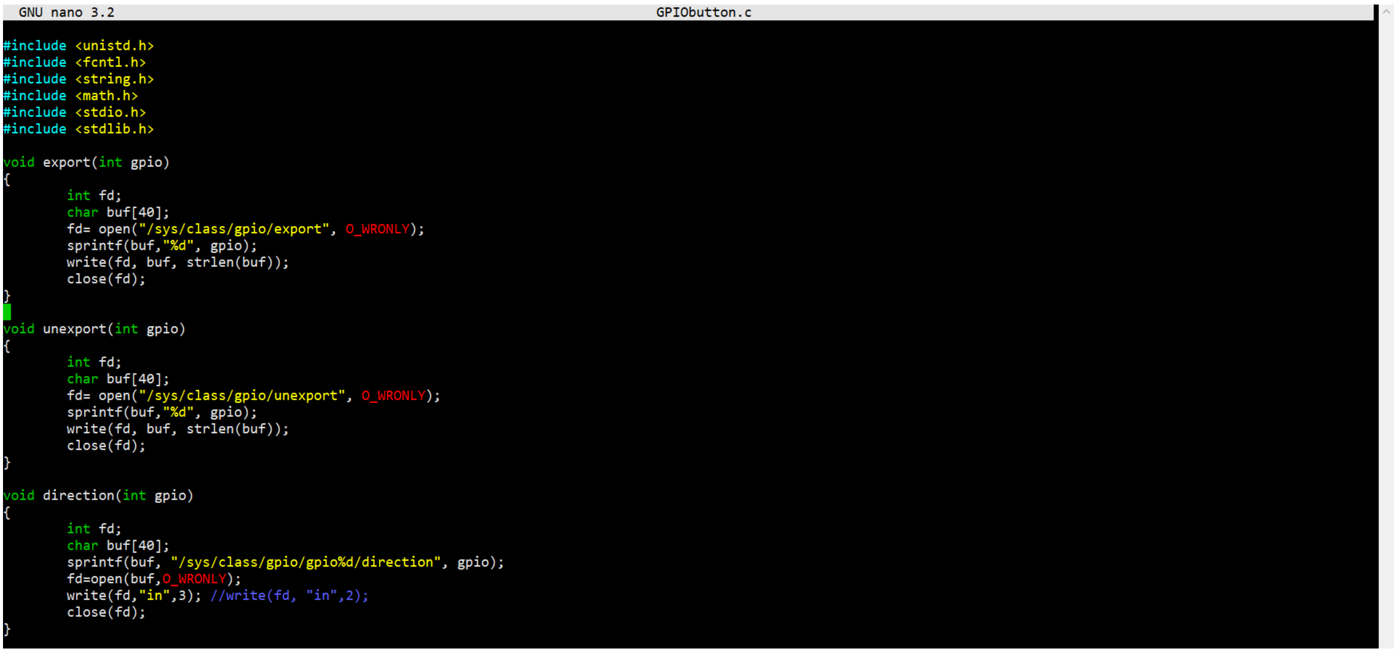
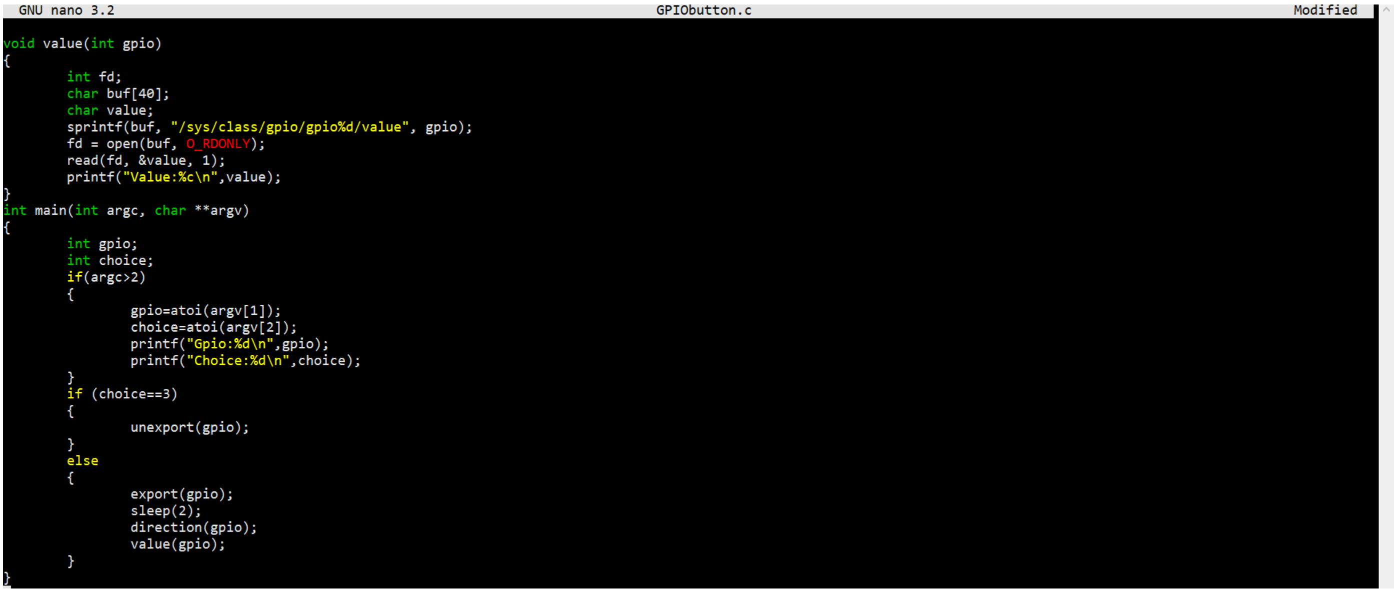
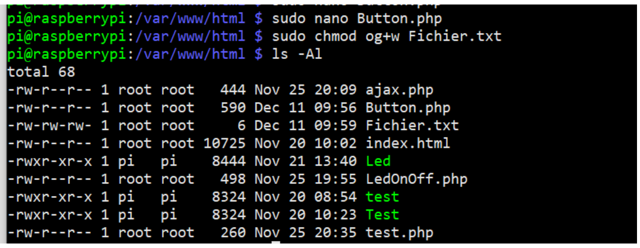
Here the code concerning the Raspberry part of the project:



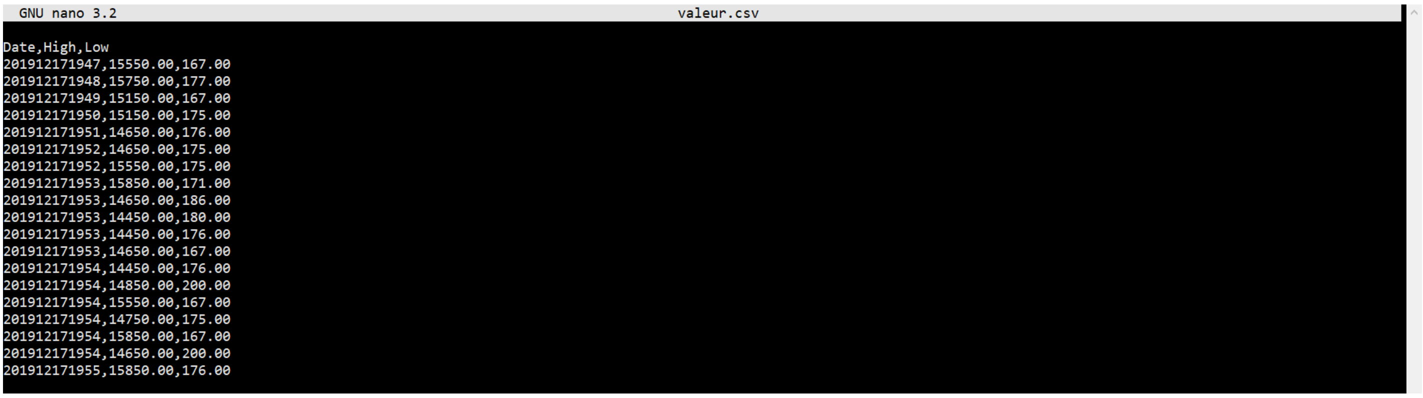
```
#include <unistd.h>
#include <fcntl.h>
#include <string.h>
#include <math.h>
#include <stdio.h>
#include <stdlib.h>

void export(int gpio)
{
        int fd;
        char buf[40];
        fd= open("/sys/class/gpio/export", O_WRONLY);
        sprintf(buf,"%d", gpio);
        write(fd, buf, strlen(buf));
        close(fd);
}

void unexport(int gpio)
{
        int fd;
        char buf[40];
        fd= open("/sys/class/gpio/unexport", O_WRONLY);
        sprintf(buf,"%d", gpio);
        write(fd, buf, strlen(buf));
        close(fd);
}

void direction(int gpio)
{
        int fd;
        char buf[40];
        sprintf(buf, "/sys/class/gpio/gpio%d/direction", gpio);
        fd=open(buf,O_WRONLY);
        write(fd,"in",3); //write(fd, "in",2);
        close(fd);
}
```



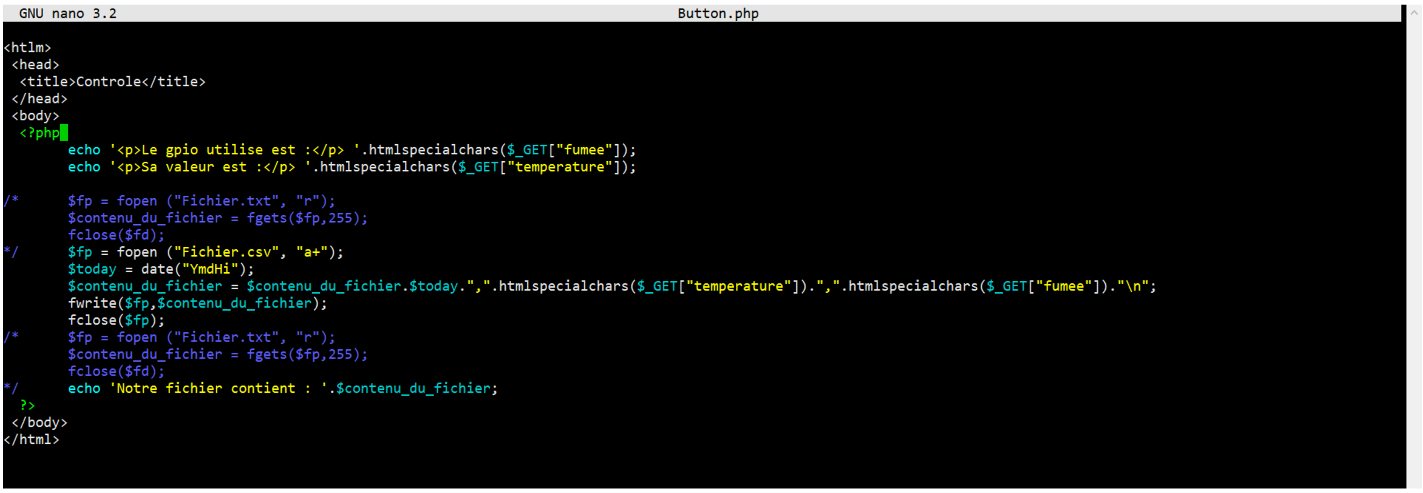
```
void value(int gpio)
{
        int fd;
        char buf[40];
        char value;
        sprintf(buf, "/sys/class/gpio/gpio%d/value", gpio);
        fd = open(buf, O_RDONLY);
        read(fd, &value, 1);
        printf("Value:%c\n",value);
}
int main(int argc, char **argv)
{
        int gpio;
        int choice;
