INTRODUCTION

1:INTRODUCTION:

India the second most populous Country in the World and is a fast growing economy. With globalization the problem of congestion on highways and in cities is becoming more and more acute. The goal of intelligent traffic management
systems is to achieve improvements in mobility, safety and productivity of the transport system through integrated
application of advanced monitoring.Intelligent management of traffic flows can reduce the negative impact of
congestion. Technologies like ZigBee, RFID and GSM can be used in traffic control to provide cost effective solutions.
RFID is a wireless technology that uses radio frequency electromagnetic energy to carry information between the RFID
tag and RFID reader. Some RFID systems will only work within the range inches or centimeters, while others may
work for 100 meters (300 feet) or more.
The existing traffic control system has a lot of disadvantages because of its fixed time method used. The traffic signal will not change based on the real time traffic on the road near the junction of two or more roads. Due to this the traffic congestion cannot be
controlled efficiently and the utilization of roads cannot be done to its maximum limit[4]. In country like India, day by day, the no of vehicles on road is increasing due to which
congestion is a major problem. Traffic congestion leads to long waiting time, fuel loss and also the money wastage. Congestion results in pollution which in turn affects the living. In India traffic is non-lane based and chaotic, so congestion control provided should be better.
On account of this congestion it is difficult for the emergency vehicles like ambulance and fire brigade to reach its destination on time which may cost the lives of people. To overcome these problems traffic control systems are made efficient with the use of new technologies like ZigBee, RF and GSM. Over the other technologies RF has advantage because it is cost
efficient system and there will be no interruption in communication even in bad weather

conditions . RF is a Radio Frequency which is a wireless technology.

Sensor is used to transmit a signal that has been installed in every ambulance to the receiver which has been placed at every traffic light junction. When an ambulance reaches the traffic light junction, the signal code will send information of frequency modulation to the receiver. The receiver demodulates the code that has been received and the red traffic light will activate at all the junctions. Thus, ambulances will have special routes to reach targets.

According to all these papers, a convenient wireless communication among emergency vehicles and the traffic light is by using RF. The design of this project is using the radio frequency of 434 MHz compared to the range of about 3 kHz to 300 GHz of frequency which have been reserved for the RF theoretically. There are three objectives to be achieved in this project. First is to analyze and implement wireless communication; Radio Frequency (RF) transmission system in traffic light control systems used for emergency vehicles. Second is to design a traffic light sequence for emergency mode when receiving a signal from an emergency vehicle like an ambulance.

Last objective is to change the sequence back to the normal sequence before the emergency mode was activated. This project has assisted in implementing wireless communication by using the radio frequency (RF) transmission of 434 MHZ in the traffic light control system.

1.1:PRINCIPLE:

The RF transmission system employs

with receiver/transmitter (Rx/Tx) pair operating at 434 MHz. The transmitter module takes serial input and then transmits these signals through RF. The receiver receives the transmitted signals and then sends to the module placed away from the source of transmission.

A radio frequency (RF) signal starts as an electrical alternating current (AC) signal that is originally generated by a transmitter [6]. This AC signal is sent through a copper conductor which is usually a coaxial cable and radiated out of an antenna element in the form of an electromagnetic wave. The Change of current flow in the antenna produces changes in the electromagnetic fields around the antenna.

changes the traffic light to red, so that the vehicle is made to stop in the traffic junction and local police can take appropriate action.

2. HARDWARE REQUIREMENTS

2.HARDWARE REQUIREMENT

1. Arduino Uno
2. LED’s
3. EM-18 MODULE
4. RFid cards
5. Pcb
6. Copperwick
7. Resistors
8. Lead
9. Soldering gun
10. Connecting wires
11. Cardboard

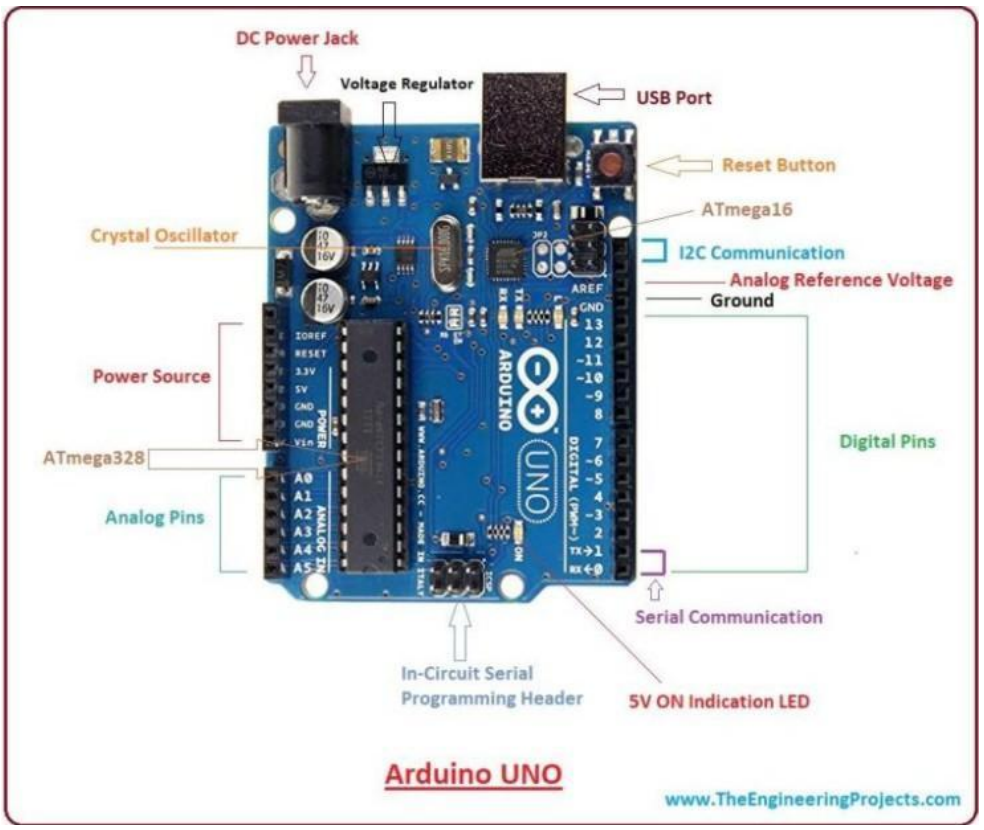
2.1:Hardware description:

