# Region Growing

L38

Goal: To use spatial continuity to guide our thresholding method for segmentation.

The idea is to start with a small set of **"seed"** pixels, and grow out from them. It is an iterative process.

```
do
   for each pixel in the set
      for each of its neighbours not yet included
         if the intensity falls between the thresholds
            add it to our set
         endif
      next neighbour
   next pixel in the set
until no pixels were added in the last pass
```

Example: included in the set already

| | | | |
|---|---|---|---|
| 1 | 2 | 7 | 4 |
| 5 | 8 | 10 | 17 |
| 6 | 14 | 12 | 21 |
| 5 | 13 | 18 | 32 |

Thresholds: include a pixel if $10 \leq \text{intensity} \leq 100$

Looking at the 14...

up: 8 ⇒ exclude

right: 12 ⇒ already included

down: 13 ⇒ include as new entry

left: 6 ⇒ exclude

(decent Matlab demo)

You can make the method more sophisticated by coming up with different conditions for the inclusion/exclusion of pixels.

Examples:

1. Choose lower and upper thresholds based on currently-

included pixels.

i.e. compute $\mu$ & $\sigma$ of selected pixels

Then low = $\mu - 2\sigma$

high = $\mu + 2\sigma$

2. Use a local pixel quantity other than raw intensity.

eg. gradient mag., local variance, texture, etc.

END