

How to build a Loc camera with panning.

Document created 3-6-2020

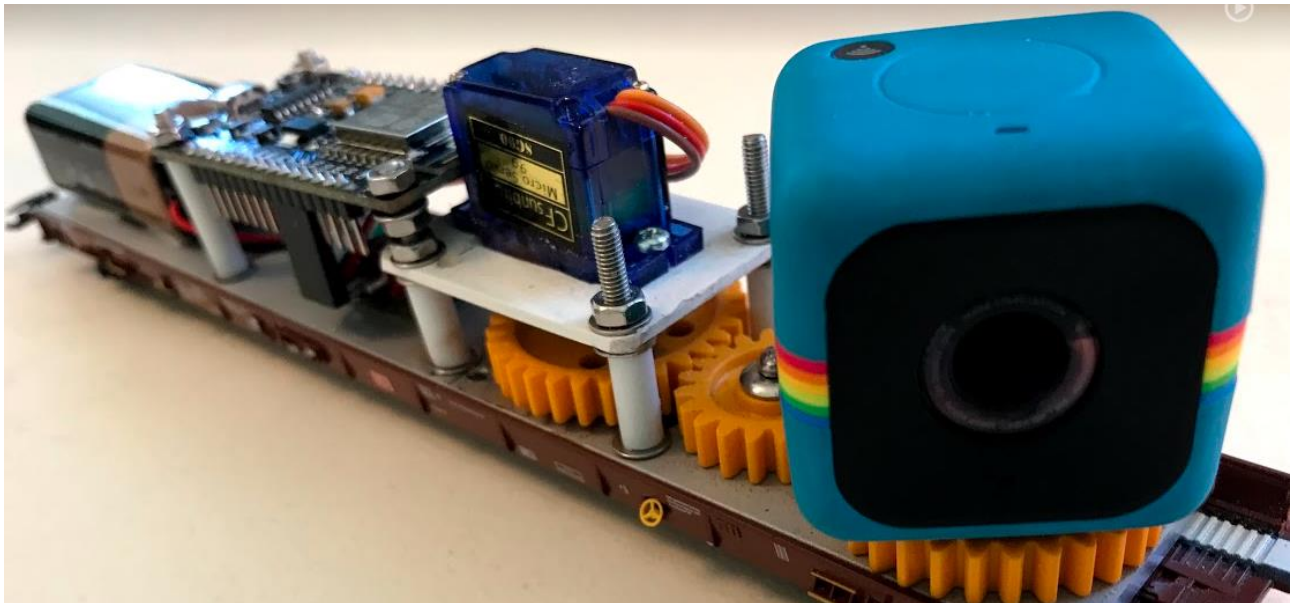
Rev A: 9-6-2020 – hardcoded WIFI credentials are replaced with log-on box.

Rev B: 19-6-2020 – code changes – and detailed setup and configurations for Blynk and ESP8266

Rev C: 21-11-2020 – code moved from this document to GitHub.

https://github.com/JensKrogsgaard/cameraWaggon/blob/main/Cube_Camera_Pan_V4.ino

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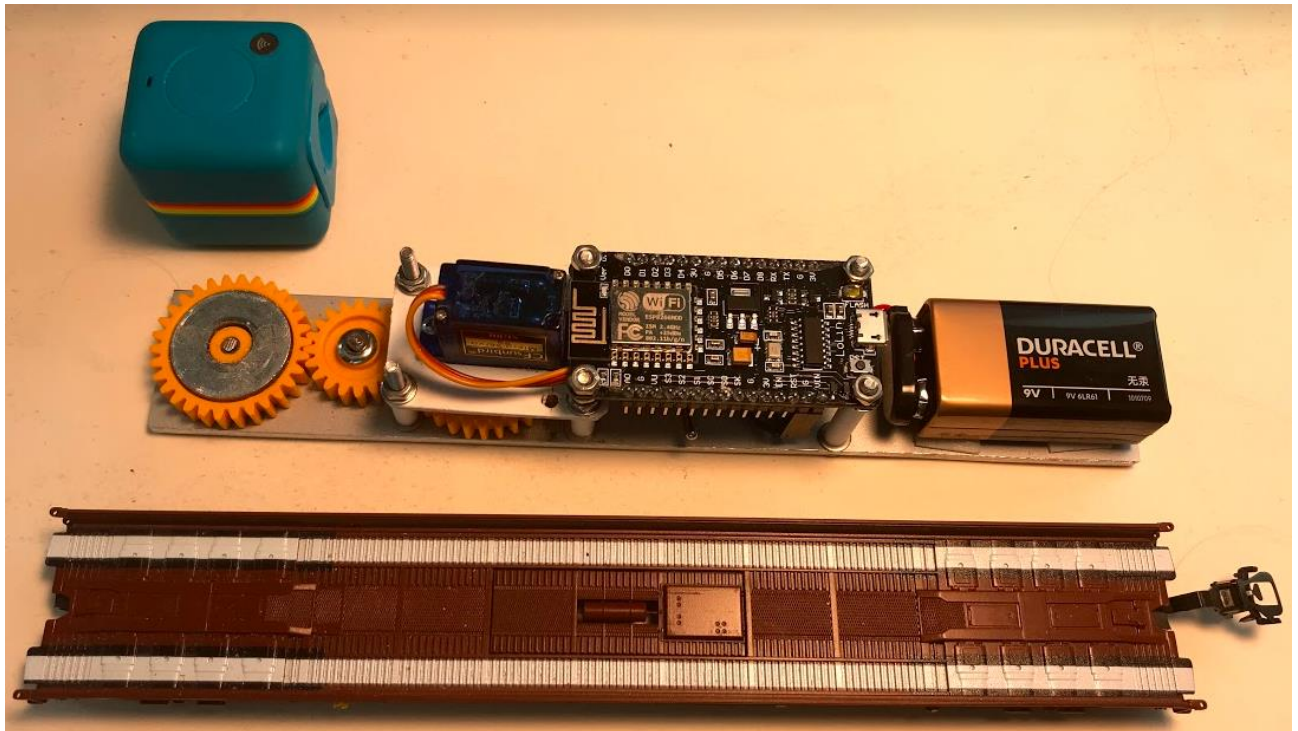


Content

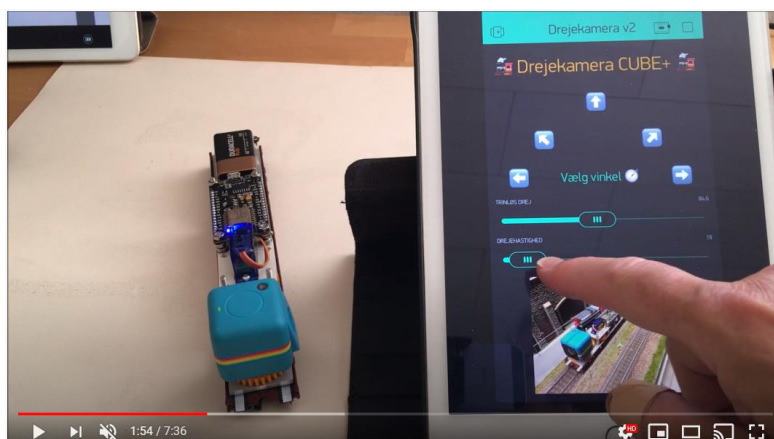
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1 Summary

This document contains a description of how I designed and programmed a camera wagon. The camera can pan and it is controlled by an ESP9266 Node MCU. To operate the camera, I have made an a Blynk app.



Check the YouTube video regarding this project: - click on the picture to start the video



1.1 Construction of the wagon

1.1.1 Bottom plate



Metal plate – 31 x 200 x 3 mm. The weight of the plate stabilizes the wagon when driving

Bought in Bauhaus and cut out.