Arduino Uno: Arduino Uno is a microcontroller board, developed by Arduino.cc, based on the Atmega328 microcontroller and is marked as the first Arduino board developed(UNO means “one” in Italian).The software used for writing, compiling & uploading code to Arduino boards is called Arduino IDE (Integrated Development Environment), which is free to download from Arduino Official Site.

- It has an operating voltage of 5V while the input voltage may vary from 7V to 12V.
- Arduino UNO has a maximum current rating of 40mA, so the load shouldn’t exceed this current rating or you may harm the board.
- It comes with a crystal oscillator of 16MHz, which is its operating frequency.
- Arduino Uno Pinout consists of 14 digital pins starting from D0 to D13. ☐ It also has 6 analog pins starting from A0 to A5.
- It also has 1 Reset Pin, which is used to reset the board programmatically. In order to reset the board, we need to make this pin LOW.
- It also has 6 Power Pins, which provide different voltage levels.
- Out of 14 digital pins, 6 pins are used for generating PWM pulses of 8-Bit resolution. PWM pins in Arduino UNO are D3, D5, D6, D9, D10 and D11.
- Arduino UNO comes with 3 types of memories associated with it, named:
- Flash Memory: 32KB
- SRAM: 2KB
- EEPROM: 1KB
- Arduino UNO supports 3 types of communication protocols, used for interfacing with third-party peripherals, named:
- Serial Protocol
- I2C Protocol

SPI Protocol

Apart from USB, a battery or AC to DC adopter can also be used to power the board.



2.2 :LED's:

LED, in full **light-emitting diode**, in electronics, a semiconductor device that emits infrared or visible light when charged with an electric current. Visible LEDs are used in many electronic devices as indicator lamps, in automobiles as rear-window and brake lights, and on billboards and signs as alphanumeric displays or even full-colour posters. Infrared LEDs are employed in autofocus cameras and television remote controls and also as light sources in fiber-optic telecommunication system.

2.3:EM-18 MODULE:

The module radiates 125KHz through its coils and when a 125KHz passive RFID tag is brought into this field it will get energized from this field. These passive RFID tags mostly consist of CMOS IC EM4102 which can get enough power for its working from the field generated by the reader.

1. Active RFID system

Active RFID tags have their own transmitter and power source (Mostly battery operated). They operate at 455 MHz, 2.45 GHz, or 5.8 GHz, and they typically have a read range of 60 feet to 300 feet (20 meters to 100 meters).

2. Passive RFID system

Passive RFID tags do not have a transmitter, they simply reflect energy (radio waves) back coming from the RFID reader antenna. They operate in Low frequency (~125 KHz) as well as High frequency (~13 MHz) band and have limited read range of up to ~1m.

2.4:PCB:

The circuits and components of a double-layer PCB board are usually connected in one of two ways: either utilizing a through-hole or with the use of a surface-mount. A through-hole connection means that small wires, known as leads, are fed through the holes, with each end of the leads then soldered to the right component. Surface mount PCBs don't utilize wires as connectors. Instead, many small leads are soldered directly to the board, meaning that the board itself is used as a wiring surface for the different components. This allows circuits to be completed using less space, freeing up space to allow the board to complete more functions, usually at higher speeds and a lighter weight than a through-hole board would allow. Double-sided PCBs are typically used in applications which require an intermediate level of circuit complexity, such as industrial controls, power supplies, instrumentation, HVAC systems, LED lighting, automotive dashboards, amplifiers and vending machines.

Alternatives to PCBs include wire wrap and point-to-point construction, both once popular but now rarely used. PCBs require additional design effort to lay out the circuit, but manufacturing and assembly can be automated. Electronic computer-aided design software is available to do much of the work of layout. Mass-producing circuits with PCBs is cheaper and faster than with other wiring methods, as components are mounted and wired in one operation. Large numbers of PCBs can be fabricated at the same time, and the layout only has to be done once. PCBs can also be made manually in small quantities, with reduced benefits.[2]

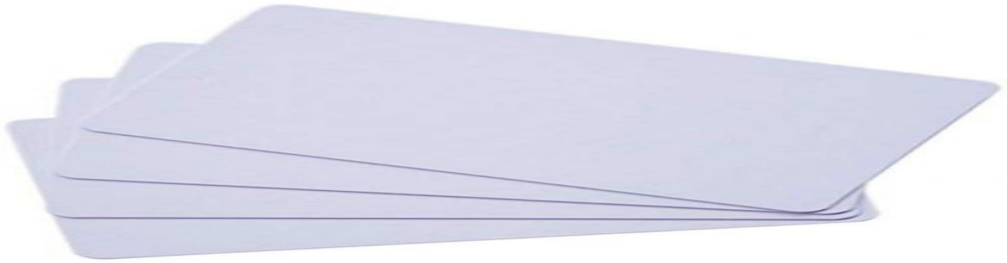
PCBs can be single-sided (one copper layer), double-sided (two copper layers on both sides of one substrate layer), or multi-layer (outer and inner layers of copper, alternating with layers of substrate). Multi-layer PCBs allow for much higher component density, because circuit traces on the inner layers would otherwise take up surface space between components. The rise in popularity of multilayer PCBs with more than two, and especially with more than four, copper planes was concurrent with the adoption of surface mount technology. However, multilayer PCBs make repair, analysis, and field modification of circuits much more difficult and usually impractical.

