Calibration of the light sensor

- Theoretically the light sensor has values between 0..100
- But in reality the light sensor only gets values in small ranges like 16..48 or 32..75
- That means we need a messurement for what is "bright" and what is "dark"

Example

Messure your weight:

1. Put your feet on a balance scale
2. Read the value on the scale
3. Do you believe the value?
4. Get a thing where you know its weight and put it on the scale
5. Now you know if you can trust the scale!

How to get light sensor values in %?

1. You could implement a programm that calibrates messured values.
2. Hold the light sensor over a black surface and save the sensor value and hold it over a white surface save this value too.
3. Check further if there is a big enough distance between dark and bright.
4. With help of these values it is possible to define light values in %: 0% for "dark" and 100% for "bright".

Calibrate light sensor

```
void calibratelight(void)
   {
     int dark, bright;

     do {
       dark = getlightvalue("dark");
       bright = getlightvalue("bright");
     } while (!(dark+8<=bright));
     thresholddark= dark +((bright - dark )*1)/5;
     thresholdbright= dark +((bright - dark )*4)/5;
   }
```

How to detect edges?

You want to follow a black line on white ground

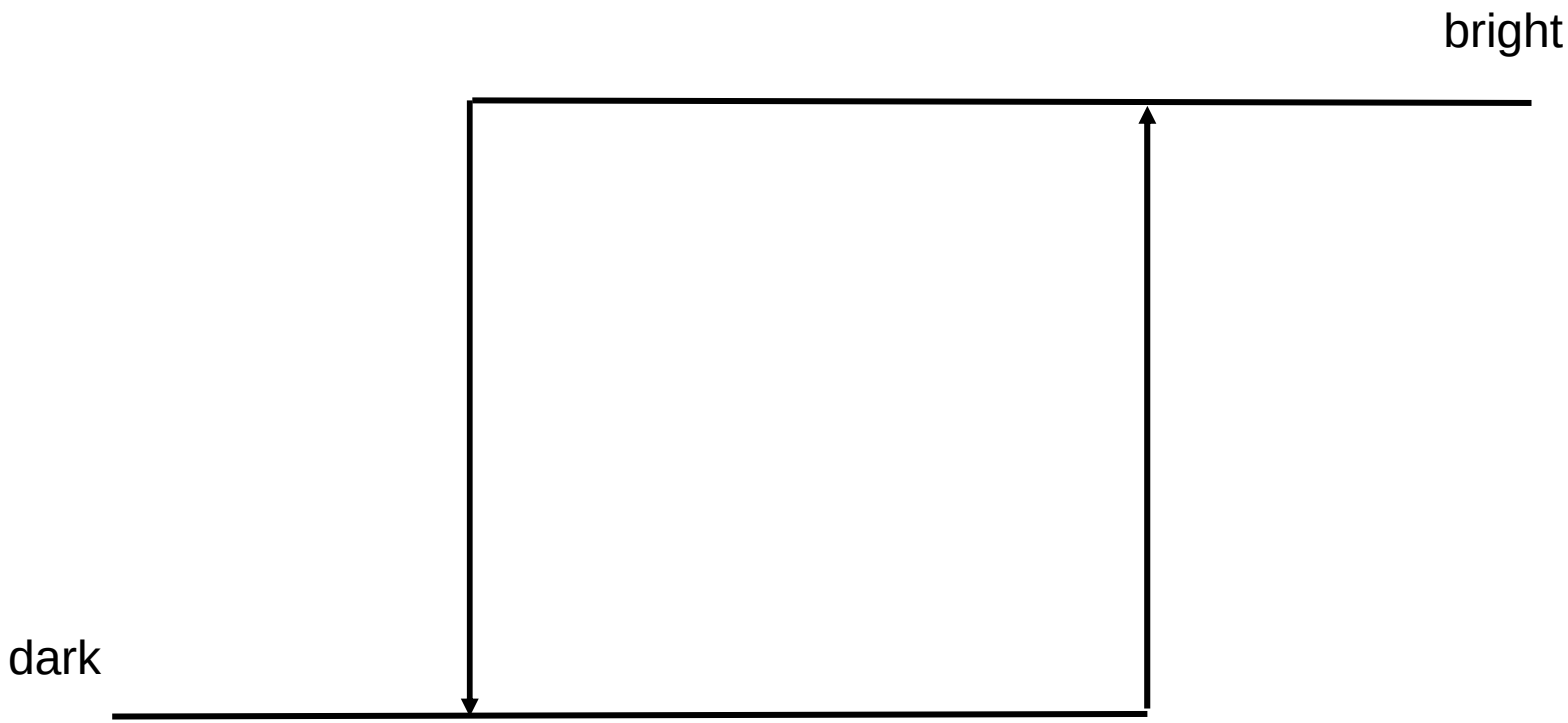
- When do you decide you are on white ground and when do you decide you are on the black line?
- You could have one threshold value in the middle
- It could be that you are not to happy with your reaction of your robot

Hysterese-procedure could be a solution.

Hysterese procedure

- Determine two threshold values, for example around 20% and around 80%. The light sensor can be in two states: „dark“ and „bright“.
- Is the light sensor in state „dark“ it has to go over the higher threshold in order to change into „bright“. The same is true for the other way around.
- So it is possible to filter small changes.

Hysterese procedure



How to detect edges?

```
//0 means dark and 1 means bright

if ((lightstatus==0) &&
        (sensorvalue>=thresholdbright)) lightstatus=1;

if ((lightstatus==1) &&
        (sensorvalue<=thresholddark)) lightstatus=0;
```