The bottom plate is designed to match the wagon from Rollende Landstraße / Rolling Road

1.1.2 Gear

I have used 3 gear-wheels:

- wheel 31,5 mm
- 1 wheel 21,5 mm is used.

Bought at Conrad.de: <https://www.conrad.de/de/search.html?search=237663>

Shafts 4 mm – bought at bauhaus



Glue a metal disc onto the gear-wheel to carry the camera - check that it is magnetic

1.1.3 Servomotor

<https://www.elextra.dk/details/H34768/servomotor-mikro-3-72vdc-120ms-60-9g>

Servomotor, mikro - 3-7,2VDC, 120ms/60° (9g)



Produktnr. H34768

69,00 DKK inkl. moms

fra **17 kr.** / md **VABILL**
uden renter og gebyrer

55,20 DKK ekskl. moms

Lagerstatus **58 stk. på centrallager.**

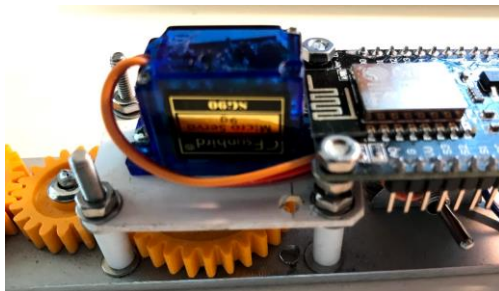
Bestil antal

1

Læg i
indkøbskurv

Selvhentergebyr (butik): Kr. 0,-
Forsendelse (GLS): Kr. 55,- inkl. moms.

[Klik her for tilbud ved min. 23 stk.](#)



The servo is mounted on a 31 x 44 x 2 mm plastic plate

The screws are 3 mm - from the Bauhaus. The bushings are plastic tubes.

1.1.4 ESP8266 – Node MCU

<https://www.conrad.de/de/p/joy-it-entwickler-platine-node-mcu-esp8266-wifi-1613301.html>

The screenshot shows the Conrad.de website interface. At the top, there is a search bar and a navigation menu. The main content area displays the product 'Joy-it Entwickler-Platine Node MCU ESP8266 WiFi Modul' with a 4-star rating and a price of 8,59 €. The product image is a black PCB with various components, including a USB port and a micro-USB port. To the right of the product image, there is a sidebar with additional information, including a 'Datenblatt' (datasheet) link and a 'Lieferung' (delivery) section. The bottom of the page shows a 'Menge' (quantity) selector with options for 1, 5, and 10 units.

1.1.5 Power supply

I have used a 9V battery - Here you might consider a different solution so you don't have to change the battery.

A toggle switch to disconnect battery power is also necessary.



1.1.6 Camera

Polaroid Cube+ - wifi.

Unfortunately, it does not appear to be available anymore



Polaroid Cube+ 1440p Mini Lifestyle Action Camera with Wi-Fi & Image Stabilization (Black)

by Polaroid

★★★★☆ 420 ratings | 143 answered questions

Available from these sellers.

Color: **Black**

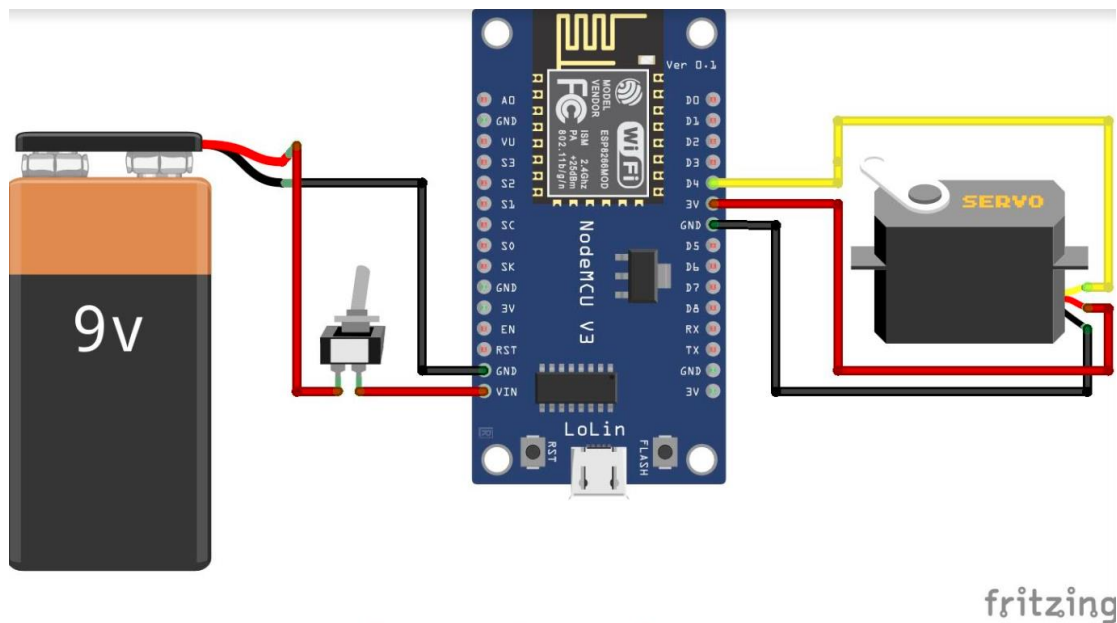
 1 option from \$251.88	 4 options from \$70.00	 2 options from \$119.02
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- World's Funnest, Cutest Lifestyle Action Camera in Light & Tiny Cubic Package
- NEW! Wi-Fi + FREE App; Shoot, View, Save, Print & Share with Your Mobile Device
- 8MP still images; Selectable 1440p / 1080p / 720p Video Rate; Full Image & Video Stabilization
- Built-In Rechargeable Battery for up to 107 Minutes of Continuous Recording Per Charge
- 124° Wide-Angle Lens; Magnetic/Clip Mounting Options; Includes MicroSD Card & Polaroid Bumper Case

There is a newer model of this item:

 Polaroid Cube+ Live Streaming 1440p Mini Lifestyle Action Camera with Wi-Fi & Image Stabilization (Black)
Currently unavailable

1.1.7 Connect Node CMU with servo and battery



The servo with its three wires is connected in this way:

- Yellow – signal – D4
- Red – 3v
- Black – Ground

The battery is connected to GND and VIN

1.2 BLYNK – app

Here there are two options:


- Import a copy of my Blynk app
- Make your own Blynk-app from scratch

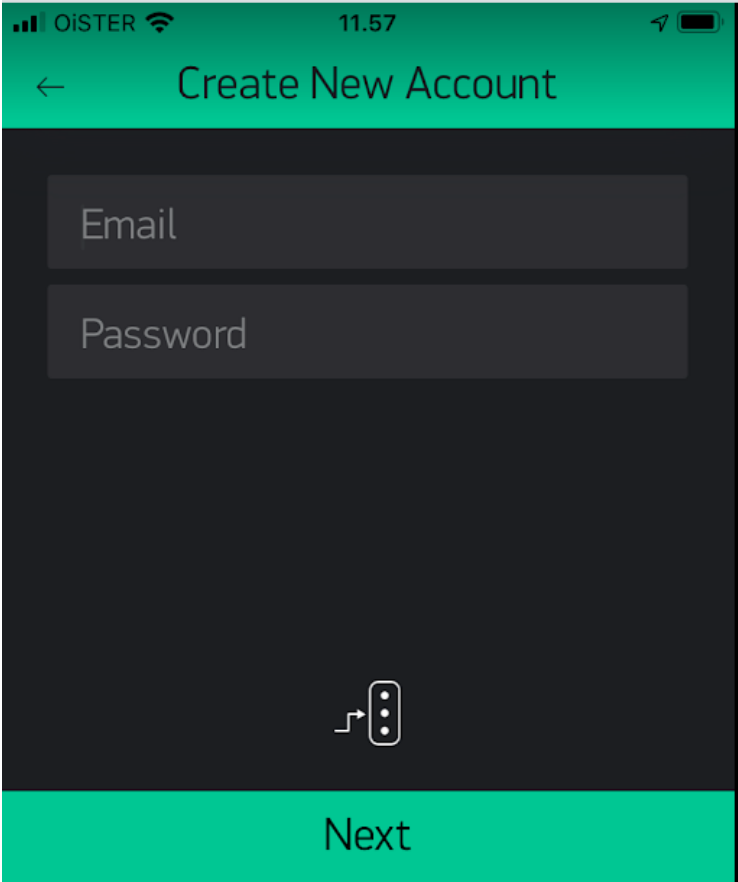
These two options are described in the next two chapters.