2.5:RFID CARDS:

Radio Frequency Identification (RFID) is the wireless non-contact use of radio frequency waves to transfer data. RFID systems usually comprise an RFID reader, RFID tags, and antennas.

Tagging items with RFID tags allows users to automatically and uniquely identify and track inventory and assets. RFID takes auto-ID technology to the next level by allowing tags to be read without line of sight and, depending on the type of RFID, having a read range between a few centimeters to over 20+ meters.

Types of RFID : Within the Electromagnetic Spectrum, there are three primary frequency ranges used for RFID transmissions – Low Frequency, High Frequency, and Ultra-High Frequency.



2.6:COPPER WICK:

solder Copper Wick Mesh is useful if you want to remove a solder joint safely, over your PCB. Purchase our Soldering Iron and Solder Flux with it.

Flux is normally added to help the solder flow from where it is not supposed to be (the jumper) to the wick.Solder wick is composed of copper threads braided together.

solder wick is sometimes called desolder braid. Yes, you really can solder anything, and solder wick is a large part of the process.

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Desoldering braid or desoldering wick is a pre-fluxed copper braid that is used to remove solder, which allows components to be replaced and excess solder (e.g. bridging) to be removed. The soldering iron is applied to the wick as it sits on the solder joint, and when both are brought up to the solder's melting point, the flux is

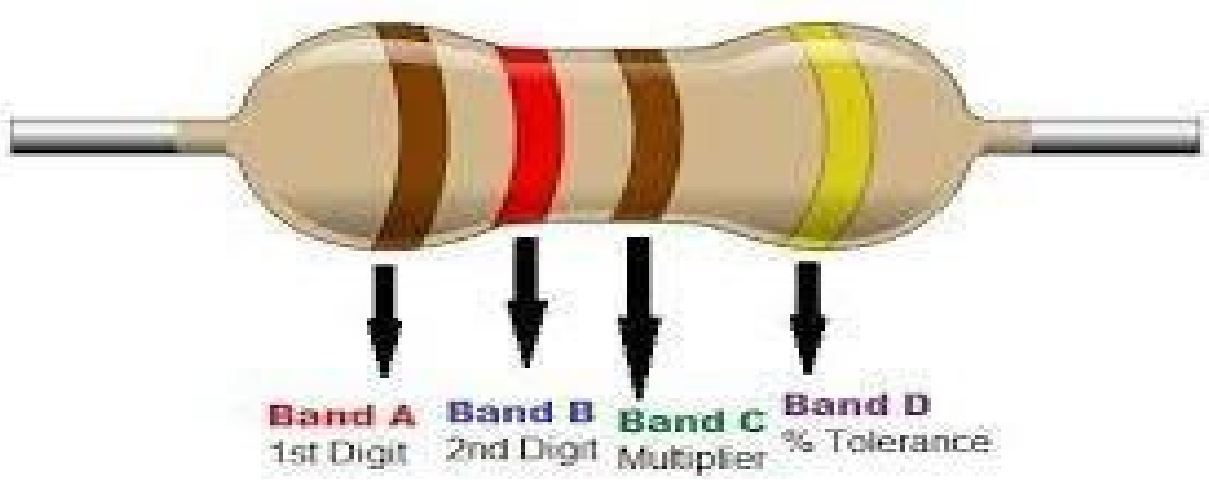
activated and, through capillary action from the braided design, solder is drawn up the wick.

Techspray wick has been a mainstay at PCB rework, repair and prototyping stations for over 30-year.

2.7:RESISTORS:

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses. High-power resistors that can dissipate many watts of electrical power as heat may be used as part of motor controls, in power distribution systems, or as test loads for generators. Fixed resistors have resistances that only change slightly with temperature, time or operating voltage. Variable resistors can be used to adjust circuit elements (such as a volume control or a lamp dimmer), or as sensing devices for heat, light, humidity, force, or chemical activity.

Resistors are common elements of electrical networks and electronic circuits and are ubiquitous in electronic equipment. Practical resistors as discrete components can be composed of various compounds and forms. Resistors are als



