Programing RaspberryPi

Tassadaq Hussain

Assistant Professor: Riphah International University

Research Collaborations: Microsoft Barcelona Supercomputing Center

University of Valenciennes, France (CNRS UMR)

UCERD Pvt Ltd Pakistan

Programming Languages

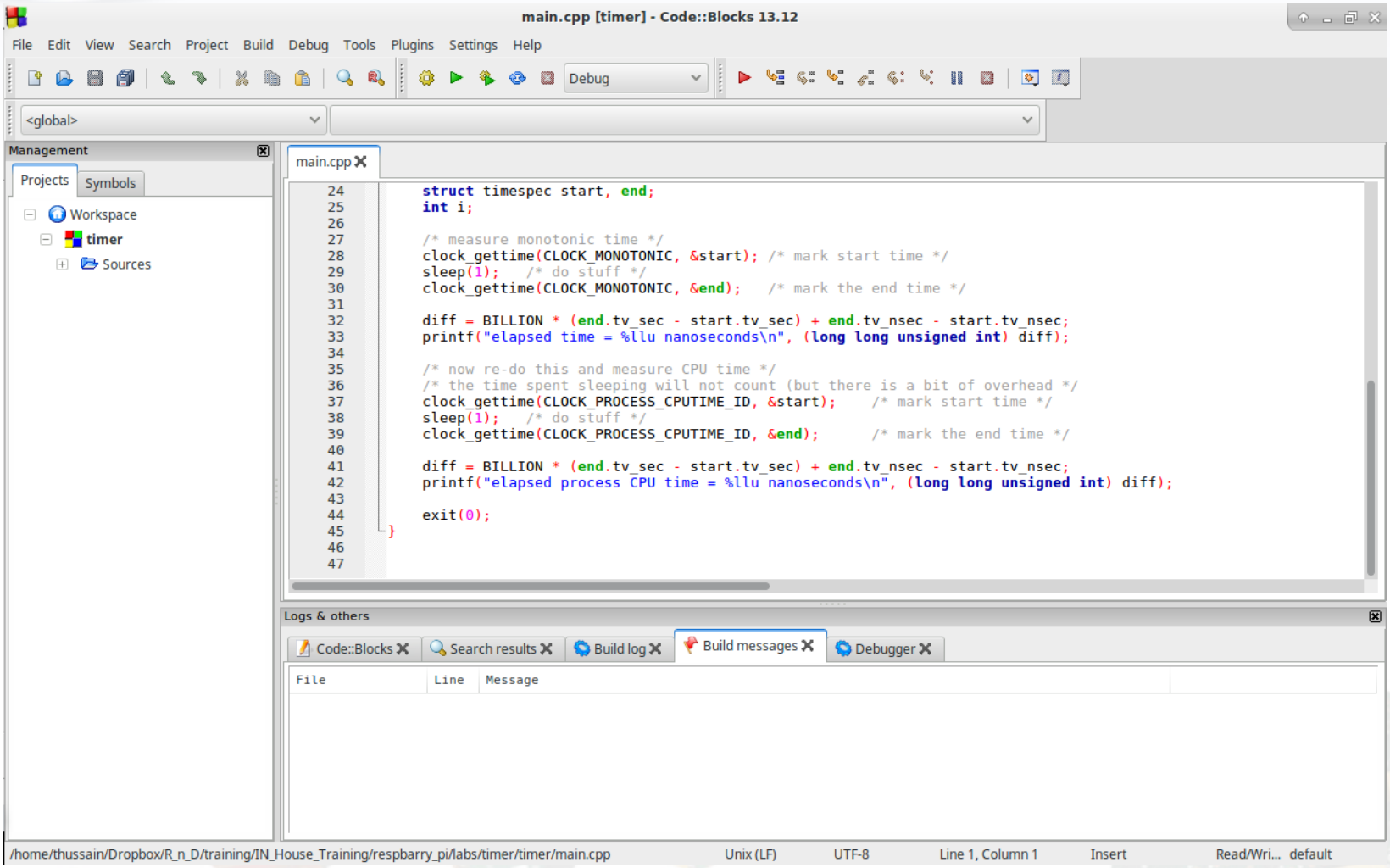
C/C++, Python, Java, PHP, bash scripting, AWK, Assembly language, LUA, JS scripting, Haskell, Erlang, Forth, Pascal, TeX, SQL, Ruby, Smalltalk and so on..

it's by no means a complete list.