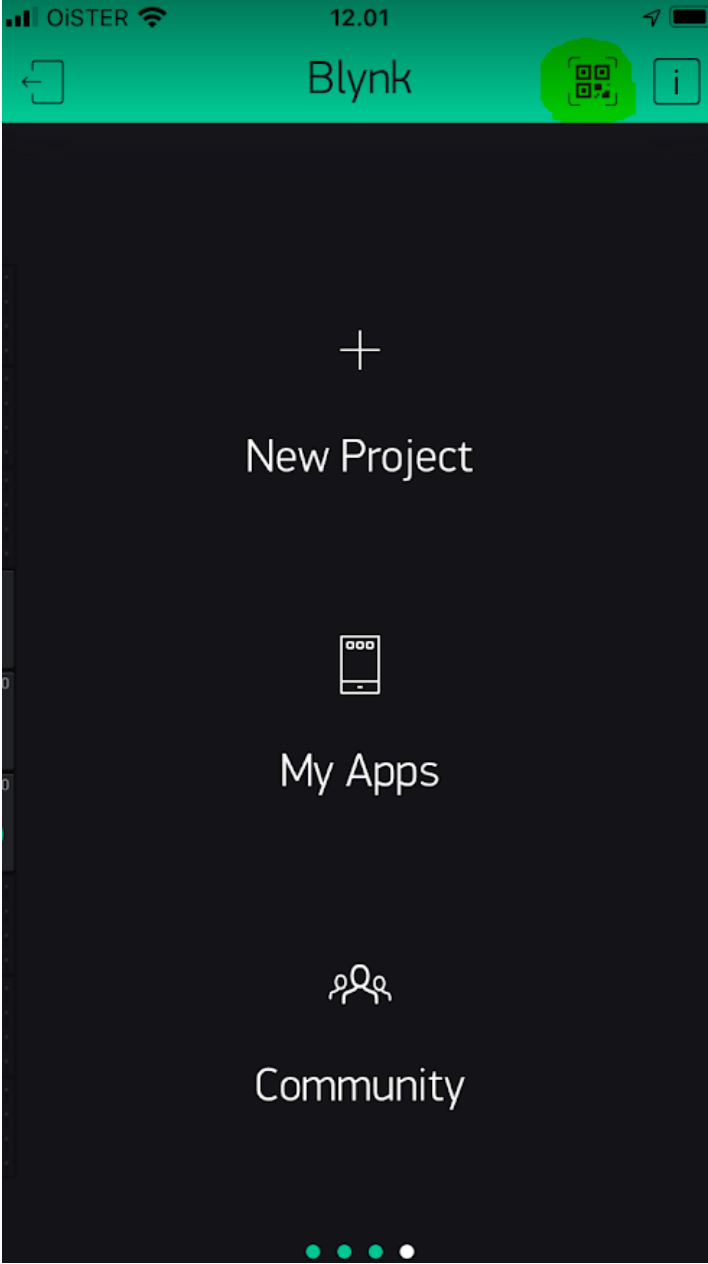
1.2.1 Import a copy of my Blynk app.


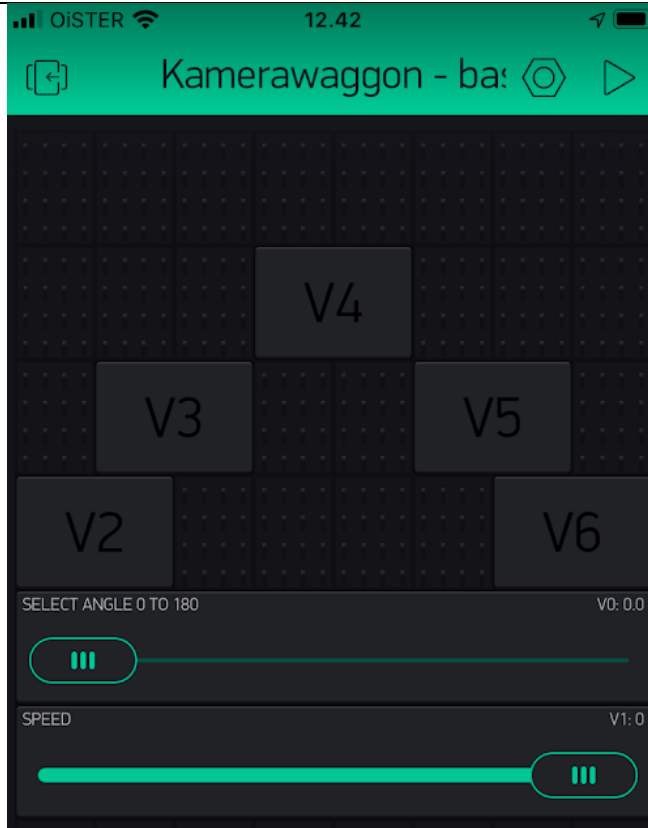
Follow the guide below step 1 to 5 to import a full functional copy of my app.

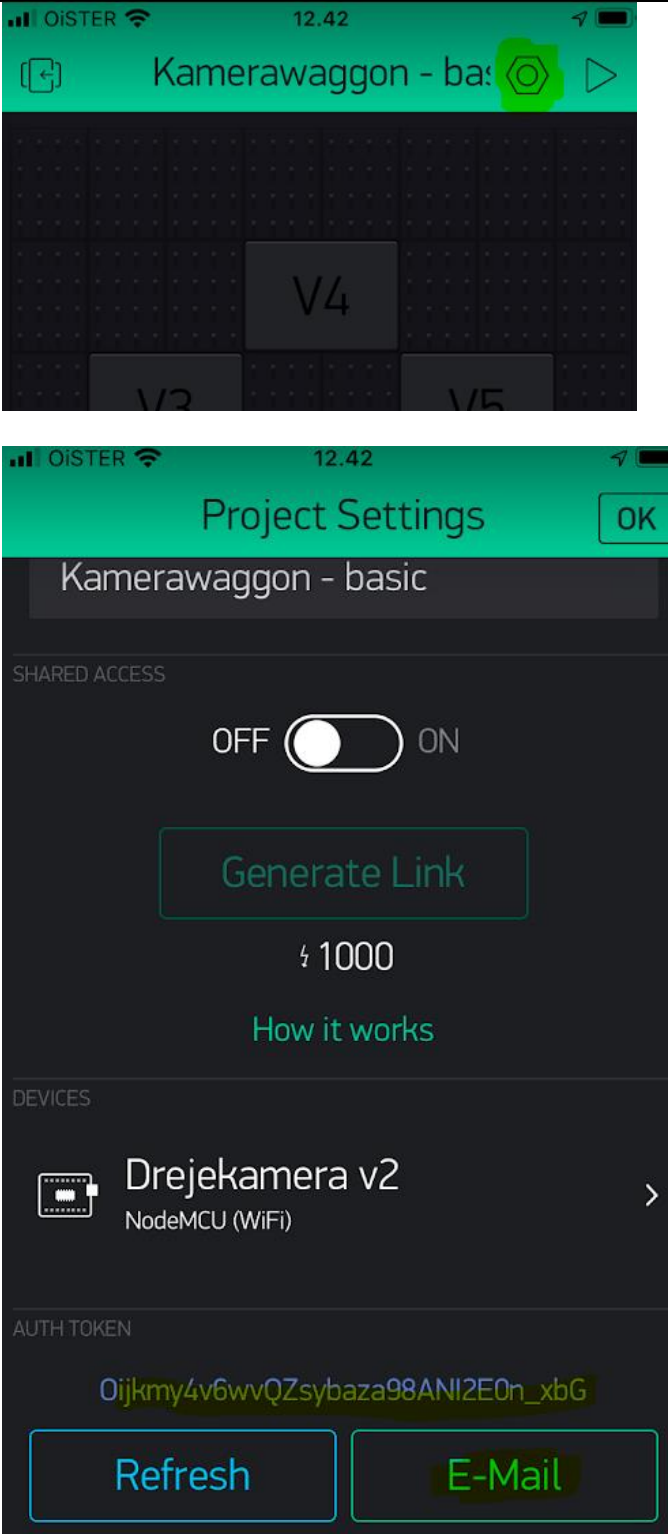
When you have imported my Blynk app – you can make all the changes to it that you want.