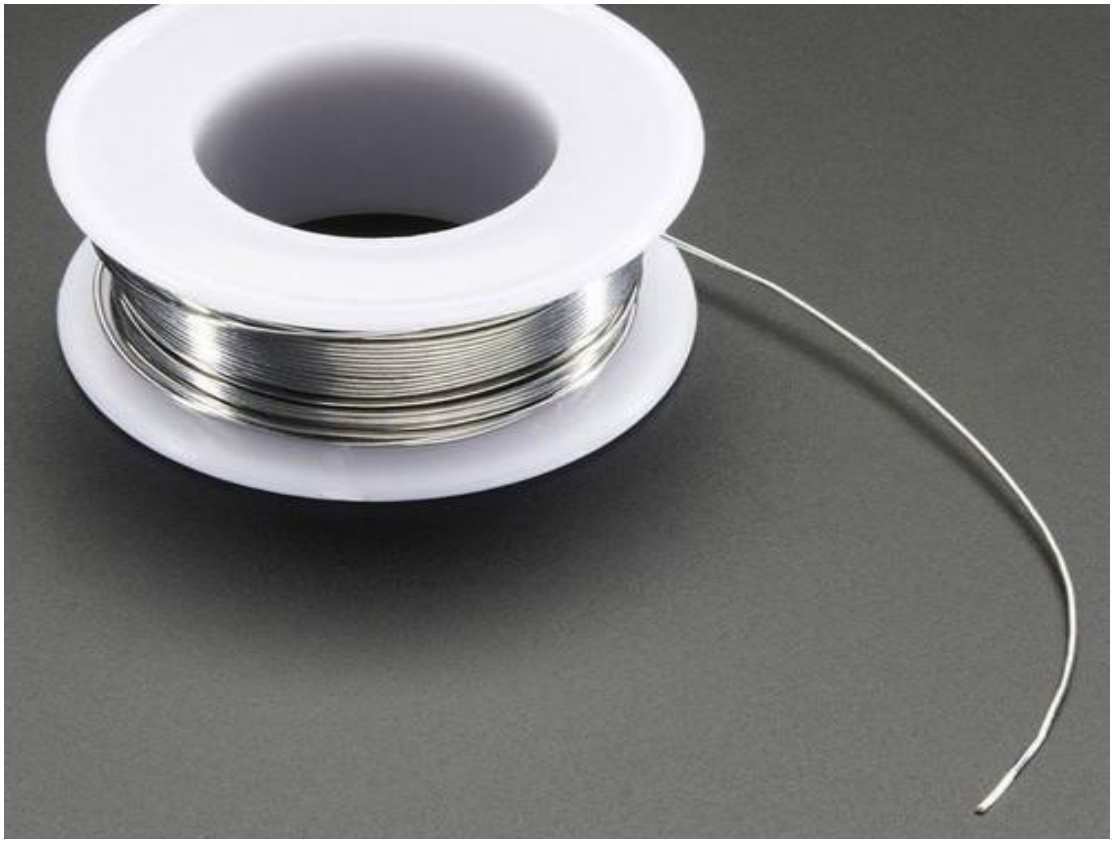
o implemented within integrated circuits.Special components called resistors are made for the express purpose of creating a precise quantity of resistance for insertion into a circuit. They are typically constructed of metal wire or carbon and engineered to maintain a stable resistance value over a wide range of environmental conditions.

The most common schematic symbol for a resistor is a zig-zag line:

Resistor values in ohms are usually shown as an adjacent number, and if several resistors are present in a circuit, they will be labeled with a unique identifier number such as R1, R2, R3, etc

2.8:LEAD:

Lead is a chemical element with the symbol Pb (from the Latin plumbum) and atomic number 82. It is a heavy metal that is denser than most common materials. Lead is soft and malleable, and also has a relatively low melting point. When freshly cut, lead is silvery with a hint of blue; it tarnishes to a dull gray color when exposed to air. Lead has the highest atomic number of any stable element and three of its isotopes are endpoints of major nuclear decay chains of heavier elements.



Solder is melted by using heat from an iron connected to a temperature controller. It is heated up to temperatures beyond its melting point at around 600 degrees fahrenheit which then causes it to melt, which then cools creating the soldered joint.

As well as creating strong electrical joints solder can also be removed using a desoldering tool.

Solder is a metal alloy used to create strong permanent bonds; such as copper joining in circuit boards and copper pipe joints. It can also be supplied in two different types and diameters, lead and lead free and also can be between .032” and .062”. Inside the solder core is the flux, a material used to strengthen and improve its mechanical properties.

A soldering iron is a hand tool used to heat solder, usually from an electrical supply at high temperatures above the melting point of the metal alloy. This allows for the solder to flow between the workpieces needing to be joined.

2.9:SOLDERING GUN:

Soldering guns are used for applications where more heat is required as irons use lower power. This tool is used for joining stained glass, light sheet metal and heavy electronic soldering work. When you need to solder intermittently, the soldering gun is much more practical as it cools much quicker.

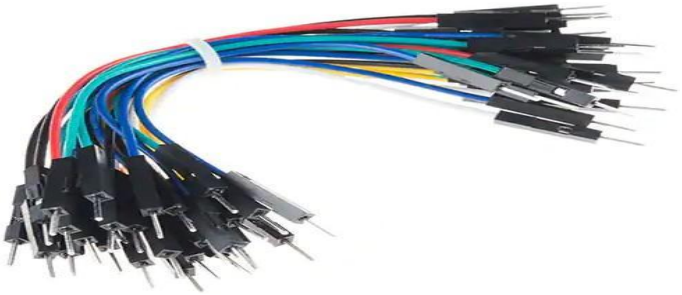
A **soldering gun** is an approximately pistol-shaped, electrically powered tool for soldering metals using tin-based solder to achieve a strong mechanical bond with good electrical contact. The tool has a trigger-style switch so it can be easily operated with one hand. The body of the tool contains a transformer with a primary winding connected to mains electricity when the trigger is pressed, and a single-turn secondary winding of thick copper with very low resistance. A soldering tip, made of a loop of thinner copper wire, is secured to the end of the transformer secondary by screws, completing the secondary circuit. When the primary of the transformer is energized, several hundred amperes of current flow through the secondary and very rapidly heat the copper tip. Since the tip has a much higher resistance than the rest of the tubular copper winding, the tip gets very hot while the remainder of the secondary warms at a much slower rate.