GCC Compiler

gcc -lib -lib filename.c -o name

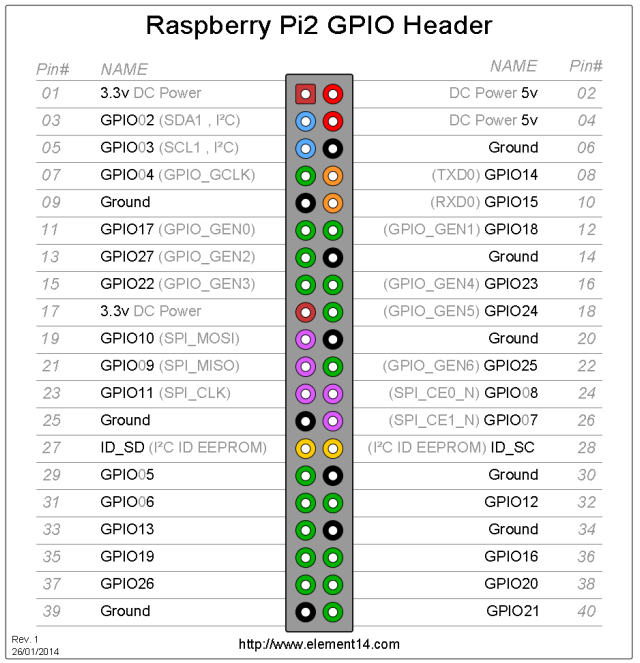
CodeBlocks

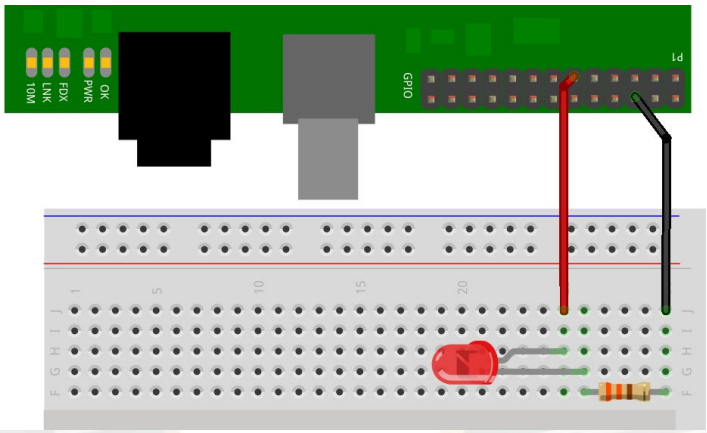


RIPHAH INTERNATIONAL UNIVERSITY

Demo: LED Programming

```
#include <stdio.h>
#include <wiringPi.h>
// LED Pin - wiringPi pin 0 is BCM_GPIO 17.
#defineLED 0
int main (void)
{  printf ("Raspberry Pi blink\n") ;
   wiringPiSetup () ;
  pinMode (LED, OUTPUT) ;
   for (;;)
  {
    digitalWrite (LED, HIGH) ;    // On
    delay (500) ;// mS
    digitalWrite (LED, LOW) ;// Off
    delay (500) ;
  } return 0 ; }
```

