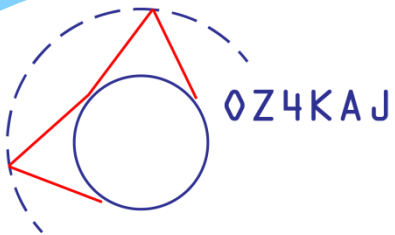




# Arduino Workshop 6

OZ7SKB 2018



# Plan for i aften

- \* Subrutiner  
Procedurer og funktioner
- \* Udvidet programstruktur
- \* Libraries  
Andres programudvidelser
- \* Displayes
  - \* Typer
  - \* Mere om TFT LCD



# Subrutiner

- \* Procedurer

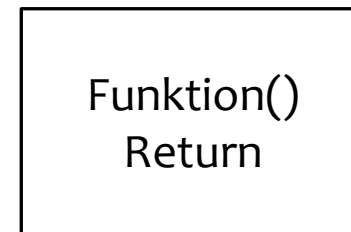
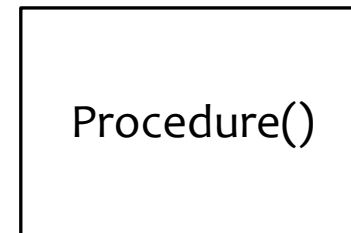
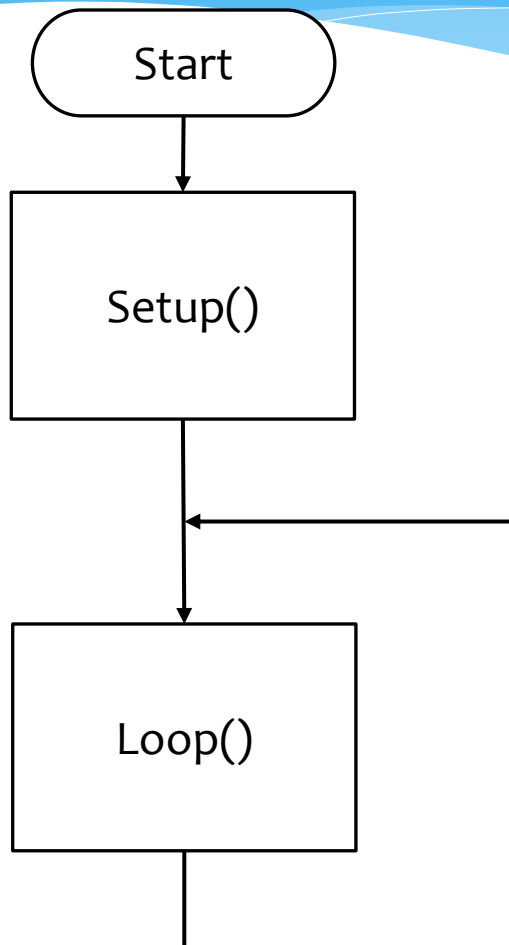
- \* Gentagne processer
- \* Giver en bedre struktureret og klarere programkode
- \* Defineres med `void displayBand(int band) { };`
  - \* Kaldes med `displayBand(80);`

- \* Funktioner

- \* "Beregninger", der returnerer et resultat
- \* Defineres med `int calcSum(int x, int y) {  
int sum;  
return sum; }`
  - \* Kaldes med `calcSum(int x, int y);`



# Programstruktur



# Subrutiner i et program

```
PAcontrol | Arduino 1.8.9
Fil Rediger Sketch Værktøjer Hjælp

PAcontrol
112 char* stationName = "Not set";
113 byte bandSelectType = 0;
114 char buf[5];
115 int portValue = 0; //Set-value to LP filter
116 char* transieverType = "None";
117
118 void setup() {
245
246 void loop() {
301
302 void dummy(char *txt) {
307
308 void analogMeter() {
422
423 void centerPrint(String txt, int vertical, byte size, int txtCol, int txtBack) {
436
437 void displayBand(int band) {
506
507 void displayTimedate() {
574
575 void errorLine(char *txt ,int colTxt, int colBack) {
581
582 byte FTdx2LPfilter(byte bandIn) {
627
628 void header() {
641
642 void plotNeedle() {
703
704 void plotLinear(char *label, int x, int y, int wy, int ay){
748
749 void plotPointer() {
750 // ****
```