Step No	Description	Clip
1	Install Blynk – app on mobile	 <p>Install the App – it is free.</p>

Step No	Description	Clip
2	Create an account	

Step No	Description	Clip
3	Import project	 <p>Press the QR-Code – button – and scan this code</p>

Step No	Description	Clip
		
4	<p>Check the project.</p> <p>The project 'Kamerawaggon – basic' should now have been imported.</p> <p>This is the basic project with functionality to operate the servo.</p> <p>You kann change it – add extra texts – buttons and pictures. To do that you must buy more' Energy' – I have bought for 59 dk – it is 7-8 Euro.</p> <p>You can start with this basic app – and see how it works.</p>	
5	Get the Blynk Token	To get the Blynk-token – press this button

Step No	Description	Clip
		 <p>Now you can see your Token – it is NOT the same as shown on the picture above. Presse the E-mail-button – and your token will be email'ed to you.</p>

1.2.2 Make your own Blynk-app from scratch

Follow the guide below if you want to make your own Blynk app – and not a copy of my app. See previous chapter.

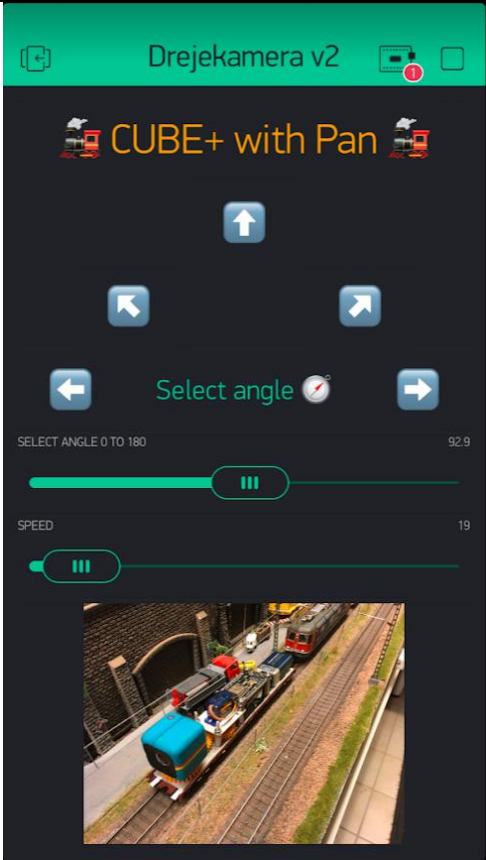
There are many videos on YouTube describing how to work with Blynk.

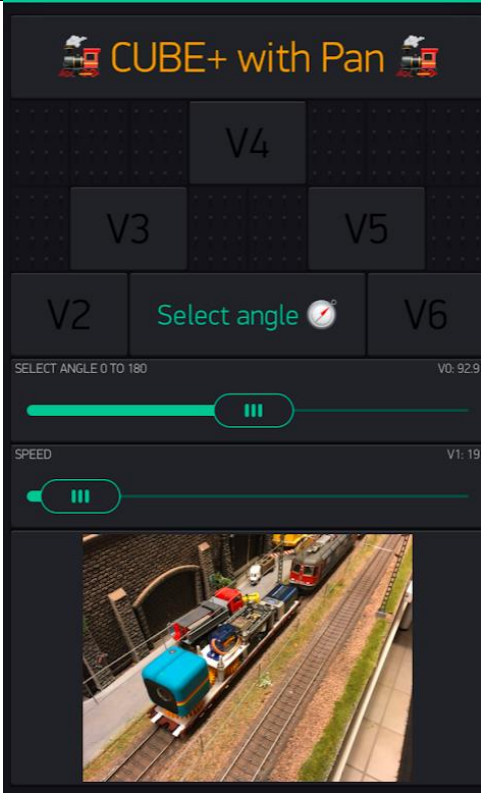
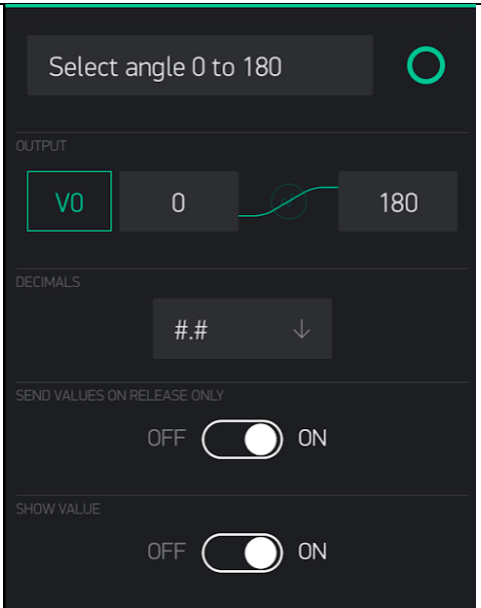
Take a look at this video: <https://www.youtube.com/watch?v=EYrEjC3QEew&t=8s>

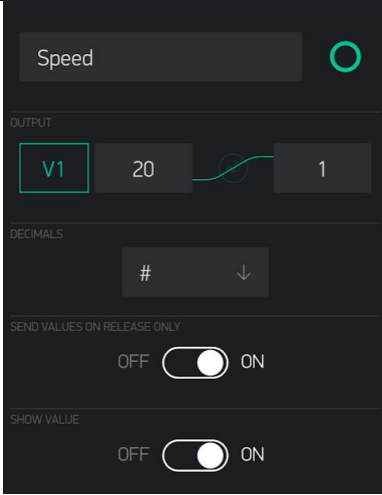
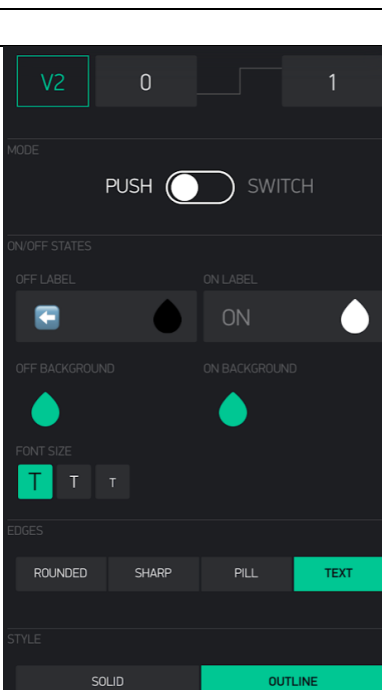
Install the Blynk app on your Mobile or iPad and follow the instructions in the video above.