        if(argc>2)
        {
                gpio=atoi(argv[1]);
                choice=atoi(argv[2]);
                printf("Gpio:%d\n",gpio);
                printf("Choice:%d\n",choice);
        }
        if (choice==3)
        {
                unexport(gpio);
        }
        else
        {
                export(gpio);
                sleep(2);
                direction(gpio);
                value(gpio);
        }
}
```



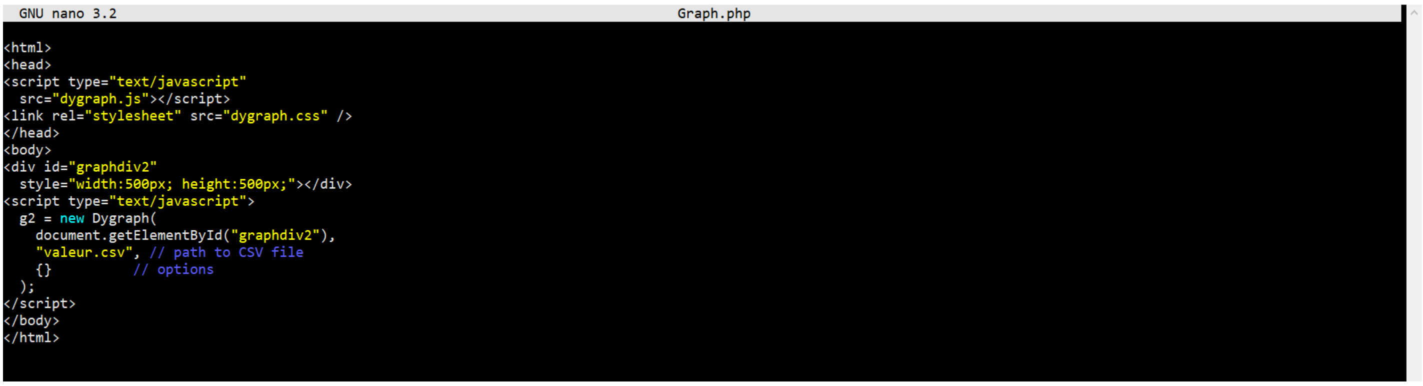
```
pi@raspberrypi:/var/www/html $ sudo nano Button.php
pi@raspberrypi:/var/www/html $ sudo chmod og+w Fichier.txt
pi@raspberrypi:/var/www/html $ ls -Al
total 68
-rw-r--r-- 1 root root   444 Nov 25 20:09 ajax.php
-rw-r--r-- 1 root root   590 Dec 11 09:56 Button.php
-rw-rw-rw- 1 root root     6 Dec 11 09:59 Fichier.txt
-rw-r--r-- 1 root root 10725 Nov 20 10:02 index.html
-rwxr-xr-x 1 pi   pi    8444 Nov 21 13:40 Led
-rw-r--r-- 1 root root   498 Nov 25 19:55 LedOnOff.php
-rwxr-xr-x 1 pi   pi    8324 Nov 20 08:54 test
-rwxr-xr-x 1 pi   pi    8324 Nov 20 10:23 Test
-rw-r--r-- 1 root root   260 Nov 25 20:35 test.php
```



```
  GNU nano 3.2                                                    valeur.csv

Date,High,Low
201912171947,15550.00,167.00
201912171948,15750.00,177.00
201912171949,15150.00,167.00
201912171950,15150.00,175.00
201912171951,14650.00,176.00