# Libraries

## **Arduino standard libraries:**

C:\Program Files (x86)\Arduino\libraries

## **Brugeruploadeede libraries**

C:\Users\Kaj\Documents\Arduino\libraries



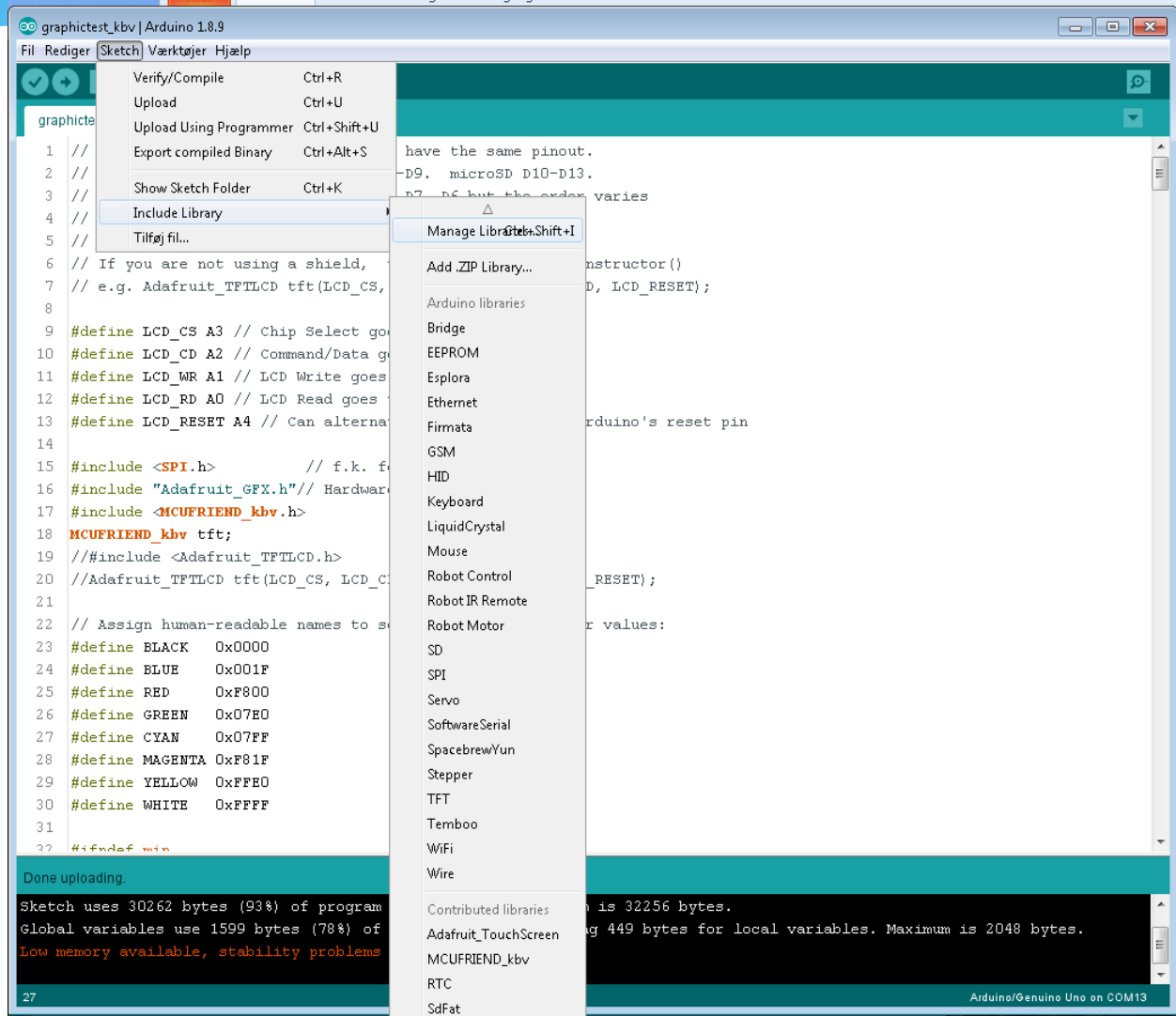
# Hente libraries

Der er to(tre) metoder:

- \* 1. Automatisk
  - \* Partnere m.fl. leverer
  - \* Library manager holder øje med opdateringer
- \* 2. Manuelt (næsten)
  - \* Dine egen downloadede Arduino .ZIP filer
  - \* F.eks. fra <https://github.com/fandonov/weatherstation>
- \* X. Helt manuelt frarådes!