Make sure to get the authorization code – you shall use it later.

Below a description of the Blynk app to control the Servo:

	<p>This is the finished application.</p> <p>There are 5 buttons with arrows and 2 horizontal sliders.</p> <p>The other elements are just texts and pictures - you can compose them as you like.</p>
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	<p>This is Design view.</p> <p>Each of the sliders and the angle-buttons have a virtual pin.</p> <ul style="list-style-type: none"> • V0 – select angle slider • V1 – speed slider • V2 – 0 degree • V3 – 45 degree • V4 – 90 degree • V5 – 135 degree • V6 – 180 degree
	<p>Detail for: The Select angle slider.</p> <p>The values are 0 to 180</p>

	<p>Detail for: The select speed slider</p> <p>NB: the values goes from 20 to 0</p> <p>The speed is implemented as an delay in milliseconds between each change of degree.</p> <p>Example – go from 45 to 90 degree.</p> <p>We loop from 45 to 90 – that is 45 steps. In each step we have a delay – if the value of the is small – for example 5 – then the speed is fast. If the delay is high – for example 18 – then the speed is slow</p>
	<p>Detail for: This is button 0 degree – V2.</p> <p>The other 4 buttons are identical – of course another pin (v3 – v4 – v5 – v6) and another label</p>


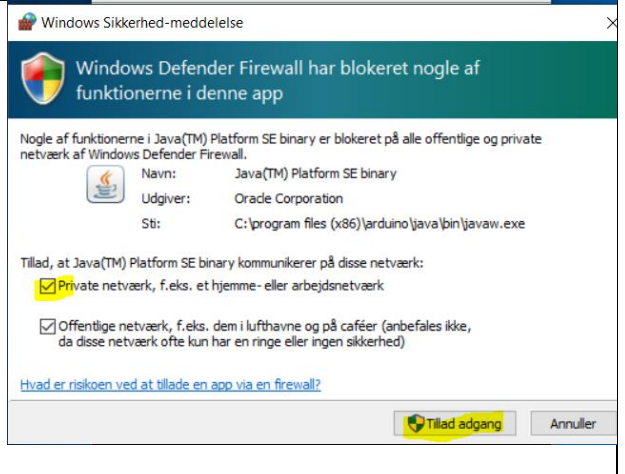
1.3 Coding the Node MCU – ESP8266


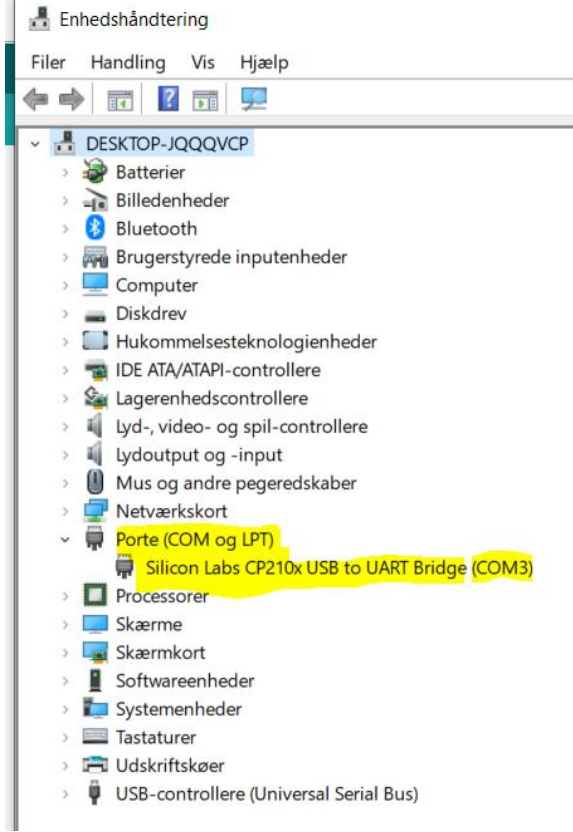
Coding of the Node MCU is done in the Arduino environment. First you must configure the Arduino IDE – and then compile the code and send it to the ESP8266.

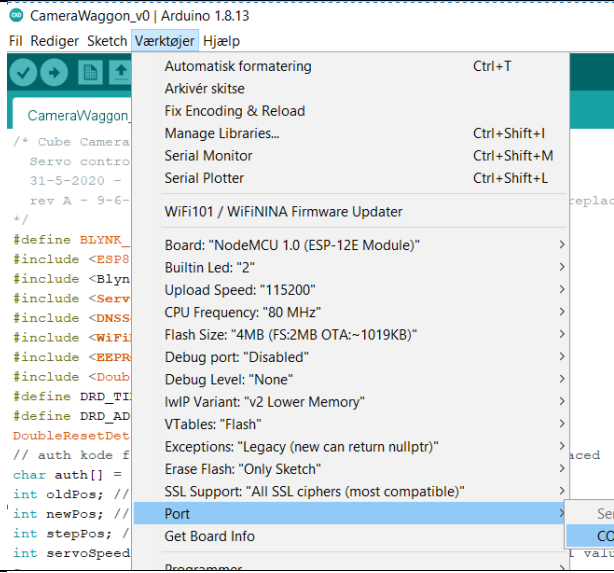
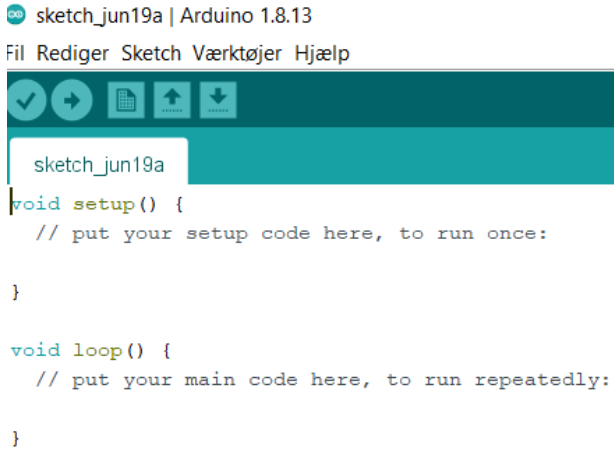
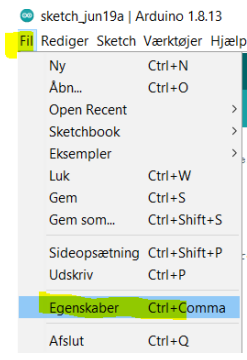
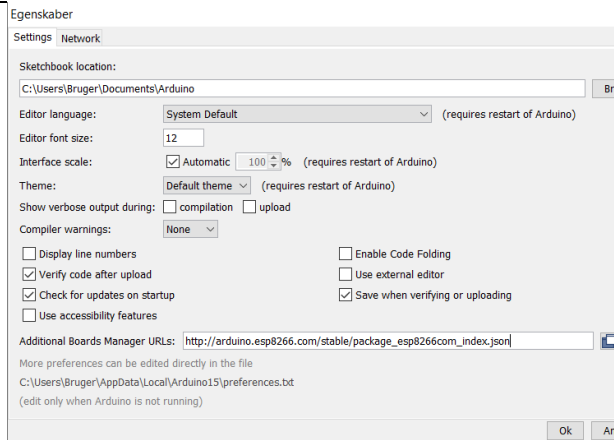
If you are new in Arduino coding you might want to have a look on this video:

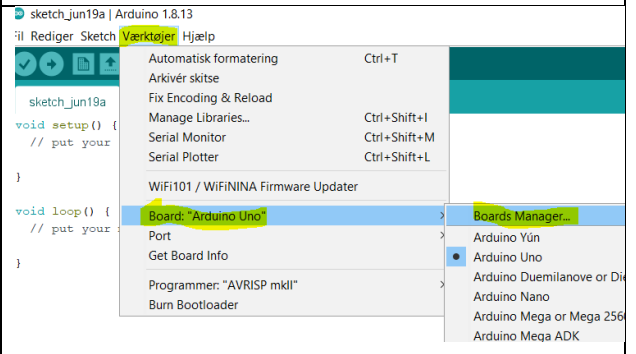
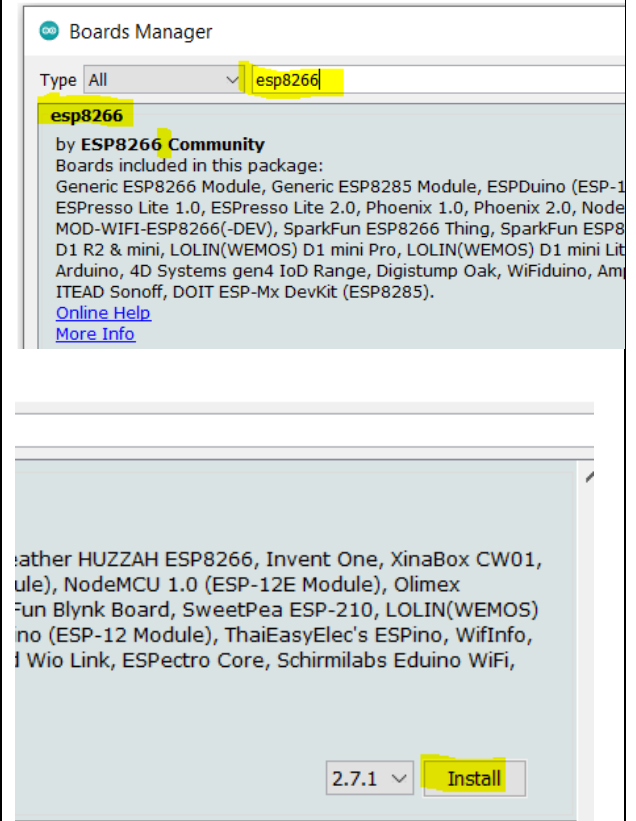
<https://www.youtube.com/watch?v=p06NNRq5NTU&t=331s>

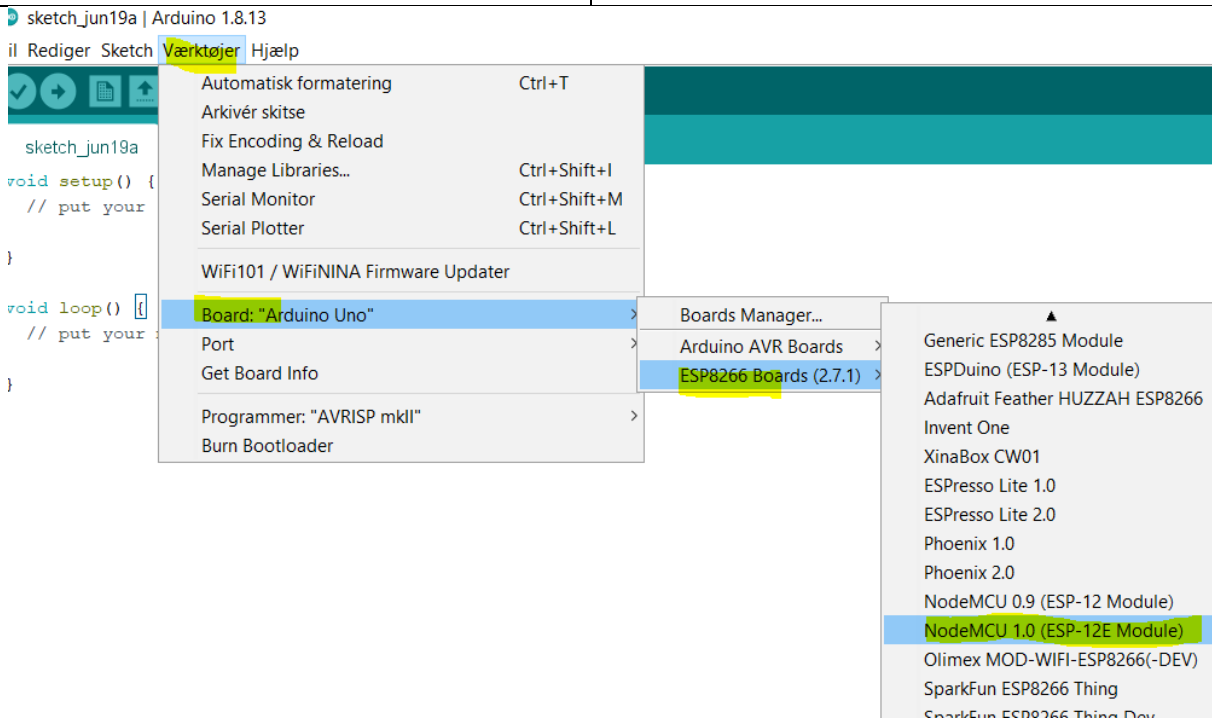
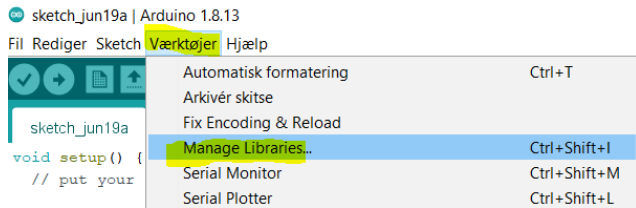
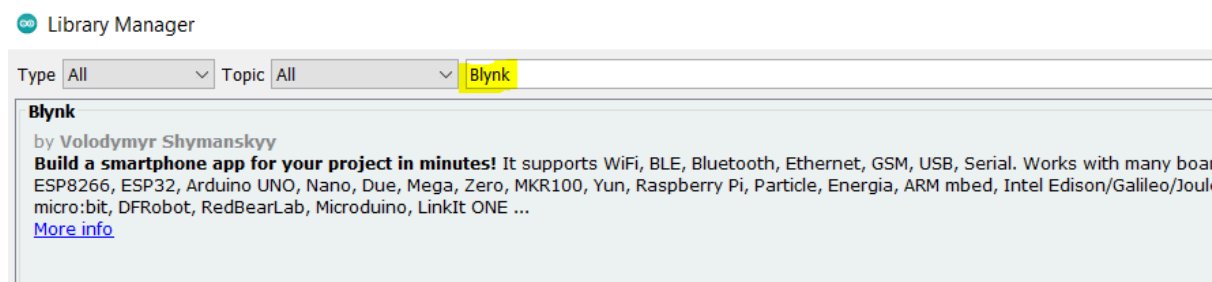
Follow the guide below to code the Node MCU – step 1 to 14.

