

Project Report

On

**“COIN BASED MOBILE CHARGING
SYSTEM”**

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CERTIFICATE

This is to certify that **Swapnil Appasaheb Dhamdhere** from Second Year Computer Engineering has successfully completed his seminar work titled “Coin Based Mobile Charging System” at RMD Sinhgad School of Engineering, Warje, Pune in the partial fulfillment of the Bachelor’s Degree in Engineering.

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- **Problem Statement**

Now a days, mobile phones became integral part of our Indians. We are depending on mobile phones from morning alarm to ordering the dinner. In Such modern, life our phone battery is low in emergency and we are out of home, there is no facility in India to provide you to charge your device. In Japan there are charging station at different places. So, we decided to design such device which allow the Indians to charge their phones at outside by inserting the coin. This service can be available at railway station, bus stop, mall, colleges, office and roads. This service can become the good business also in the industry.

- **Motivation**

Firstly, we wanted to do something innovative so we done survey on what we can do which will impact in reality so we focused on mobile charging problem and going to implement this project on small scale because its costly.

- **Objectives**

1. To reduce wastage of electrical power which often arises due to negligence of user.
2. Provide facility for charging mobile phones at public places.
3. Creating a smart Technology Environment.
4. Easily make available the charging station

- **Literature survey:**

1. **A Coin Acceptor – Mobile Battery Charging using Solar Panel.**
(Ammu Anna Mathew, Anoop J.R.s Vivekanandan)

Abstract :

Various technologies are now developing in the field of electronics. One of the main technologies in our world is mobile phones. Nowadays it has become common among our people and the world can't think about a globe without mobile phones. People are using different types of mobile phones from different companies with various specifications as needed by the customer. One of the common factors between all the mobile phones is the power needed for the life of mobile phones [1]. Some manufacturers are entering the mobile market with portable chargers, but not all are functioning in the same way as their competitors.

The emerging technologies in electronics give smart phones with sophisticated technology having better battery power which will work for two or three days. But due to the heavy use by the customers, most of them last only for six to seven hours. So here a technique for charging the mobile phones while we are away from our home or office. In case of energy it is also depleting from day to day, so we are using solar energy for this purpose. Solar mobile chargers are devices that can charge your mobile phone with the sunray

- **Advantages :**

- A novel method for mobile phone charging based on a coin acceptor is designed and will be of great use to the public.
- the system is energy-efficient.
- This system can be placed at public places, thus everyone can access the mobile charging facility

- **Disadvantages :**

- Components are high costly.
- Requires solar panels and sunlight for charging.

2. **Mobile Charging Station based on Coin Insertion System.**

(Shaikh Mohd Shakeeb, Shaikh Mohd Ahsan, Fahad Khan, Tanvir Salmani, Nayna Dahatonde, Junaid Mandviwala)

Abstract :

Now a day's smart phones become an ineluctable part of human's life. The power supply is an integral part of all electronic systems. Most of the works are done through mobile phones daily, so charging is the essential requirement to operate them. Therefore, the idea is to develop a system that will provide charging on coin insertion. The important thing is that the said system will be available at public places at any time. The user has to insert the coin into the coin acceptor and plug the suitable adapter into the mobile phone. The amount of charging will be pre-defined values, as mentioned in the microcontroller. This system is easy to install and useful for everyone using a Smartphone. insertion-based mobile charging system that provides an effective

solution to everyone's low battery issues while travelling or during day-to-day activities. Most people use a Smartphone, which consumes tremendous battery power.

Within a few hours of usage, the mobile battery gets drained, and the users either have to switch off their net packs or use their mobile in power saving modes. At this time, users use readily available power banks, but power banks' availability is not a surety in each case. What if the mobile is switched off during the case of an emergency and there is an extremely urgent need to call someone or to check any email or respond to someone during travelling. Often, the battery becomes low in the middle of a conversation, particularly at inconvenient times when access to a standard charger is not possible. Also, at certain places such as colleges during exam time and in many commercial complexes, people are asked to keep their mobile phones outside before entering the premises. This time can be an excellent utilization for charging their phones using the coin insert mobile charger, which would provide efficient charging at reasonable rates. An Arduino microcontroller is programmed for all the controlling applications. Once the coin is inserted, the coin acceptor detects for authenticity of coin. For every unit of price, the power will be available only for a limited period. Then Arduino calculates the time based on the number of coins inserted. This is how a charging system will work. The system can be installed in places like malls, cafeterias, hospitals, railway stations, restaurants, colleges, airports, and many more.