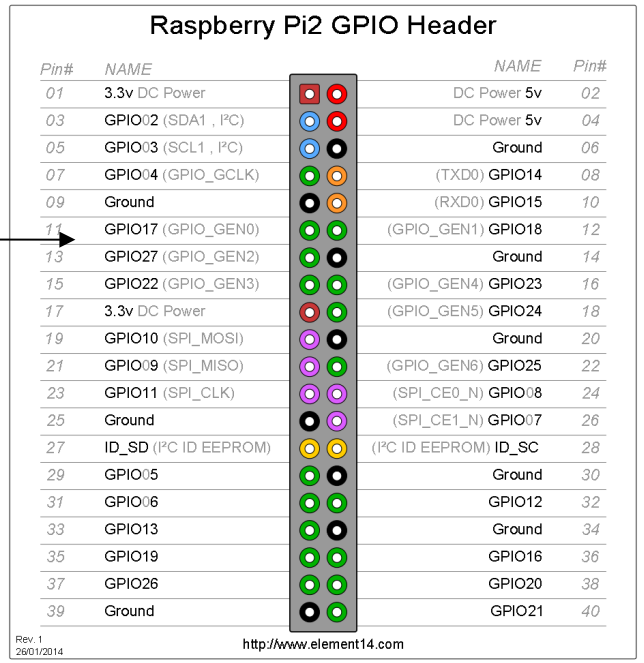


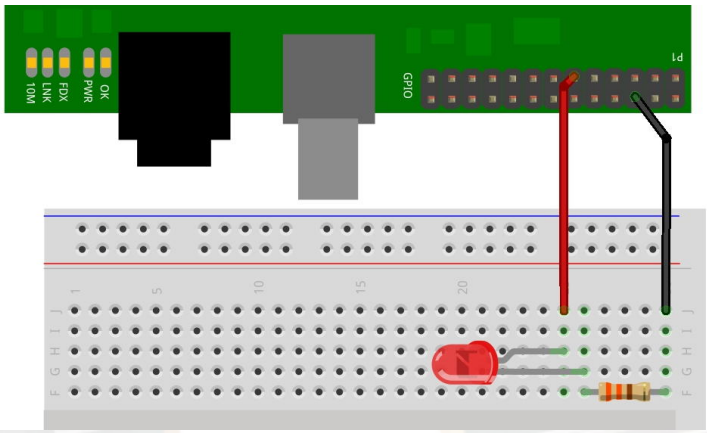


RIPHAH INTERNATIONAL UNIVERSITY

Programming Demo

```
#include <stdio.h>
#include <wiringPi.h>
// LED Pin - wiringPi pin 0 is BCM_GPIO 17.
#defineLED 0
int main (void)
{  printf ("Raspberry Pi blink\n") ;
   wiringPiSetup () ;
  pinMode (LED, OUTPUT) ;
   for (;;)
  {
    digitalWrite (LED, HIGH) ;    // On
    delay (500) ;// mS
    digitalWrite (LED, LOW) ;// Off
    delay (500) ;
  } return 0 ; }
```





RIPHAH INTERNATIONAL UNIVERSITY

Compiling

gcc -libraries -c filename.c -o output.out

gcc -lwiringPi -lwiringPiDev -c blinking.c -o blink.out

Arduino: LED Blinking

```
int led0 = 22;
int led1 = 23;
int led2 = 24;
int led3 = 25;


// the setup routine runs once when you
   press reset:
void setup() {
  // initialize the digital pin as an output.
  pinMode(led0, OUTPUT);
  pinMode(led1, OUTPUT);
  pinMode(led2, OUTPUT);
  pinMode(led3, OUTPUT);

}
```

```
// the loop routine runs over and over again forever:
void loop() {
  digitalWrite(led0, HIGH);   // turn the LED on (HIGH is
   the voltage level)
  digitalWrite(led1, LOW);   // turn the LED off (Low is the
   voltage level)
  digitalWrite(led2, LOW);
  digitalWrite(led3, LOW);
  delay(1000);               // wait for a second
  digitalWrite(led0, LOW);
  digitalWrite(led1, HIGH);
  digitalWrite(led2, LOW);
  digitalWrite(led3, LOW);
  delay(1000);               // wait for a second
  digitalWrite(led0, LOW);
  digitalWrite(led1, LOW);
  digitalWrite(led2, HIGH);
  digitalWrite(led3, LOW);
  delay(1000);               // wait for a second
  digitalWrite(led0, LOW);
  digitalWrite(led1, LOW);
  digitalWrite(led2, LOW);
  digitalWrite(led3, HIGH);
  delay(1000);               // wait for a second
}
```