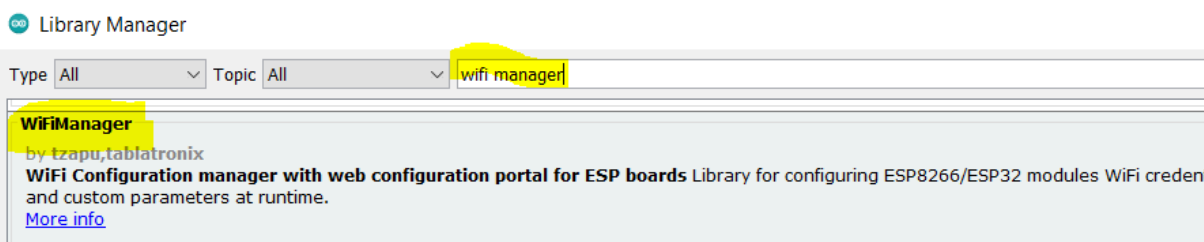
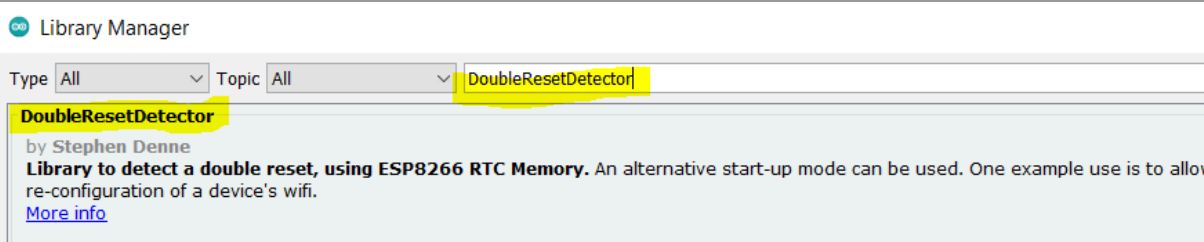

Step No	Description	Clip
1	Install Arduino https://www.arduino.cc/en/Main/Software	
2	Start Arduino IDE from the desktop icon	

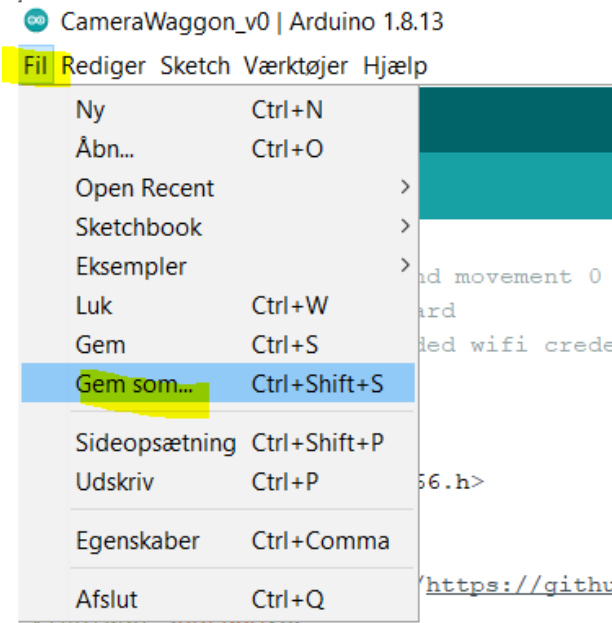
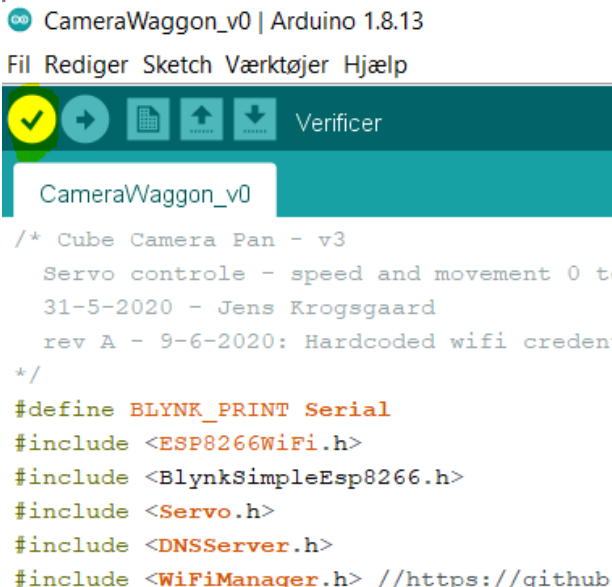
Step No	Description	Clip
3	Connect the ESP8266 to the PC with USB-cable	
4	Check com-port Open device manger – and check the com-port number. In this Example is et COM3	 <p>Now choose this port in Arduino:</p>

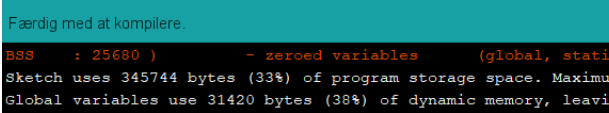
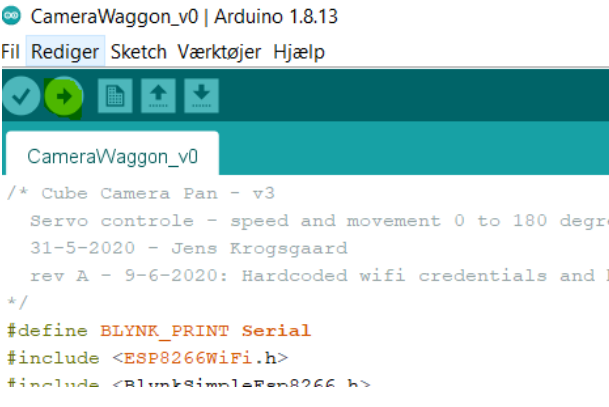
Step No	Description	Clip
		
5	Open Arduino IDE	
6	Install ESP8266 – board Choose File -> Properties –	  <p>Copy the URL for the line below to the "Additional boards Manager URL"</p> <p>http://arduino.esp8266.com/stable/package_esp8266com_index.json</p>

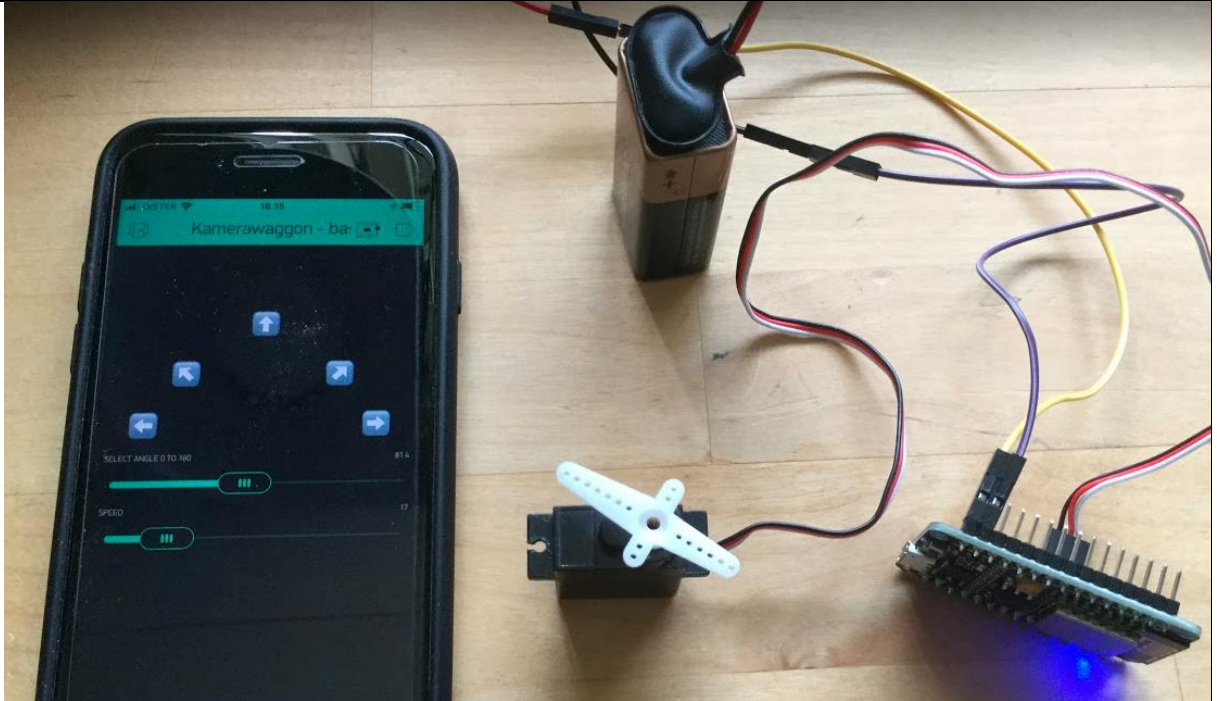
Step No	Description	Clip
7		 <p>In the Board manager- search for esp8266 – now you should see esp8266 – as below</p>  <p>Now – hit the Install button</p>
8	Choose the NodeMCU 1.0 board – as shown below	