The soldering gun is useful when soldered joints must be made intermittently. A constant-heat

device has to be set in a safe place when powered but not actually in use, to prevent damage or injury. The fast-switching gun cools quickly enough to be set down a few seconds after use.

2.10:CONNECTING WIRES:

Connecting wires provide a medium to an electrical current so that they can travel from one point on a circuit to another. In the case of computers, wires are embedded into circuit boards to carry pulses of electricity. Most wires in computers and electronic components are made of copper or aluminum, because copper is cheap and electrically conductive.



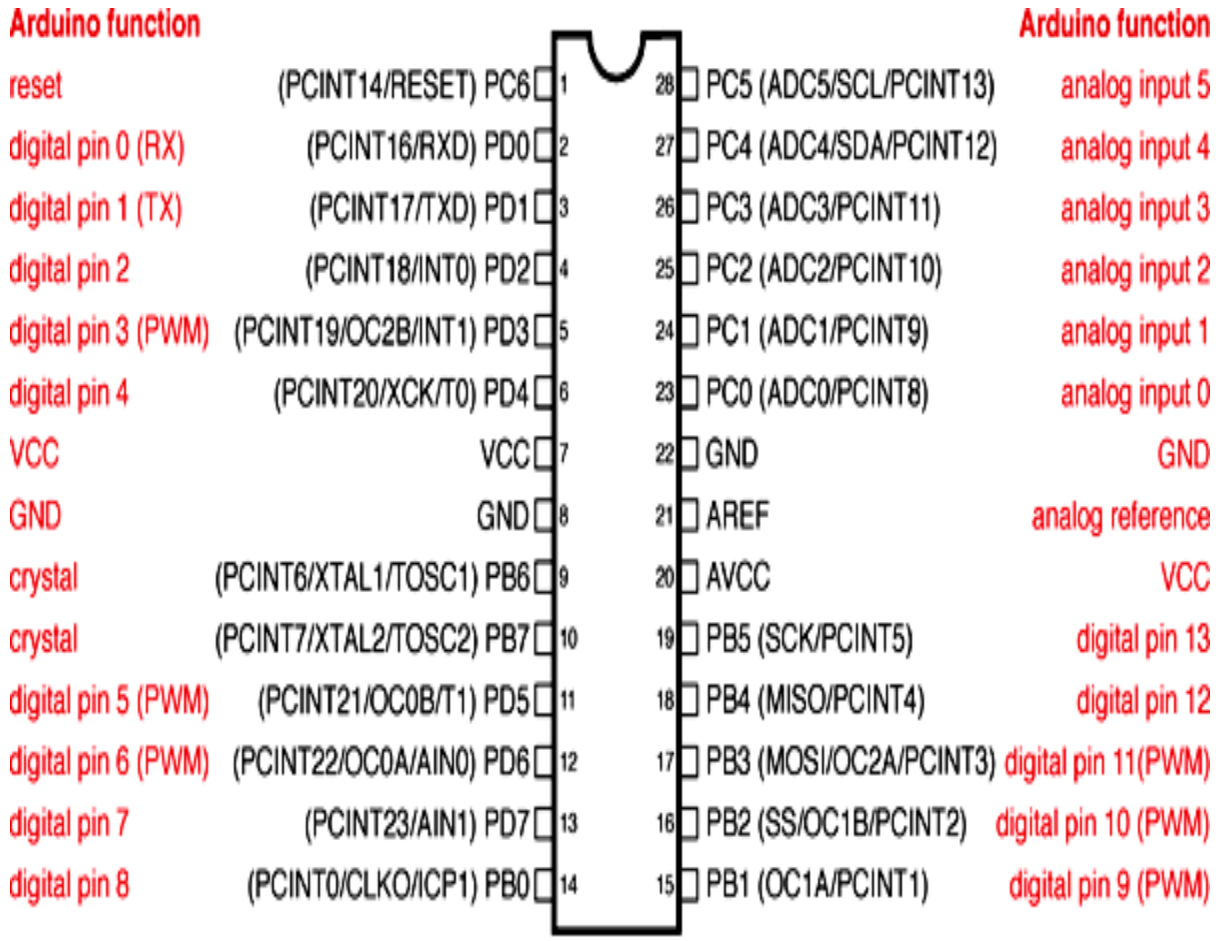
it is sometimes necessary to connect the various electronics components using the right wire. For example it is often useful to use coloured connecting wire to indicate such items as electronics wire used for connecting the supplies, signals, and grounds. In this way it is easier to identify the different signals and lines and this reduces the possibility of errors. In addition to this it is sometimes necessary to have connecting wire of a particular size to ensure the connections are made in the right manner. If the wire is too thick it may not be easy to accommodate in some situations, whereas thicker wire may be needed for higher currents of physical strength or robustness in other situations.

2.11:CARDBOARDS:

You are making an electrical circuit. Electricity is the flow of electrons & an electric circuit is a circular pathway electrons can flow through. If the circuit is open, there is a break in it, the electricity cannot flow through. The circuit has to be closed, a complete circle.