The project was ideated considering the various issues, particularly college students faced throughout their day. Based on a survey done, many students did not have any safe source for charging their phones in case of an emergency. Hence the idea of implementing this system was formed. This project has been implemented by USA by a company called "Chargetech", wherein it is used at public places like malls and restaurants. This system can be used to generate revenue by displaying advertisements on the cabinet.

- **Advantages :**

- In this project, a coin insertion based mobile charging system is designed and developed, which can be installed at public places such as airports, railway stations, wherein users need to charge their phones as well as at places such as colleges and educational institutions wherein users can charge their mobile phones.
- The proposed system is designed and developed using Coral Raw and is programmed in Arduino IDE.

- **Disadvantages :**

- High cost and maintenance.
- Power issue during night, more costly overall and not feasible over a long run.

3. Coin Based Cell Phone Charger with Solar Tracking System. **(Mr. C.V. Raja Reddy, Uzoigwe Daniel, Rupesh Rai, Balaji R.)**

Abstract:

In the society today, the mobile phone has become a very important means of communication all around the world. The mobile phone has been a very helpful means of portraying information to people no matter the country you are. But there are certain people who tend to forget their mobile phone charger at home or in their place of work. This is where the coin based cell phone charger takes over, such that mobile phones can be charged in public places with the insertion of a coin. The need to provide a public charging service is essential. A mobile battery charger circuit is a device that can automatically recharge a mobile phone's battery when the

power in it gets low. Nowadays mobile phones have become an integral part of everyone's life and hence require frequent charging of battery owing to longer duration usage. Battery chargers come as simple, trickle, timer based, intelligent, universal battery charger-analyzers, fast, pulse, inductive, USB based, solar chargers and motion powered chargers. These battery chargers also vary depending on the applications like mobile phone charger, battery charger for vehicles, electric vehicle batteries chargers and charge stations.

The uses of alternative sources of energies are becoming widely spread in all over the world. The sun is also a very good source of different energies; the light energy has a very remarkable value. The Solar panel converts the light energy into the electrical energy. The

efficiency of solar panel can be maximized by aligning the solar panel with the sun. The sun tracking system is designed in this project, which offers a reliable and affordable method of aligning a solar panel with the sun. This project is based on microcontroller 8051 with a simple circuit and sun tracking software this power is stored in lead-acid battery and used for the coin based cell phone charger.

- **Advantages :**

- Effectively receive maximum energy from sun towards earth rotation.
- More useful to save energy from sun and intelligent tracking solar energy.
- Simple and hand efficient.
- Less expensive.
- Reduced man power.
- Low power consumption.

- **Disadvantages :**

- Less effective during winter season.
- After the energy stored in the battery is finished during night time, it has to wait till the sun rises up for further charging

- **Methodology/ Proposed system block diagram:**

This coin based charger system takes the electricity supply and charge the battery A coin insertion slot is a machine-driven space is attached with electrical triggering.

- ✓ User can start the system by placing the coin
- ✓ IR sensor detect the inserted coin
- ✓ If detected, then charging will start, otherwise refund the coin.
- ✓ User connect the charger to mobile
- ✓ If more coins added to increase charging.