201912171952,14650.00,175.00
201912171952,15550.00,175.00
201912171953,15850.00,171.00
201912171953,14650.00,186.00
201912171953,14450.00,180.00
201912171953,14450.00,176.00
201912171953,14650.00,167.00
201912171954,14450.00,176.00
201912171954,14850.00,200.00
201912171954,15550.00,167.00
201912171954,14750.00,175.00
201912171954,15850.00,167.00
201912171954,14650.00,200.00
201912171955,15850.00,176.00
```



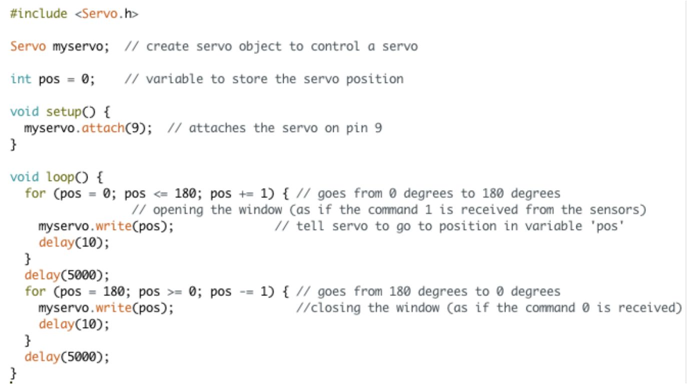
```
  GNU nano 3.2                                                    Button.php

<htlm>
 <head>
  <title>Controle</title>
 </head>
 <body>
  <?php
        echo '<p>Le gpio utilise est :</p> '.htmlspecialchars($_GET["fumee"]);
        echo '<p>Sa valeur est :</p> '.htmlspecialchars($_GET["temperature"]);

/*      $fp = fopen ("Fichier.txt", "r");
        $contenu_du_fichier = fgets($fp,255);
        fclose($fd);
*/      $fp = fopen ("Fichier.csv", "a+");
        $today = date("YmdHi");
        $contenu_du_fichier = $contenu_du_fichier.$today.",".htmlspecialchars($_GET["temperature"]).",".htmlspecialchars($_GET["fumee"])."\n";
        fwrite($fp,$contenu_du_fichier);
        fclose($fp);
/*      $fp = fopen ("Fichier.txt", "r");
        $contenu_du_fichier = fgets($fp,255);
        fclose($fd);
*/      echo 'Notre fichier contient : '.$contenu_du_fichier;
  ?>
 </body>
</html>
```



```
