<u>Today</u>
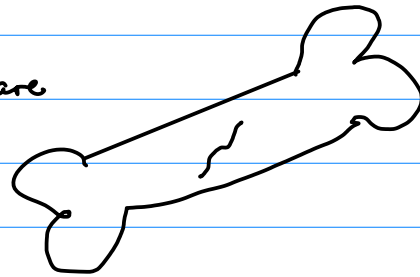- review for exam 1
- edge detection
- dot products

<u>Edge detection</u>

Problem: find edges in an image
Applications:
- self-driving cars
- safety features in cars
- X-ray scans
- fingerprint software

<u>Strategy</u>: • plot some pixels

• differences of nearby pixels

7  9  12  97  99  100  99

-2  -3  -85  -2  -1  -1  99
↑   ↑   ↑      ↑   ↑   ↑
small     small
    large        small

CODE:

graydiff = Agray(310, :);

graydiff(1:end-1) = graydiff(1:end-1) - graydiff(2:end);

graydiff(100) = Agray(310,100) - Agray(310,101)

## Dot Product :

$$u = [u_1 \; u_2 \; u_3 \; u_4 \; \cdots \; u_n]$$

$$v = [v_1 \; v_2 \; v_3 \; v_4 \; \cdots \; v_n]$$

**Same length!**

**Def** : The **dot product** of $u$ and $v$ is

$$u \cdot v = \sum_{k=1}^{n} u_n v_n = u_1 v_1 + u_2 v_2 + \cdots + u_n v_n.$$

**Ex** : $u = [1 \; 0 \; -1]$     $v = [2 \; 3 \; 5]$

$$u \cdot v = 1 \cdot 2 + 0 \cdot 3 + (-1) \cdot 5 = 2 - 5 = \boxed{-3}$$