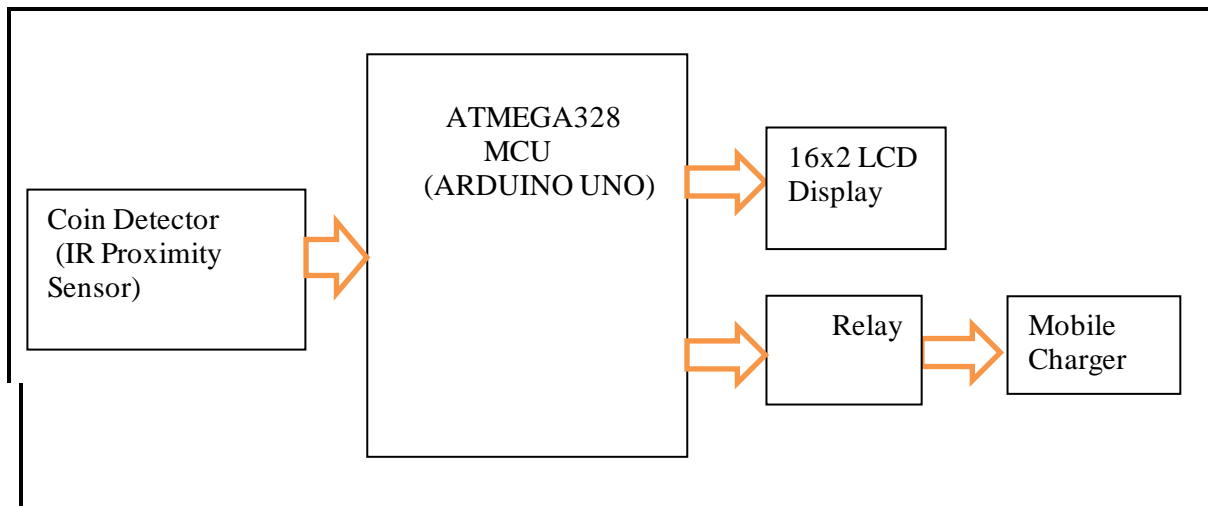


Fig. 1.1 - Project Basic Block diagram

1. REGULATED POWER SUPPLY

The power supply unit is used to provide a constant 5V of DC supply from a 230V of AC supply. These 5V DC will acts as power to different standard circuits. It mainly uses three devices

