2020F_ESE_3014_1

SEMESTER: 3rd SEM

INSTRUCTOR: Prof. Linchen Wang

LAB 6

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INTRODUCTION :

UART is also known as Universal Asynchronous Receiver/Transmitter. It is used to transfer the data serially , one bit at a time, between two electronic devices. UARTs were originally standalone ICs, but now we majorly integrate it with the host microprocessor/microcontroller.

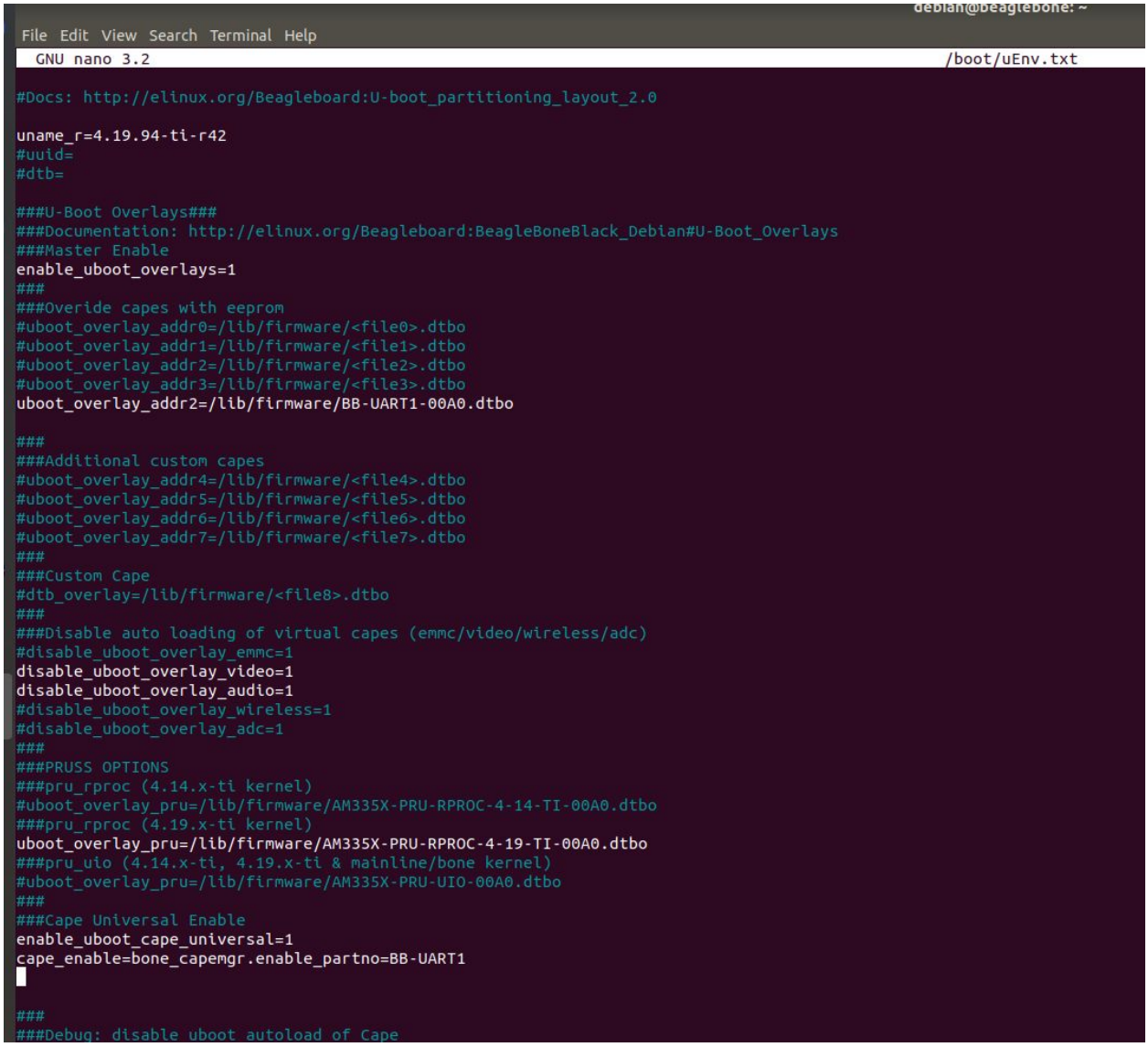
It is called as asynchronous as the sender does not have to send a clock signal to synchronize the transmission. Here in this communication protocol start and stop bits are used to synchronize the transmission of data.

