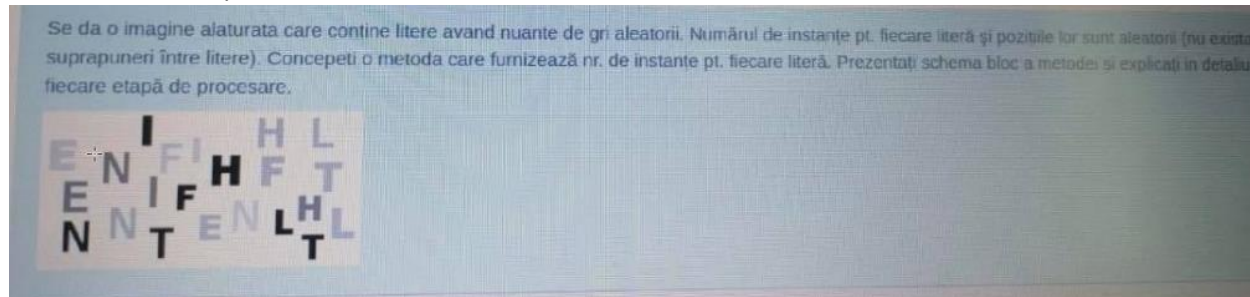
### Stele si pentagoane



- Fac perimetru/arie
- -> o sa fie mare la stele, mic la pentagoane
- SAU
- Folosesc factor de iregularitate  $1/T$

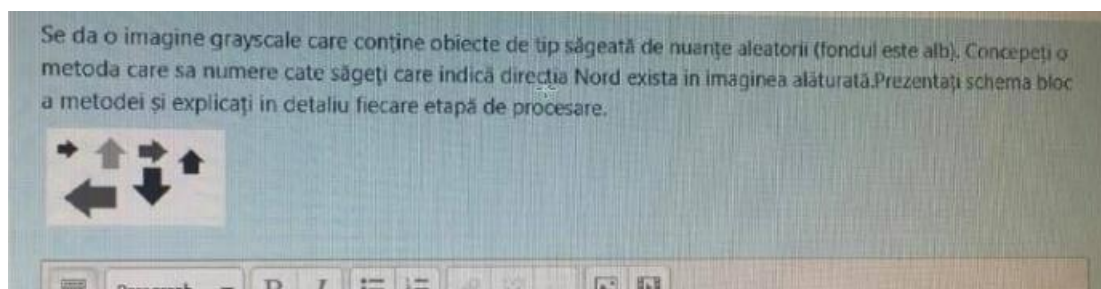
### Problem 11

Numar instantele pt fiecare litera



- label all letters
- do chain codes for each labeled object
- remove duplicates from chain codes (pt ca unele litere sunt mai groase decat altele)
- frequency counter

### Problem 12



- proiectie orizontala
- daca primul rand are doar 1 pixel -> e varf si arata spre nord

### Problem 13

Count number of coins

4. The following grayscale image contains several equal-sized coins and some noise. Propose a solution based on image processing for automatic counting the number of coins. Briefly describe each step of the proposed algorithms.



- eroziune cu un element structural mare ca sa scap de cercurile alea mici si de noise