In part one you will work with the microcontroller, the display and a variable resistor.

You get a list of tasks to accomplish that are designed to show how to build complex programs.

Part 1:

Please attach the variable resistor to the Arduino. Take care that the middle connection of the variable resistor is connected with the A2 input pin.

In the folder “prog\_complete” you find three programs. They are complete so you can download them to the Arduino.

* ecg\_sequence\_2:
  + shows the text 123 moving from the upper left to the bottom right. Please let it run until the text disappears on the right and becomes visible again.
* ecg\_sequence\_poti:
  + shows the actual voltage on the A2-pin, ranging from 0 to 1023, 10-bit resolution.
* Ecg\_sequence\_sinus:
  + Same as before, but now calculating the sin of the input

Please examine the programs and understand how they work, especially:

How to print text on the screen  
 How to set the cursor position  
 How to draw lines on the screen

Part 2:

In the folder prog\_with\_gaps you find a collection of programs that are not complete. In the main loop there are some instructions missing.

Find the missing instructions and make the programs running. In the description of the library SimpleILI9341.h you may find additional information about how the library is to be used.

Example: The main loop of the program ecg\_sequence\_sinus\_dynamic\_leer looks like:

void loop(void){  
 val=analogRead(ECG\_IN);  
 val\_rad=val;  
 val\_rad=val\_rad/100;  
 val\_display=120\*sin(val\_rad);  
 DrawBox(???, ???, ???, ???, ???);  
 delay(25);  
 posx++;  
 if(posx==320) posx=???;  
}

If you fill the question marks with the correct values you will see a sequence of little boxes forming a line on the screen depending of the value of the variable resistor.

The following programs are contained in the folder “prog\_with\_gaps”:

ecg\_sequence\_sinus\_dynamic\_leer  
ecg\_sequence\_sinus\_dynamic\_line\_leer  
ecg\_sequence\_sinus\_dynamic\_pixel\_leer  
ecg\_sequence\_sinus\_rotating\_arrow\_leer  
ecg\_sequence\_sinus\_rotating\_arrow\_numeric\_leer  
ecg\_sequence\_sinus\_rotating\_line\_leer  
ecg\_sequence\_sinus\_static\_line\_leer

If you need the already completed programs you can download a zip-file from: [www.quantum-abc.de/prog\_gaps\_filled.zip](http://www.quantum-abc.de/prog_gaps_filled.zip), but please try for yourself first.