1. Step Down Transfomer
2. Bridge wave rectifier
3. Voltage regulator

- **Activity Diagram :-**

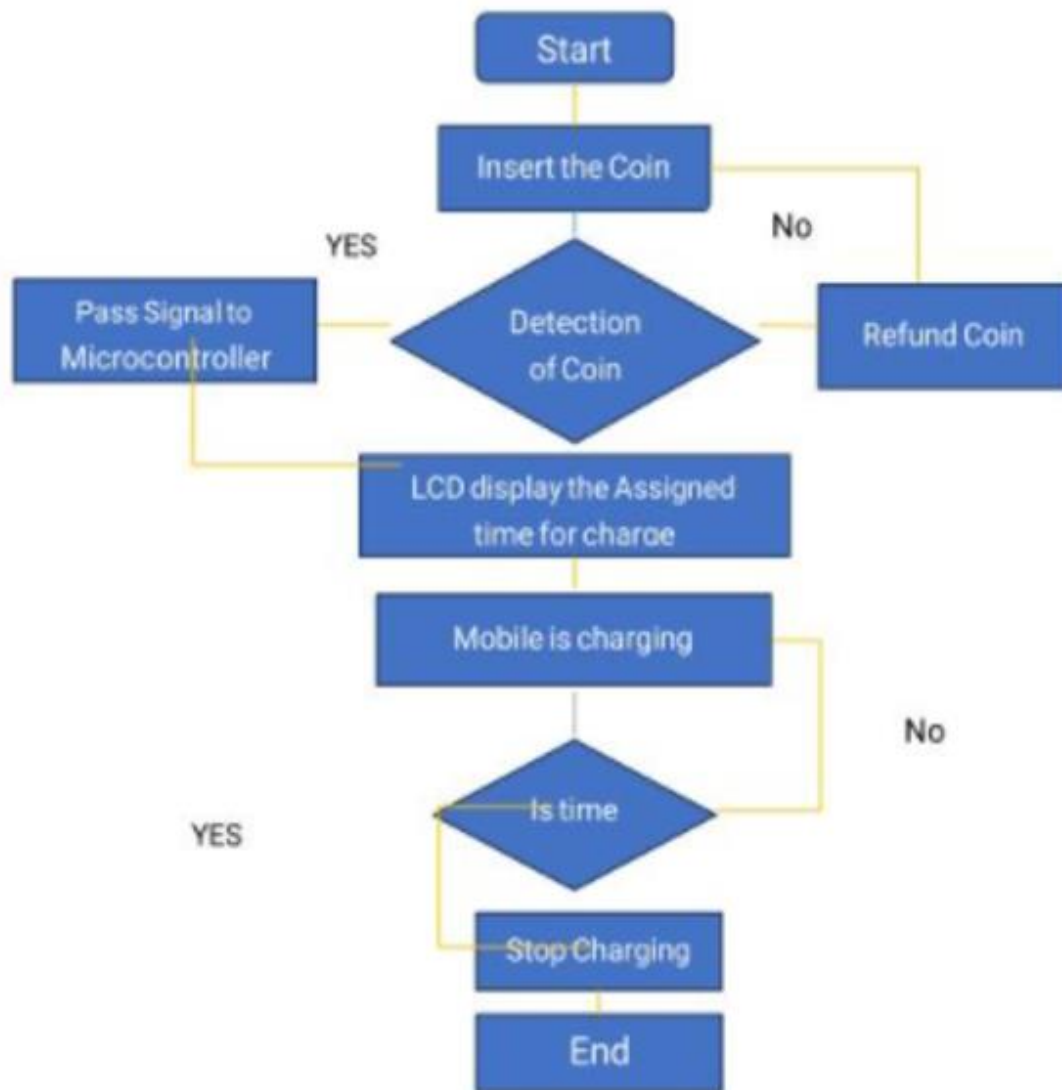
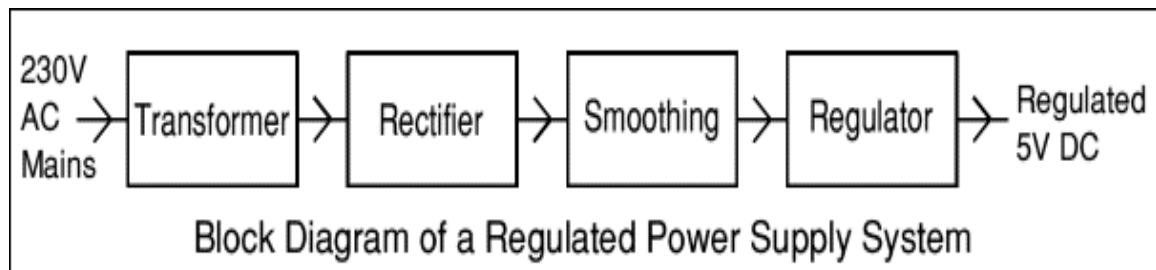


Fig. 1.2 - Activity Diagram for Coin Based Charger



1.3 – Block Diagram for Regulated Power Supply

2. BRIDGE WAVE RECTIFIER

A rectifier is an electrical device that converts alternating current (AC) to direct current (DC), a process known as rectification. The term rectifier describes a diode that is being used to convert AC to DC.

A bridge-wave rectifier converts the whole of the input waveform to one of constant polarity (positive or negative) at its output. Bridge-wave rectifier converts both polarities of the input waveform to DC (direct current), and is more efficient. However, in a circuit with a center tapped transformer (9-0-9) is used.