DESCRIPTION :

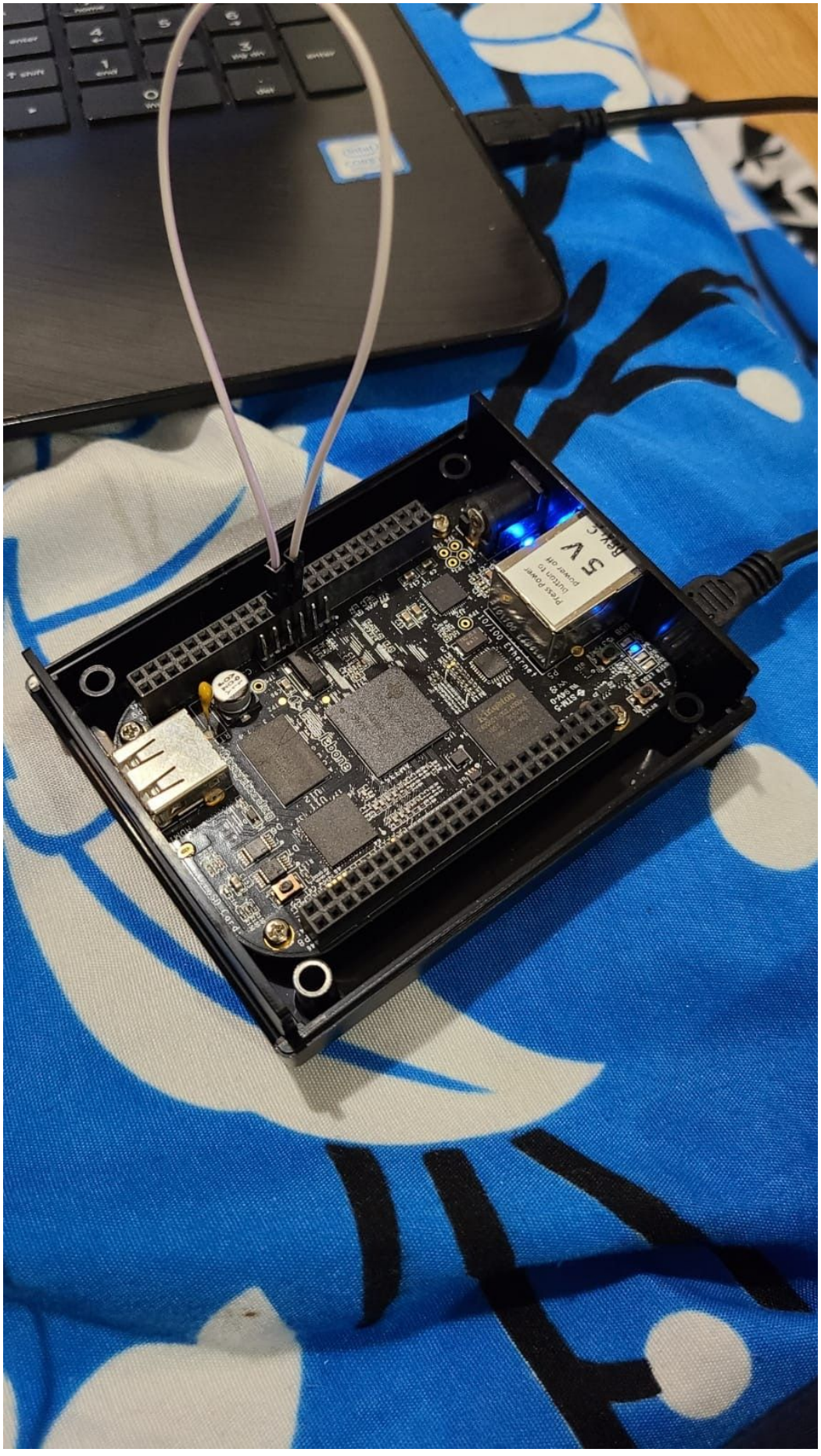
To begin with, we enabled the UART1 of Beaglebone black as follows :

--> `sudo nano /boot/uEnv.txt`

Then here we made the changes in the uEnv.txt file to enable the UART1 of beaglebone.