# Hente libraries



The screenshot shows the Arduino IDE interface with the 'Include Library' menu open. The menu lists various libraries, including 'Arduino libraries' and 'Contributed libraries'. The 'MCUFRIEND\_kbv' library is highlighted in the list. The background shows a sketch with code for an LCD display, including pin definitions and color constants.

```
1 //
2 //
3 //
4 //
5 //
6 // If you are not using a shield,
7 // e.g. Adafruit_TFTLCD tft(LCD_CS,
8
9 #define LCD_CS A3 // Chip Select goes to digital pin A3
10 #define LCD_CD A2 // Command/Data goes to digital pin A2
11 #define LCD_WR A1 // LCD Write goes to digital pin A1
12 #define LCD_RD A0 // LCD Read goes to digital pin A0
13 #define LCD_RESET A4 // Can alternatively be a separate pin
14
15 #include <SPI.h> // f.k. for SPI
16 #include "Adafruit_GFX.h" // Hardware graphics interface
17 #include <MCUFRIEND_kbv.h>
18 MCUFRIEND_kbv tft;
19 //#include <Adafruit_TFTLCD.h>
20 //Adafruit_TFTLCD tft(LCD_CS, LCD_CD, LCD_RD, LCD_RESET);
21
22 // Assign human-readable names to some common pin numbers:
23 #define BLACK 0x0000
24 #define BLUE 0x001F
25 #define RED 0xF800
26 #define GREEN 0x07E0
27 #define CYAN 0x07FF
28 #define MAGENTA 0xF81F
29 #define YELLOW 0xFFE0
30 #define WHITE 0xFFFF
31
32 #ifndef min
```

Done uploading.

Sketch uses 30262 bytes (93%) of program memory, leaving 2273 bytes for variables. Global variables use 1599 bytes (78%) of program memory, leaving 449 bytes for local variables. Maximum is 2048 bytes.

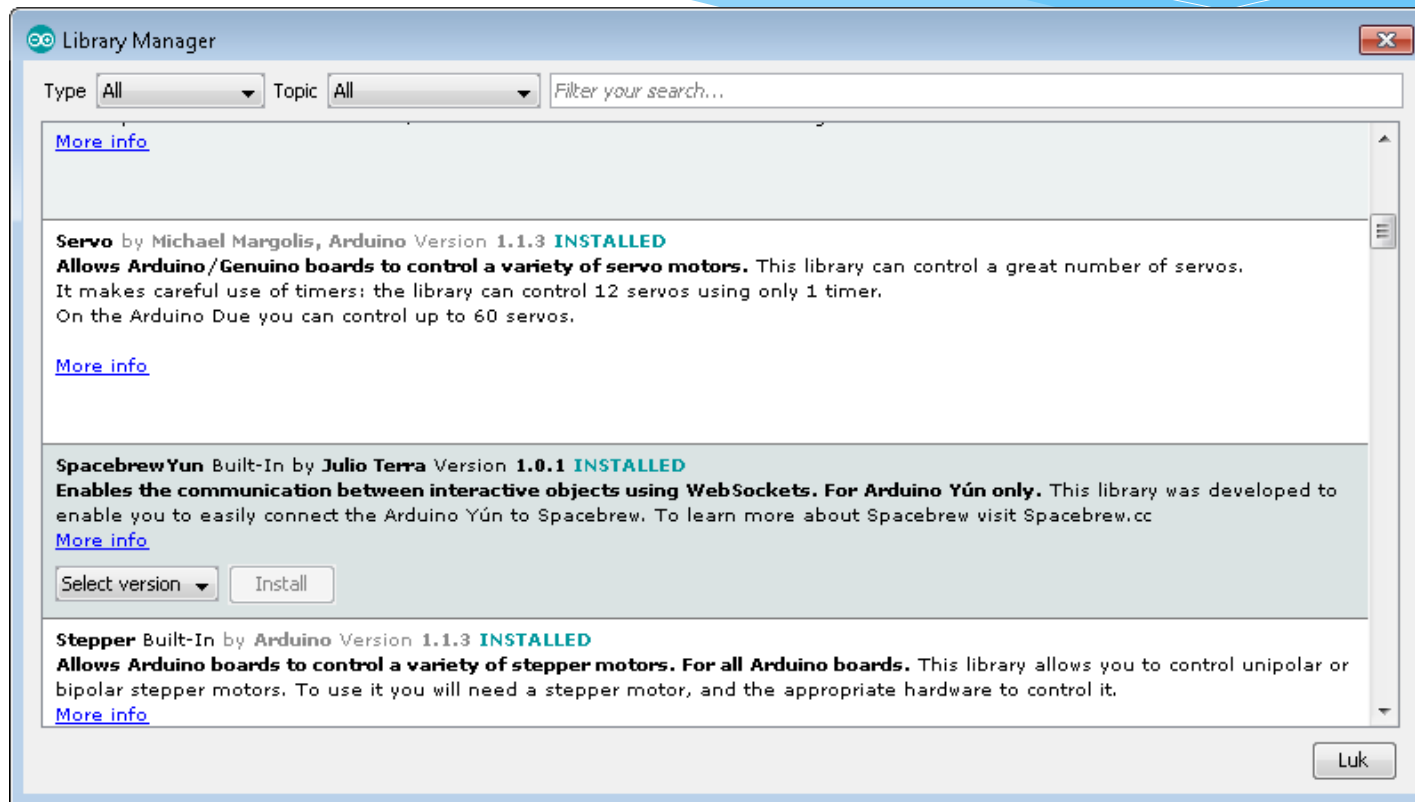
Low memory available, stability problems may occur.