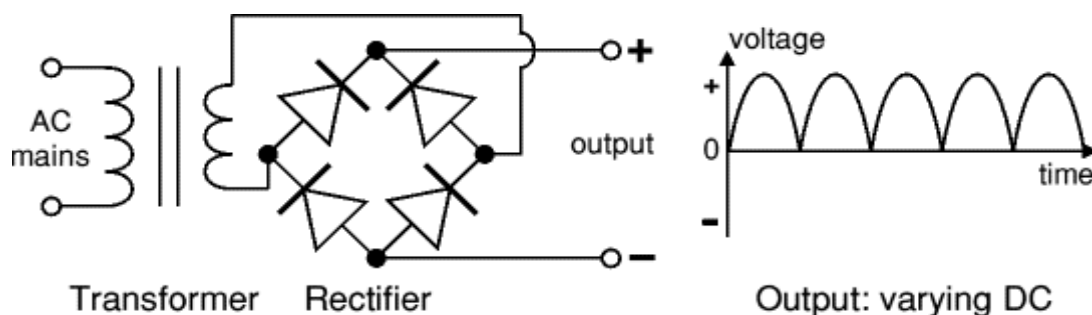


Fig. 1.4 – Bridge Wave Rectifier

For single-phase AC, if the transformer is center-tapped, then two diodes back-to-back (i.e. anodes-to-anode or cathode-to-cathode) can form a full-wave rectifier. Many windings are required on the transformer secondary to obtain the same output voltage.

In this only two diodes are activated at a time i.e. D1 and D3 activate for positive cycle and D2 and D4 activates for negative half cycle. D2 and D4 convert negative cycle to positive cycle as it as negative supply and negative cycle as positive cycle at its output.

VOLTAGE REGULATOR

Th is is most common voltage regulator that is still used in embedded designs. LM7805 voltage regulator is a linear regulator. With proper heat sink these LM78xx types can handle even more than 1A current. They also have Thermal overload protection, Short circuit protection. This will connect at the output of rectifier to get constant Dc supply instead of ripple .

voltages. It mainly consists of 3 pins :

1. Input voltage
2. Output voltage
3. Ground

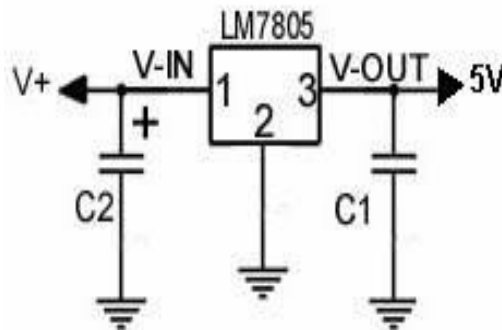


Fig. 1.5 – 3 Pin Diagram

- **Software and Hardware Requirement :**

- **Hardware Requirement :**

- 9V adaptor : 1
 - 5V regulator : 1
 - 16X2 LCD : 1
 - Arduino Uno : 1
 - IR Sensor : 1
 - Buzzer : 1
 - Relay(5V) : 1
 - Mobile Charger Adaptor : 1
 - Bread_Board : 1
 - I2C Connector : 1

- **Advantages/Disadvantages of system:**

- **Advantages:**

- Simple and Hand Efficient
 - Less Expensive
 - Reduced Man Power
 - Low Power Consumption

- **Disadvantages:**

- Data Breaching
 - Device Security
-

• Implementation:

The coin based mobile charger system, we developed needs to be thought as a full flex product and hence must be seen from a user point of view.