3. PIN DIAGRAM

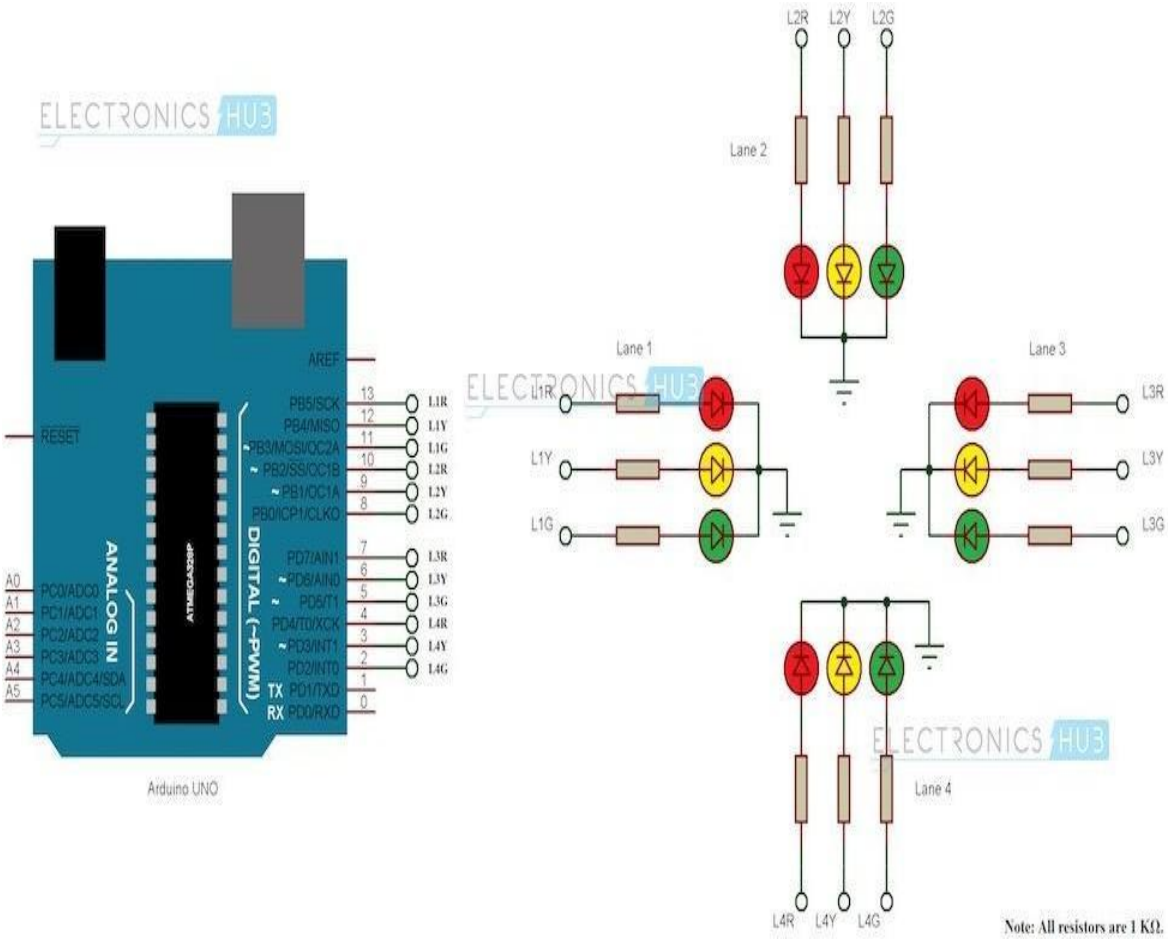
ARDUINO PIN DIAGRAM:



Digital Pins 11,12 & 13 are used by the ICSP header for MOSI, MISO, SCK connections (Atmega168 pins 17,18 & 19). Avoid low-impedance loads on these pins when using the ICSP header.

4.ARDUINO UNO

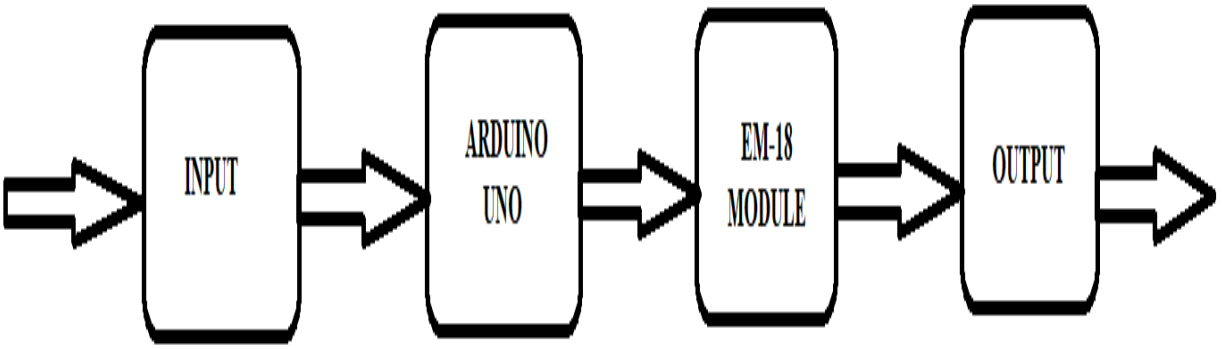
ARDUINO UNO


ELECTRONICS HUB
AREF
RESET
ANALOG IN
DIGITAL (~PWM)
ATMEGA328P
A0
A1
A2
A3
A4
A5
PC0/ADC0
PC1/ADC1
PC2/ADC2
PC3/ADC3
PC4/ADC4/SDA
PC5/ADC5/SCL
PB5/SCK
PB4/MISO
PB3/MOSI/OC2A
PB2/SS/OC1B
PB1/OC1A
PB0/ICP1/CLKO
PD7/AIN1
PD6/AIN0
PD5/T1
PD4/T0/XCK
PD3/INT1
PD2/INT0
TX PD1/TXD
RX PD0/RXD
L1R
L1Y
L1G
L2R
L2Y
L2G
L3R
L3Y
L3G
L4R
L4Y
L4G
Arduino UNO
Lane 1
Lane 2
Lane 3
Lane 4
Note: All resistors are 1 KΩ.