Arduino/Genuino Uno on COM13

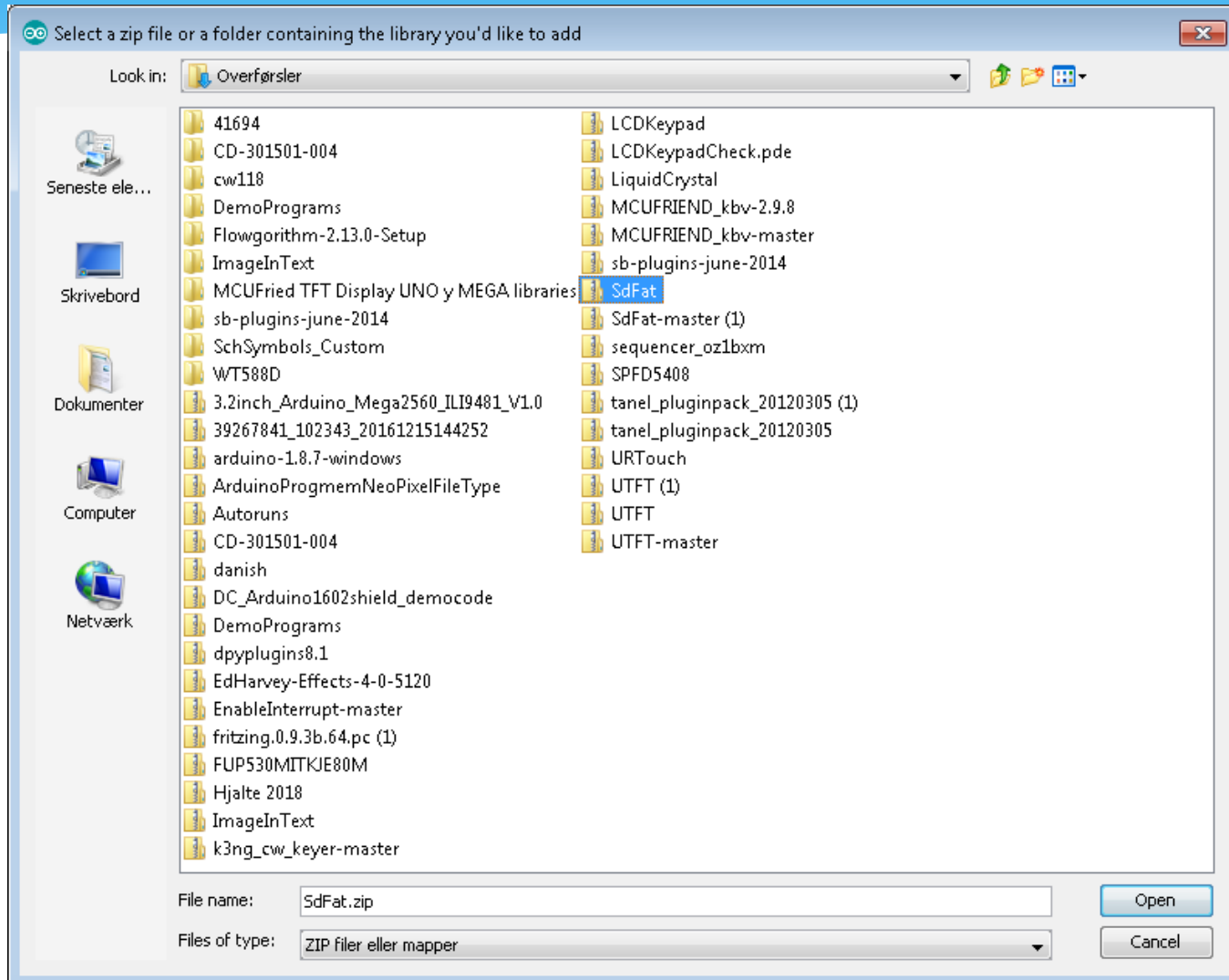




# Manage libraries




# Add .ZIP library














# GitHub

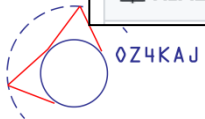
<https://github.com/fandonov/weatherstation>