  GNU nano 3.2                                                    Graph.php

<html>
<head>
<script type="text/javascript"
  src="dygraph.js"></script>
<link rel="stylesheet" src="dygraph.css" />
</head>
<body>
<div id="graphdiv2"
  style="width:500px; height:500px;"></div>
<script type="text/javascript">
  g2 = new Dygraph(
    document.getElementById("graphdiv2"),
    "valeur.csv", // path to CSV file
    {}            // options
  );
</script>
</body>
</html>
```

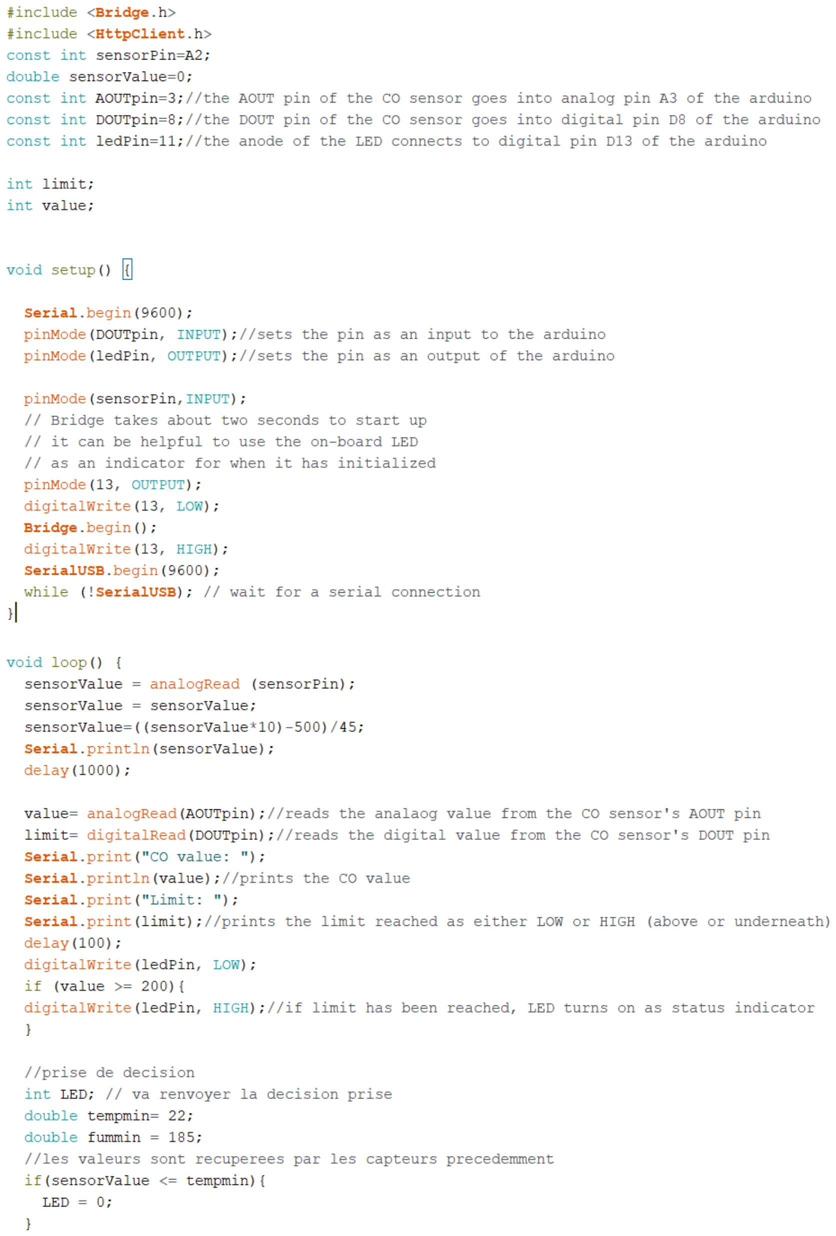
Here the code concerning the Arduino part:

- For the servo:



```
#include <Servo.h>

Servo myservo;  // create servo object to control a servo

int pos = 0;    // variable to store the servo position

void setup() {
  myservo.attach(9);  // attaches the servo on pin 9
}

void loop() {
  for (pos = 0; pos <= 180; pos += 1) { // goes from 0 degrees to 180 degrees
               // opening the window (as if the command 1 is received from the sensors)
    myservo.write(pos);              // tell servo to go to position in variable 'pos'
    delay(10);
  }
  delay(5000);
  for (pos = 180; pos >= 0; pos -= 1) { // goes from 180 degrees to 0 degrees
    myservo.write(pos);                 //closing the window (as if the command 0 is received)
    delay(10);
  }
  delay(5000);
}
```

- For the sensors and the communication between Arduino and Raspberry:



```
#include <Bridge.h>
#include <HttpClient.h>
const int sensorPin=A2;
double sensorValue=0;
const int AOUTpin=3;//the AOUT pin of the CO sensor goes into analog pin A3 of the arduino
const int DOUTpin=8;//the DOUT pin of the CO sensor goes into digital pin D8 of the arduino
const int ledPin=11;//the anode of the LED connects to digital pin D13 of the arduino

int limit;
int value;


void setup() {

  Serial.begin(9600);
  pinMode(DOUTpin, INPUT);//sets the pin as an input to the arduino
  pinMode(ledPin, OUTPUT);//sets the pin as an output of the arduino

  pinMode(sensorPin,INPUT);
  // Bridge takes about two seconds to start up
  // it can be helpful to use the on-board LED
  // as an indicator for when it has initialized
  pinMode(13, OUTPUT);
  digitalWrite(13, LOW);
  Bridge.begin();
  digitalWrite(13, HIGH);
  SerialUSB.begin(9600);
  while (!SerialUSB); // wait for a serial connection
}

void loop() {
  sensorValue = analogRead (sensorPin);
  sensorValue = sensorValue;
  sensorValue=((sensorValue*10)-500)/45;
  Serial.println(sensorValue);
  delay(1000);

  value= analogRead(AOUTpin);//reads the analaog value from the CO sensor's AOUT pin
  limit= digitalRead(DOUTpin);//reads the digital value from the CO sensor's DOUT pin
  Serial.print("CO value: ");
  Serial.println(value);//prints the CO value
  Serial.print("Limit: ");