5.BLOCK DIAGRAM

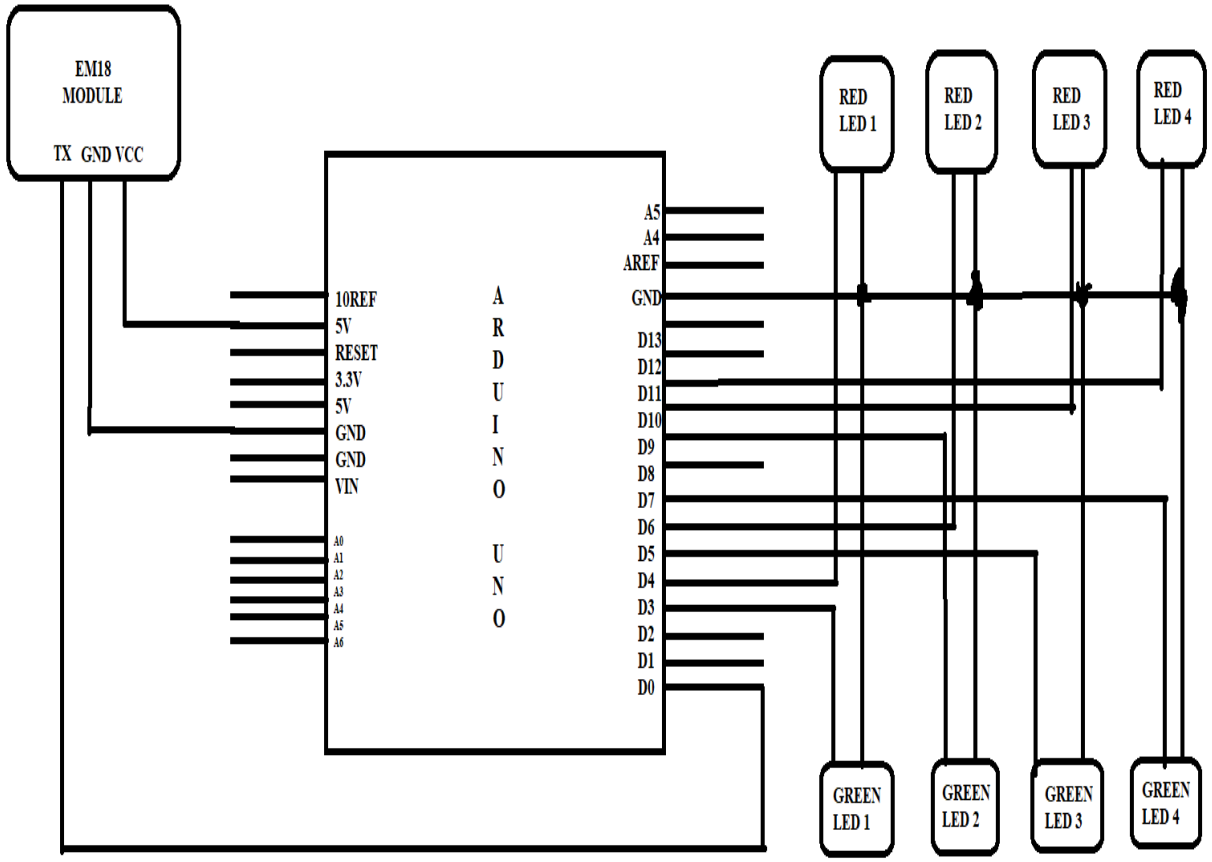
At the transport layer, congestion control for streaming multimedia is adopted to make sure the users have a fair share of the network resources without flooding the links. Congestion control for the wireless scenario has to differentiate packet loss due to wireless link error from packet loss due to congestion since the transport protocol needs to decrease the sending rate only when there is congestion in the network. Moreover, it has to take into account the smoothness of the sending rate, in addition to the fairness and responsiveness of the transport protocol, to supporting the multimedia application for better playback quality

BLOCK DIAGRAM:



6.CIRCUIT DIAGRAM

CIRCUIT DIAGRAM:


EM18
MODULE
TX GND VCC
10REF
5V
RESET
3.3V
5V
GND
GND
VIN
A0
A1
A2
A3
A4
A5
A6
ARDUINO UNO
A5
A4
AREF
GND
D13
D12
D11
D10
D9
D8
D7
D6
D5
D4
D3
D2
D1
D0
RED LED 1
RED LED 2
RED LED 3
RED LED 4
GREEN LED 1
GREEN LED 2
GREEN LED 3
GREEN LED 4

7.PROCEDURE

PROCEDURE:-

We know that in our daily life we can see lot of lives was killed due to traffic conjunction. Traffic conjunction is major cause for the lot of deaths in an emergency situation. So, to make easier way to emergency vehicles or we can maintain without traffic conjunction to save the lives of emergency peoples.