Branch: master ▾ New pull request Find File Clone or download ▾

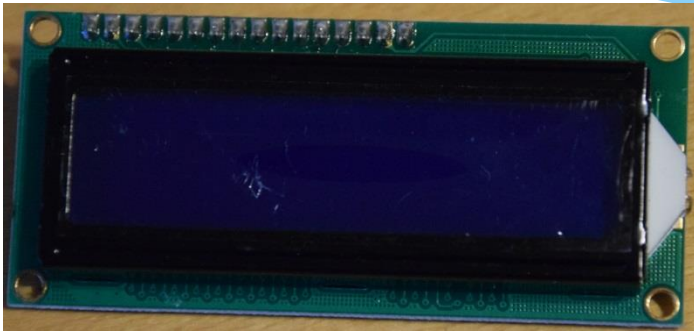
 demercel TODO fixed, source moved to dir Latest commit eb79e2f on 1 Oct 2017

 <a href="#">weather-station</a>	TODO fixed, source moved to dir	2 years ago
 <a href="#">IMG_2466-2.jpg</a>	Add files via upload	2 years ago
 <a href="#">LICENSE</a>	Initial commit	2 years ago
 <a href="#">README.md</a>	Update README.md	2 years ago
 <a href="#">REQUIREMENTS.txt</a>	Add files via upload	2 years ago
 <a href="#">TODO.txt</a>	TODO fixed, source moved to dir	2 years ago
 <a href="#">TODO.txt~</a>	TODO fixed, source moved to dir	2 years ago
 <a href="#">english_description.pdf</a>	wiring diagram	2 years ago
 <a href="#">weather-station.ino</a>	Changes in atmospheric pressure tendency calculation	2 years ago
 <a href="#">wiring.png</a>	wiring diagram	2 years ago

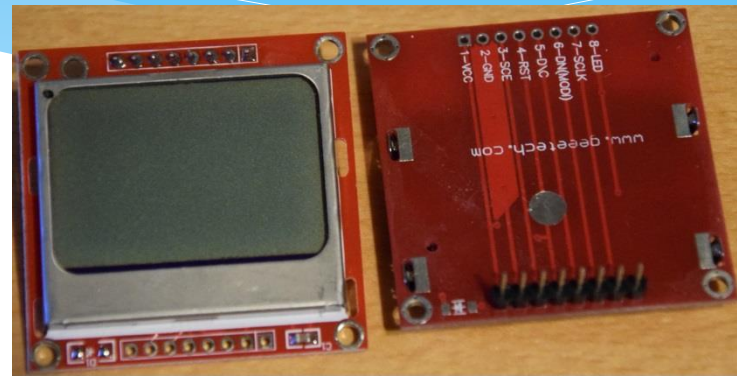
 [README.md](#)



# Displayes



Monokrom og linjeorienteret

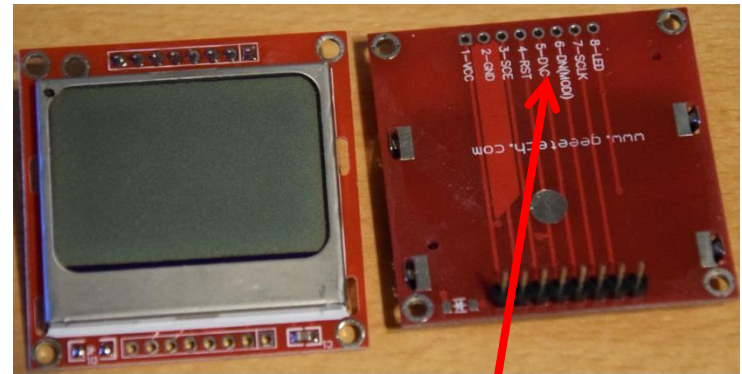
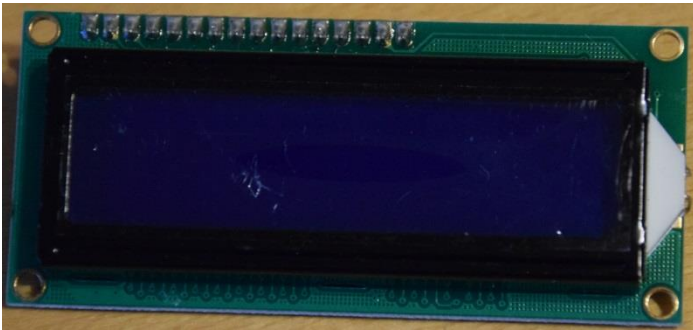