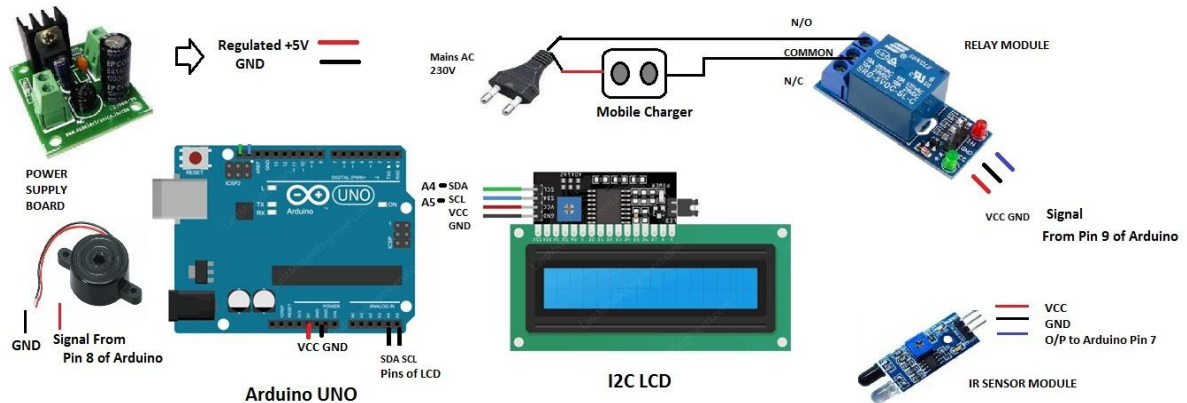


Fig. 1.6 – Components Diagram

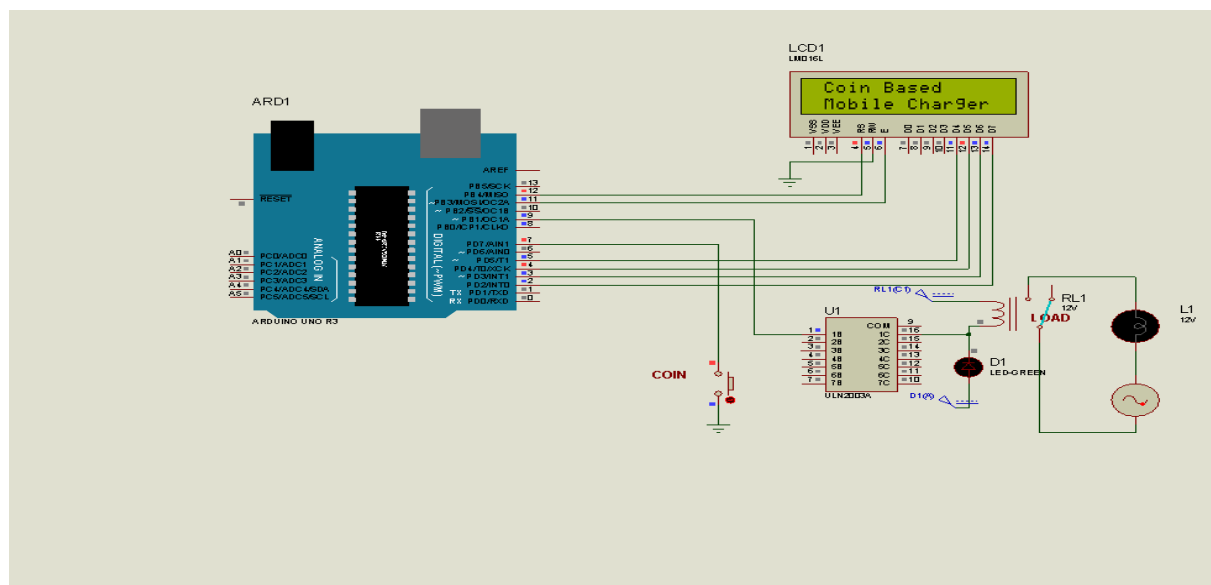


Fig. 1.7 - Connection Diagram

Step 1 : Working of LCD:

LCD is used to give instruction and information related to project , so according to LCD instruction user can easily interact to module and get benefits of module as much as easily. User can also see reverse count down time.