Now, how this prototype is useful for a emergency vehicles is going to explain now. Here, arduino uno is the micro controller to get the data to process the data and to store the data in many ways it is going to useful in our daily life. The Radio Frequency module i.e., EM18 module is placed for a certain distance for a junction when an emergency vehicle passes through it the module send the signal to the microcontroller after receiving the signal from module the micro controller controls the junction. Now, the junction will be, the lane which the vehicles comes in is set as green and remaining lanes are said to be in red to reduce Traffic Conjunction. By this method we can reduce the deaths of peoples by traffic conjunctions in emergency signals. To execute these process we need to run a code or execute a code in arduino ide.

8.ARDUINO IDE

ARDUINO IDE:-


Arduino IDE 1.8.19
The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. This software can be used with any Arduino board.
Refer to the Getting Started page for Installation instructions.
SOURCE CODE
Active development of the Arduino software is hosted by GitHub. See the instructions for building the code. Latest release source code archives are available here. The archives are PGP-signed so they can be verified using this gpg key.
DOWNLOAD OPTIONS
Windows Win 7 and newer
Windows ZIP file
Windows app Win 8.1 or 10
Get
Linux 32 bits
Linux 64 bits
Linux ARM 32 bits
Linux ARM 64 bits
Mac OS X 10.10 or newer
Release Notes
Checksums (sha512)

9.SOURCE CODE

SOURCE CODE:-

```
int count = 0;                          // count = 0
char input[12];                          // character array of size 12
boolean flag = 0;      // flag =0
#define g1 3
#define r1 4
#define g3 5
#define r2 6
#define g4 7
#define g2 9
#define r3 10
#define r4 11
void setup()
{
  Serial.begin(9600); // begin serial port with baud rate 9600bps
```

```
  pinMode(r3,OUTPUT);
  pinMode(r4,OUTPUT);
  pinMode(r2,OUTPUT);
  pinMode(r1,OUTPUT);
  pinMode(g1,OUTPUT);
  pinMode(g2,OUTPUT);
  pinMode(g3,OUTPUT);
  pinMode(g4,OUTPUT);
}
void loop()
{
 digitalWrite (g4,HIGH);
 digitalWrite (r3,HIGH);
 digitalWrite (r2,HIGH);
 digitalWrite (g2,LOW);
 digitalWrite (g3,LOW);
 digitalWrite (g1,LOW);
 digitalWrite (r4,LOW);
 digitalWrite (r1,HIGH);
 delay(2000);
 digitalWrite (g1,HIGH);
 digitalWrite (r1,LOW);
 digitalWrite (g2,LOW);
 digitalWrite (g3,LOW);
 digitalWrite (g4,LOW);
 digitalWrite (r2,HIGH);
 digitalWrite (r3,HIGH);
 digitalWrite (r4,HIGH);
 delay(2000);
 digitalWrite (g2,HIGH);
 digitalWrite (r2,LOW);
 digitalWrite (r1,HIGH);
 digitalWrite (r3,HIGH);
 digitalWrite (g1,LOW);
 digitalWrite (r4,HIGH);
```

```
 digitalWrite (g3,LOW);
 digitalWrite (g4,LOW);
 delay(2000);
 digitalWrite (g3,HIGH);
 digitalWrite (r1,HIGH);
 digitalWrite (r3,LOW);
 digitalWrite (r2,HIGH);
 digitalWrite (g2,LOW);
 digitalWrite (g1,LOW);
 digitalWrite (r4,HIGH);
 digitalWrite (g4,LOW);
 delay(2000);
  if(Serial.available(
  {
    count = 0;
    while(Serial.available() && count < 12)          // Read 12 characters and store them in input
array
    {
      input[count] = Serial.read();
      count++;
      delay(5);
    }
    Serial.print(input);                          // Print RFID tag number

    if((input[0] ^ input[2] ^ input[4] ^ input[6] ^ input[8] == input[10]) &&
      (input[1] ^ input[3] ^ input[5] ^ input[7] ^ input[9] == input[11])){
      digitalWrite (r1,HIGH);
 digitalWrite (g3,HIGH);
 digitalWrite (r2,HIGH);
 digitalWrite (r3,LOW);
 digitalWrite (r4,HIGH);
 digitalWrite (g2,LOW);
 digitalWrite (g1,LOW);
```

```
 digitalWrite (g4,LOW);
 delay(7000);
          Serial.println("No Error");
       }
    else{
          Serial.println("Error");
  }
  }
}
```

10.OUTPUT

OUTPUT:-

11.ADVANTAGES & APPLICATIONS

ADVANTAGES:

1. Cost effective
2. Less prone to error
3. No need for traffic police.
4. number of lives can be saved
5. no other traffic issues for emergency vehicles
6. less time to reach hospital

APPLICATIONS:

1.Ambulance
2. Fire engines
3. other emergency vehicles etc…,

12.CONCLUSION

CONCLUSION

As a conclusion, this project have achieved the main objective stated earlier which is analyzing and exploring wireless communication; the radio frequency (RF) transmission in the traffic light control system for emergency vehicles. The model of this project is using the frequency of 434 MHz compared to the range of about 3 kHz to 300 GHz of frequency which have been reserved for the RF theoretically. Besides, the performance of this project proved that the other objectives have been successfully attained which are designing an emergency sequence mode of traffic light when emergency vehicles passing by a junction and changing the sequence back to the normal sequence before the emergency mode was activated. The sequences for this project have

been developed using the programming in the microcontroller. In future, this prototype system can be upgraded by controlling the real traffic situation and the study can be done by investigating the length and transmission issue for the system can be operated with this traffic light control system.

13.BIBLIOGRAPHY

BIBLIOGRAPHY

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