This guide is for explaining step by step how to set up the network.
- **based on FUMO project.**

Once per robot:
1. Connect the two USB dongles to the laptop(only one if endpoint).
2. Open a terminal and run sudo gedit /etc/udev/rules.d/70-persistent-net.rules . Locate the device where "ATTR{address}" equals the MAC address printed on the dongle you want for the left link. Make sure that the "NAME" equals "wlan2". Assign "wlan3" for that of the right link. If any "NAME" was changed make sure there are no conflicts with other devices names. Save the file.

Access Point setup (all robots except right endpoint)
1. Run sudo apt-get install hostapd
2. Run sudo gedit /etc/hostapd/hostapd.conf and put the following:
interface=wlan3
driver=nl80211
ssid=base   %base for one network
hw_mode=g
channel=1
wpa=1
wpa_passphrase=risifrutti   %Or anything that you'd like
wpa_key_mgmt=WPA-PSK
wpa_pairwise=TKIP CCMP
wpa_ptk_rekey=600

3. Read and act according to the comments but REMOVE the comments above before saving the file.
4. Run sudo gedit /etc/NetworkManager/NetworkManager.conf and add the following:
[keyfile] unmanaged-devices=mac:e4:f4:c6:4f:f4:92   %This should be the mac address of the interface used for AP, "wlan3".
5. Again, remove the comment before saving file.

WIFI client configuration (all robots except left endpoint)
1. In the Network Manager(top right of screen), choose "Edit Connections..."

2. Click "Add" and select "Wi-Fi"

3. For "SSID" enter the ssid base

4. For "Device MAC address" select "wlan2".

5. Under the "General" tab make sure that it connects automatically 6. Under the "Wi-Fi Security" tab, select "WPA and WPA2 Personal" and give "risifrutti" for password or whatever you chose.

7. Go to the "IPv4 Settings" tab and set "Method" to "Manual".

8. Click "Add" and give for "Address" 192.168.id.2 where id is robotnumber and for "Netmask" 255.255.255.0 , save and close.

At every system start

1. Make sure laptop is restarted since previous steps

2. Run sudo hostapd /etc/hostapd/hostapd.conf for Access Point.

3. Run sudo ifconfig wlan3 192.168.2.1/24 for AP.

When nl80211 driver bug - walkaround

1. Open terminal

2. Run sudo nmcli nm wifi off

3. Run sudo rfkill unblock wlan

4. Run sudo service hostapd stop

5. Run sudo hostapd /etc/hostapd/hostapd.conf