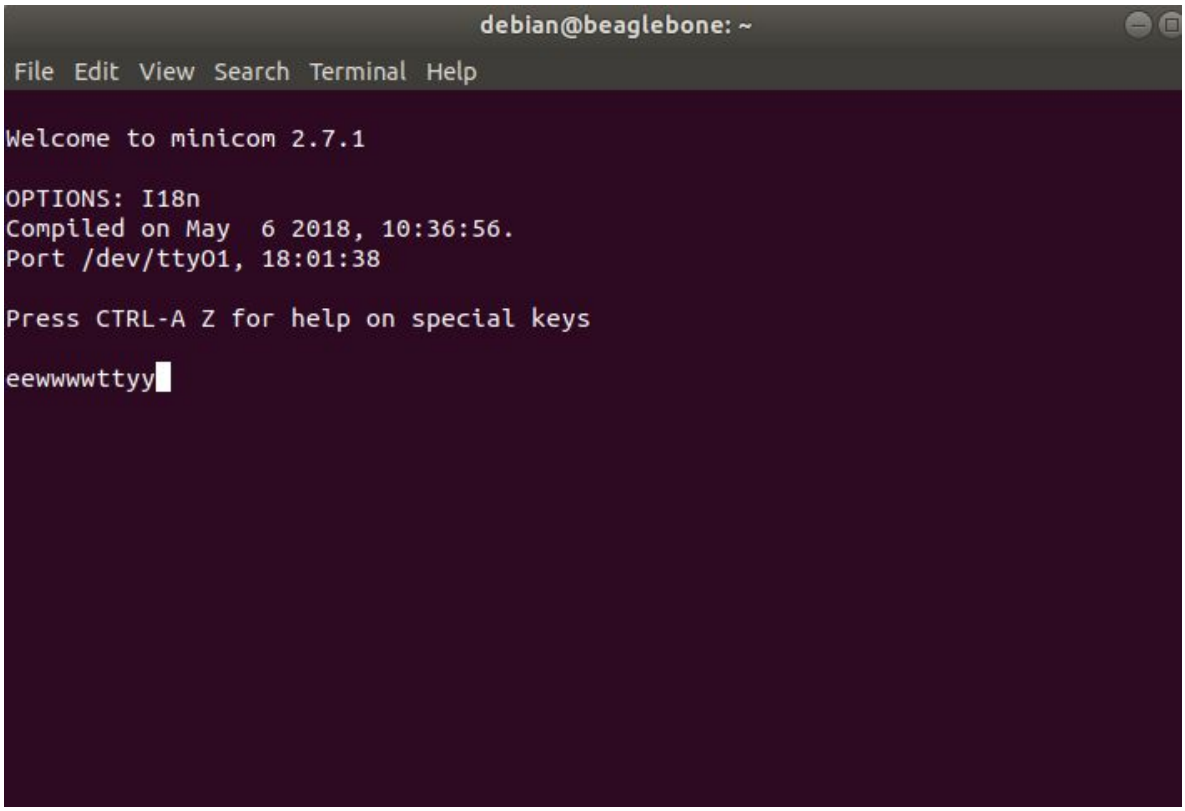
Then using the loop back(we connected 24 and 26 pins of beaglebone black).


5V
Press Power
button to
power on

Further using the minicom,we tested whether the UART1 is working on beaglebone or not with the help of following command :

```
minicom -b 9600 -o -D /dev/ttyO1
```

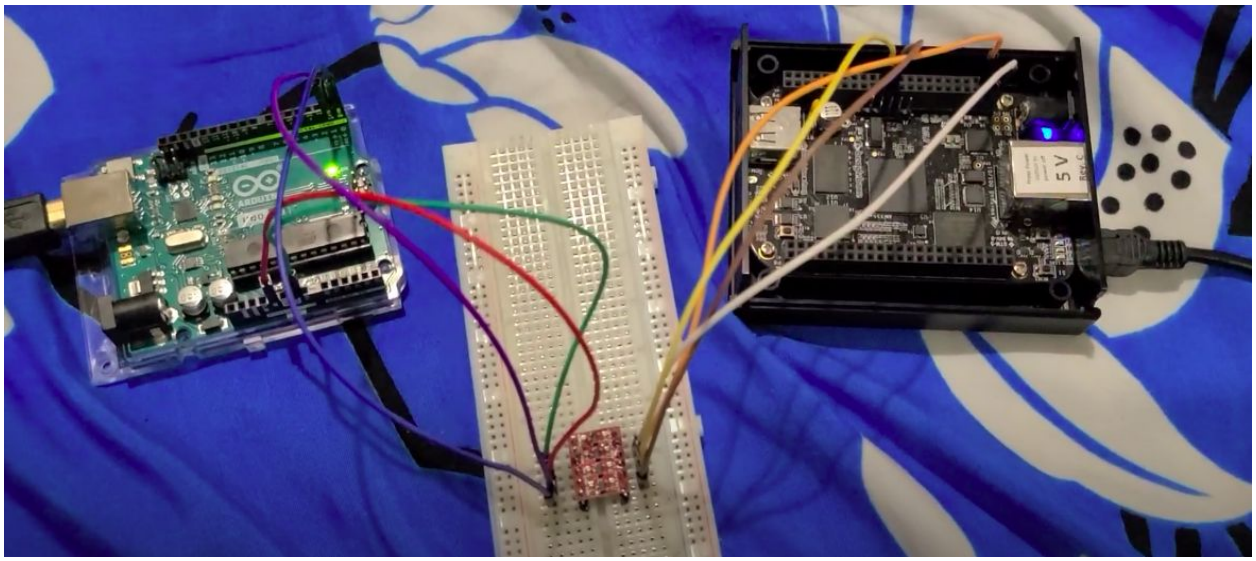
Output :



So here you can see that as we typed the letter e,w,w,t and y , we got back the same result in return .