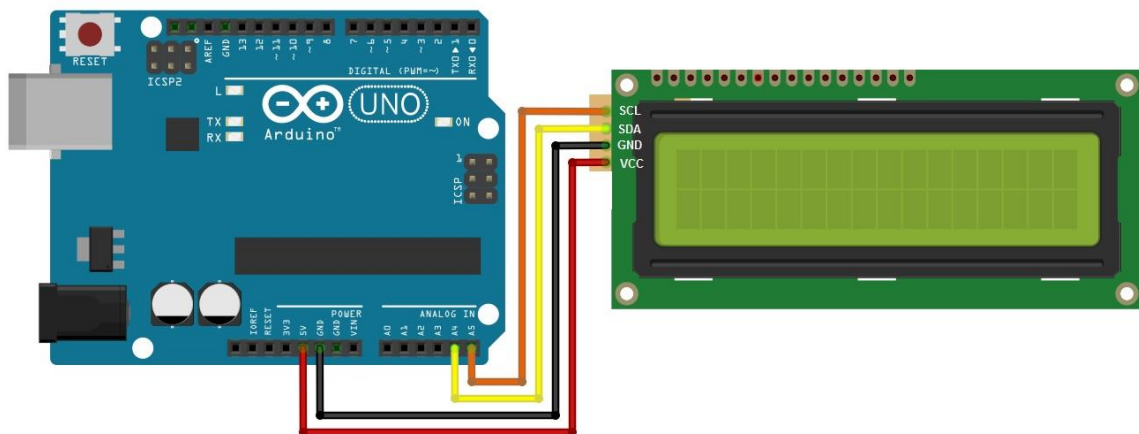


Fig. 1.8 - Connection of LCD

Step 2: Working with IR Sensor

An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion.

When we give power supply to components initial value of IR Sensor giving to Arudino is LOW because As per the property of light — light falling on a smooth shiny surface bounces off in a particular direction i.e. reflection — the ray send by IR Transmitter gets reflected from a surface and falls on IR Reciever. Subsequently, the receiver's resistance drops, and a LOW/0 signal is sent by the OUT pin to DIGITAL INPUT PIN 7 of the Arduino.

When we insert the coin in coin box IR sensor giving HIGH signal to Arudino because when the light sent isn't reflected either because there is no surface ahead or the surface ahead absorbs light, the resistance of the receiver rises and a HIGH/1 signal is sent by OUT pin to DIGITAL INPUT PIN 7 of the Arudino.

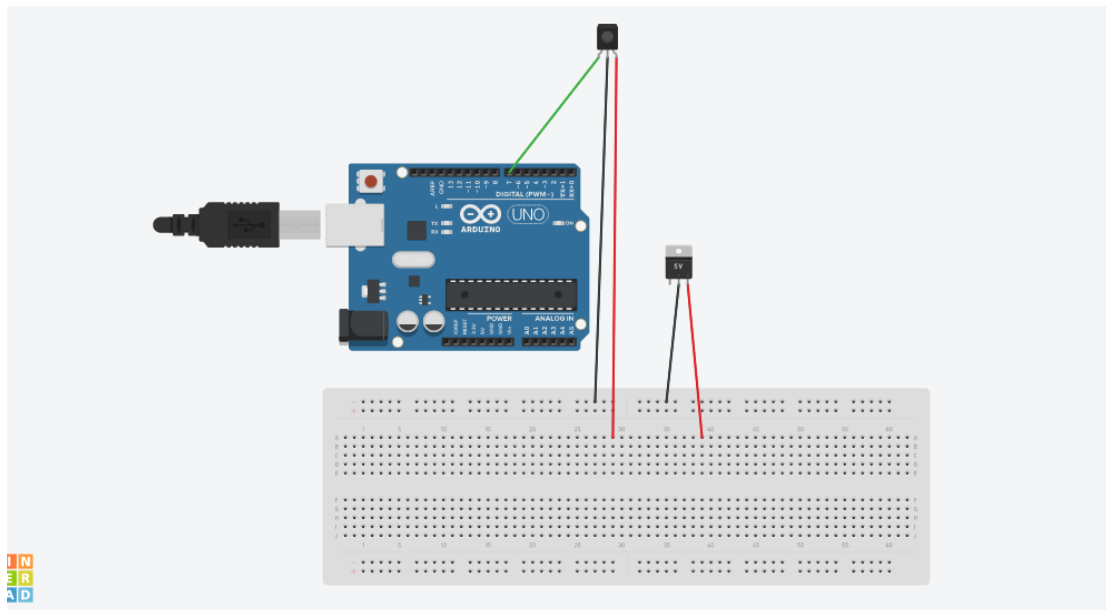


Fig. 1.9 - Connection of IR Sensor

Step 3: Working of Relay

A relay is an electrically operated switch that can be turned on or off, letting the current go through or not, and can be controlled with low voltages, like the 5V provided by the Arduino pins.