Soft and USB Serial Comm

```
#include <SoftwareSerial.h>

SoftwareSerial mySerial(0, 1); // RX, TX
char serial_data='c';

void setup()
{
    // set the data rate for the SoftwareSerial port
  mySerial.begin(9600);
  mySerial.println("Serial Print");
}

void loop() // run over and over
{
  serial_data=mySerial.read();
  if(serial_data !='c')
    mySerial.write(serial_data);
}
```

Stepper Motor Controller

```
#include <stdio.h>
#include <stdlib.h>
#include <wiringPi.h>
#define LED0   0 // pin number 11
#define LED1   2 // pin number 13
#define LED2   3 // pin number 15
#define LED3   1 // pin number 10
int main (void)
{  printf ("Raspberry Pi blinking LEDs\n") ;
  wiringPiSetup () ;
  pinMode (LED0, OUTPUT) ;
  pinMode (LED1, OUTPUT) ;
  pinMode (LED2, OUTPUT) ;
  pinMode (LED3, OUTPUT) ;
  for (;;)
  {
    digitalWrite (LED0, HIGH) ; // On
    digitalWrite (LED1, LOW) ;  // off
    digitalWrite (LED2, LOW) ;  // off
    digitalWrite (LED3, LOW) ;  // off
    delay (500) ;// mS
    digitalWrite (LED0, LOW) ;  // off
    digitalWrite (LED1, HIGH) ; // On
    digitalWrite (LED2, LOW) ;  // off
    digitalWrite (LED3, LOW) ;  // off
    delay (500) ;// mS
    digitalWrite (LED0, LOW) ;  // off
    digitalWrite (LED1, LOW) ;  // off
    digitalWrite (LED2, HIGH) ; // On
    digitalWrite (LED3, LOW) ;  // off
    delay (500) ;// mS
   digitalWrite (LED0, LOW) ;   // off
    digitalWrite (LED1, LOW) ;  // off
    digitalWrite (LED2, LOW) ;  // off
    digitalWrite (LED3, HIGH) ; // On
    delay (500) ;// mS
  }  return 0 ; }
```

Serial Comm

```
#include <stdio.h>
#include <string.h>
#include <errno.h>
#include <wiringPi.h>
#include <wiringSerial.h>
int main ()
{
  int fd ;
  int count ;
  unsigned int nextTime ;
  if ((fd = serialOpen ("/dev/ttyAMA0", 115200)) < 0)
  {
    fprintf (stderr, "Unable to open serial device: %s\n",
   strerror (errno)) ;
    return 1 ;
  }
  if (wiringPiSetup () == -1)
  {
    fprintf (stdout, "Unable to start wiringPi: %s\n", strerror (errno)) ;
    return 1 ;
  }
  nextTime = millis () + 300 ;
  for (count = 0 ; count < 256 ; )
  {
    if (millis () > nextTime)
    {
      printf ("\nOut: %3d: ", count) ;
      fflush (stdout) ;
      serialPutchar (fd, count) ;
      nextTime += 300 ;
      ++count ;
    }

    delay (3) ;
    while (serialDataAvail (fd))
    {
      printf (" -> %3d", serialGetchar (fd)) ;
      fflush (stdout) ;
    }
  }
  printf ("\n") ;
  return 0 ;
}
```

RIPHAH INTERNATIONAL UNIVERSITY