Step No	Description	Clip
	 <p>sketch_jun19a Arduino 1.8.13</p> <p>File Rediger Sketch Værktøjer Hjælp</p> <p>Automatisk formatering Ctrl+T</p> <p>Arkivér skitse</p> <p>Fix Encoding & Reload</p> <p>Manage Libraries... Ctrl+Shift+I</p> <p>Serial Monitor Ctrl+Shift+M</p> <p>Serial Plotter Ctrl+Shift+L</p> <p>WiFi101 / WiFinINA Firmware Updater</p> <p>Board: "Arduino Uno"</p> <p>Port</p> <p>Get Board Info</p> <p>Programmer: "AVRISP mkII"</p> <p>Burn Bootloader</p> <p>Boards Manager...</p> <p>Arduino AVR Boards</p> <p>ESP8266 Boards (2.7.1)</p> <p>Generic ESP8285 Module</p> <p>ESPduino (ESP-13 Module)</p> <p>Adafruit Feather HUZZAH ESP8266</p> <p>Invent One</p> <p>XinaBox CW01</p> <p>ESPRESSO Lite 1.0</p> <p>ESPRESSO Lite 2.0</p> <p>Phoenix 1.0</p> <p>Phoenix 2.0</p> <p>NodeMCU 0.9 (ESP-12 Module)</p> <p>NodeMCU 1.0 (ESP-12E Module)</p> <p>Olimex MOD-WIFI-ESP8266(-DEV)</p> <p>SparkFun ESP8266 Thing</p> <p>SparkFun ESP8266 Thing Dev</p>	
9	<p>Add extra Libraries</p> <p>Go to this menu</p>  <p>sketch_jun19a Arduino 1.8.13</p> <p>File Rediger Sketch Værktøjer Hjælp</p> <p>Automatisk formatering Ctrl+T</p> <p>Arkivér skitse</p> <p>Fix Encoding & Reload</p> <p>Manage Libraries... Ctrl+Shift+I</p> <p>Serial Monitor Ctrl+Shift+M</p> <p>Serial Plotter Ctrl+Shift+L</p> <p>Now you must add 3 Library's – choose the last version – and install them</p> <p>The 3 library's is listed below:</p> <p>Find Blynk library – and install it</p>  <p>Library Manager</p> <p>Type All Topic All Blynk</p> <p>Blynk</p> <p>by Volodymyr Shymanskyi</p> <p>Build a smartphone app for your project in minutes! It supports WiFi, BLE, Bluetooth, Ethernet, GSM, USB, Serial. Works with many boards: ESP8266, ESP32, Arduino UNO, Nano, Due, Mega, Zero, MKR100, Yun, Raspberry Pi, Particle, Energia, ARM mbed, Intel Edison/Galileo/Joule micro:bit, DFRobot, RedBearLab, Microduino, LinkIt ONE ...</p> <p>More info</p> <p>Find WiFiManager library – and install it:</p>	

Step No	Description	Clip
	 <p>Find DoubleResetDetector library – and install it</p> 	
10	Remove existing code – and paste in the code	<p>When you start Arduino – there are some line with codes – remove these lines</p>  <p>Now copy and paste in the code-lines rom GitHub. (see row below)</p> <p>Save the projects</p>

Step No	Description	Clip
		 <p>Choose a destination and name for the project</p>
11	Copy in the Blynk-Token	<p>In the Blynk installation – step 3 – you emailed the Blynk token. Now find this token and paste it into the code:</p> <p>That is – replace the yellow-marked text in the code above with your Blynk token.</p> <p>When you have done it save the project.</p>
12	Compile the project	<p>Press the Check/compile button</p> 

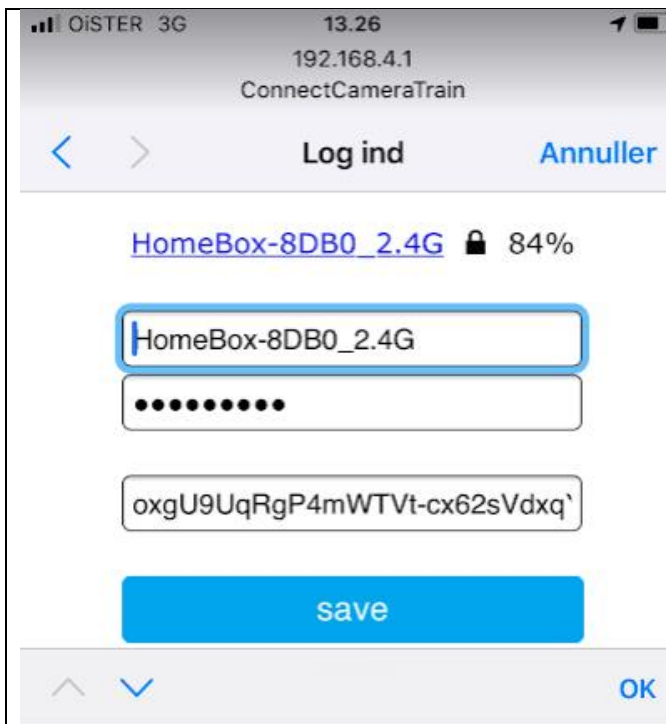
Step No	Description	Clip
		<p>If everything is OK- in the bottom of the screen you will now see this message:</p>  <p>This is Danish – in English it must be Finish compiling..</p> <p>If there are errors they will belistet and you must correct them.</p>
13	Send the code to the ESP8266	 <p>If everything is OK – you will see this message in the bottom of the screen</p> 
14	Test – test – test	

Step No	Description	Clip
	 <p>If there problems connecting the Blynk app to the ESP8266 then take a look at the rest of this chapter.</p>	

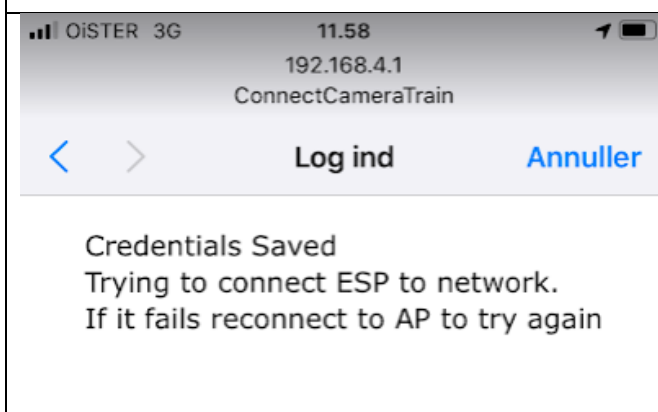
Follow this procedure to connect the Camera Train to your wifi-network – if it not connected automatically:

- 1 – Find your Blynk token – from mail or in the Blynk app. Copy this token to the clipboard
- 2 – Turn on the camera-train with the switch button.
- 3 – On your Mobile/Ipad or PC – find the hotspot 'ConnectCameraTrain – and choose this hotspot. See Examples below

	<p>Choose the hotspot ConnectCamaraTrain</p>
	<p>Choose the first button – ‘Configure WiFi</p>
	<p>Choose your WiFi network and type in the password.</p> <p>The next field is for the Blynk Token (see previous chapter).</p> <p>Paste in this token here.</p>



Click Save.



If everything is Ok – you should now see this message (picture to the left) And there must be a blue-light on the ESP8266 – as shown below.