  Serial.print(limit);//prints the limit reached as either LOW or HIGH (above or underneath)
  delay(100);
  digitalWrite(ledPin, LOW);
  if (value >= 200){
  digitalWrite(ledPin, HIGH);//if limit has been reached, LED turns on as status indicator
  }

  //prise de decision
  int LED; // va renvoyer la decision prise
  double tempmin= 22;
  double fummin = 185;
  //les valeurs sont recuperees par les capteurs precedemment
  if(sensorValue <= tempmin){
    LED = 0;
  }
  else{
    if(value <= fummin){
      LED = 0;
    }
    else{
      LED = 1;
    }
  }




  // Initialize the client library
  HttpClient client;
  String raspberry = String("192.168.43.59");
  String page = String("/Button.php");
  String chemin = String("http://");
  double temperature = sensorValue;
  double fumee = value;
  chemin = chemin+raspberry;
  chemin = chemin+page;
  chemin = chemin+String("?temperature=");
  chemin = chemin+temperature;
  chemin = chemin+String("&fumee=");
  chemin = chemin + fumee;
  chemin = chemin +String("&decision=");
  chemin = chemin + LED;
  Serial.println(chemin);

  // Make a HTTP request:
  client.get(chemin);


  // if there are incoming bytes available
  // from the server, read them and print them:
  while (client.available()) {
    char c = client.read();
    SerialUSB.print(c);
  }
  SerialUSB.flush();

  delay(20000);

}
```