So Output confirms that the UART1 is enabled properly and its working.

Connections between beaglebone black and Arduino Uno



Now coming to Arduino uno,we wrote a testing program to check whether the communication is proper or not .

We wrote the following program in arduino ide.

```
void setup() {
  Serial.begin(9600);

}

void loop() {
  Serial.print("Test");
  delay(1000);
```

Output on the beaglebone :
Follow the youtube link below :
https://www.youtube.com/watch?v=ul5-IzUsYyU

After getting the clear idea that the communication is done properly,we are writing a program to flash the led at different frequencies (i.e having different delay values).

arduino ide program :

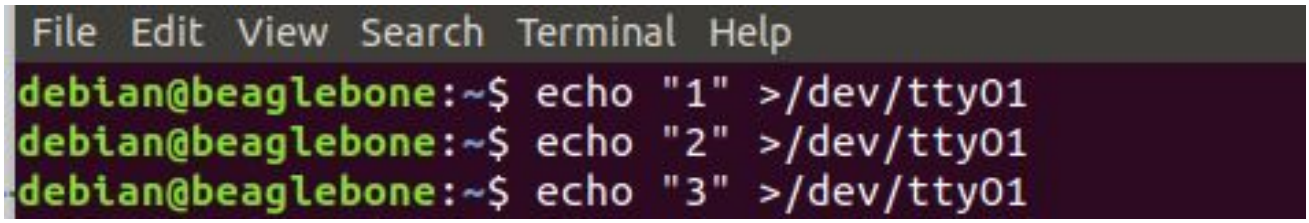
```
char x;
void setup() {
  // put your setup code here, to run once:
  Serial.begin(9600); //setting up baud rate to 9600
pinMode(LED_BUILTIN,OUTPUT); //setting on board led of
arduino as output

}

void loop() {


  //Serial.print("Test");

  if(Serial.available()) //checking whether the
communication is there or not
  {

    x=Serial.read(); //reading the data from the
beaglebone and saving that value in x.
    if(x=='1') //if x == 1 then the delay will be 100
ms
    {


      digitalWrite(LED_BUILTIN,HIGH); // LED ON
```

```
      delay(100);  //delay of 100ms(milliseconds)
      digitalWrite(LED_BUILTIN,LOW); //LED OFF
      delay(100);
       digitalWrite(LED_BUILTIN,HIGH);
      delay(100);
      digitalWrite(LED_BUILTIN,LOW);
      delay(100);
       digitalWrite(LED_BUILTIN,HIGH);
      delay(100);
      digitalWrite(LED_BUILTIN,LOW);
      delay(100);
       digitalWrite(LED_BUILTIN,HIGH);
      delay(100);
      digitalWrite(LED_BUILTIN,LOW);
      delay(100);
      digitalWrite(LED_BUILTIN,HIGH);
      delay(100);
      digitalWrite(LED_BUILTIN,LOW);
      delay(100);



      }

    else if(x=='2') //if x == 2 then the delay will be
1000 ms
    {


      digitalWrite(LED_BUILTIN,HIGH);
      delay(1000);
```

```
      digitalWrite(LED_BUILTIN,LOW);
      delay(1000);
      digitalWrite(LED_BUILTIN,HIGH);
      delay(1000);
      digitalWrite(LED_BUILTIN,LOW);
      delay(1000);
       digitalWrite(LED_BUILTIN,HIGH);
      delay(1000);
      digitalWrite(LED_BUILTIN,LOW);
      delay(1000);
      }

       else if(x=='3') //if x == 3 then the delay will
be 500 ms
    {


      digitalWrite(LED_BUILTIN,HIGH);
      delay(500);
      digitalWrite(LED_BUILTIN,LOW);
      delay(500);
      digitalWrite(LED_BUILTIN,HIGH);
      delay(500);
      digitalWrite(LED_BUILTIN,LOW);
      delay(500);
       digitalWrite(LED_BUILTIN,HIGH);
      delay(500);
      digitalWrite(LED_BUILTIN,LOW);
      delay(500);
      digitalWrite(LED_BUILTIN,HIGH);
      delay(500);
```

```
      digitalWrite(LED_BUILTIN,LOW);
      delay(500);
       digitalWrite(LED_BUILTIN,HIGH);
      delay(500);
      digitalWrite(LED_BUILTIN,LOW);
      delay(500);

    }
    Serial.println(x); //printing the value of x on the
serial command window
  }
  }
```

Beaglebone commands:



OUTPUT: FOLLOW THE YOUTUBE LINK BELOW---

https://youtu.be/XF1_gUbcncM

CONCLUSION:

To conclude , we can say that,in this lab we successfully controlled our Arduino on-board led frequency using beaglebone black.