Monokrom og simpel grafik

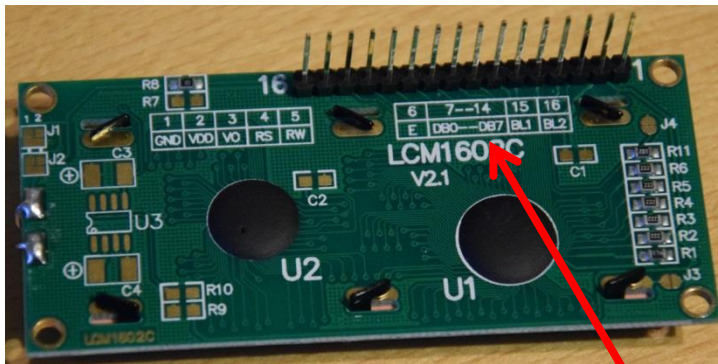


Farve og avanceret grafik  
Touch skærm mulig

# Displayes



Serial



8 bit parallel

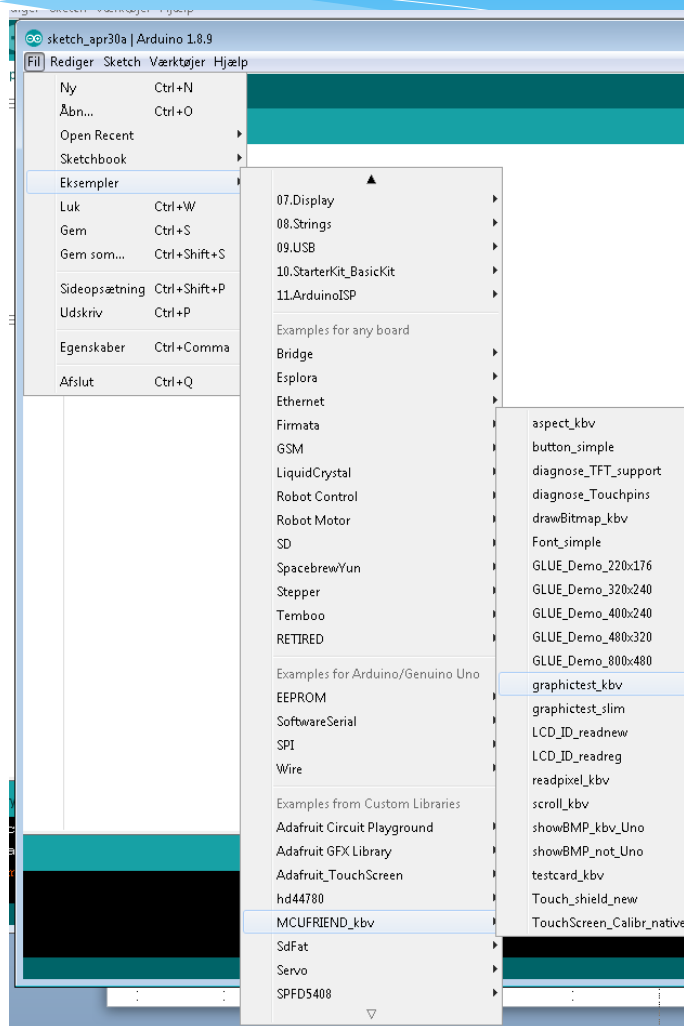


# Opgave

- \* Sæt en skærm i din Arduino
- \* Hent dette library fra USB nøglen:
  - \* MCUFRIEND\_kbv-2.9.8
- \* I Arduino under **Fil, Eksempler, MCUFRIEND\_kbv**
  - \* Indlæs **graphicstest\_kbv**
- \* Kompiler progreammet



# Opgave



# Programgennemgang

- \* Vi ser på programmet i fællesskab



Stop for i aften  
og  
tak for denne gang