INPUT pin of relay is connected to Arduino DIGITAL OUTPUT PIN 9. When IR Sensor detect the coin it will send HIGH/1 signal to Arduino then at the same time arduino send HIGH/1 signal to relay through DIGITAL OUTPUT PIN 9. However, Relay get HIGH/1 signal it will generate magnetic field because of this, common is connected to NO & NC so circuit is completed and mobile getting charge through main supply till arduino send LOW/0 signal to Relay.

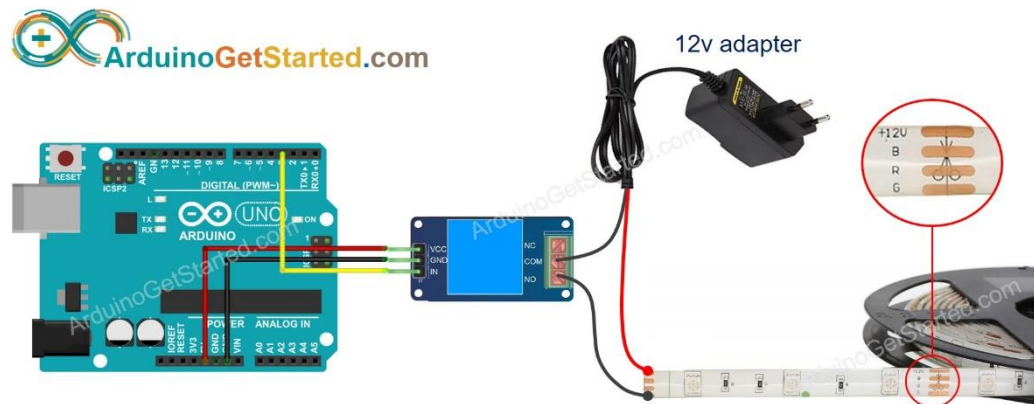


Fig. 1.10 - Connection of Relay

Step 4: Working of Buzzer

An arduino buzzer is also called a piezo buzzer. It is basically a tiny speaker that you can connect directly to an Arduino

When reverse count down time reaches to 0 (zero), Arduino send HIGH/1 signal to buzzer INPUT pin through DIGITAL OUTPUT PIN 8 . After getting HIGH/1 signal buzzer will beep for 0.5 sec .

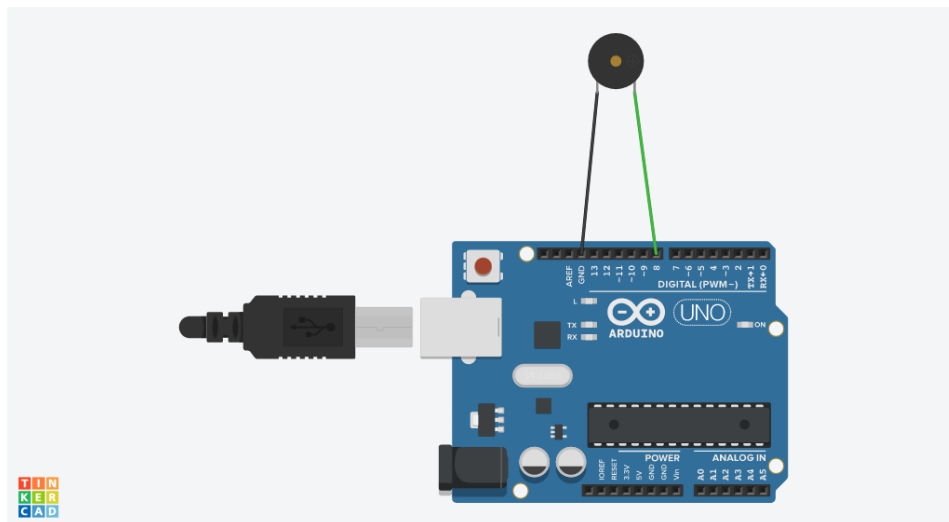


Fig. 1.11 - Connection of Buzzer

- **Results:**

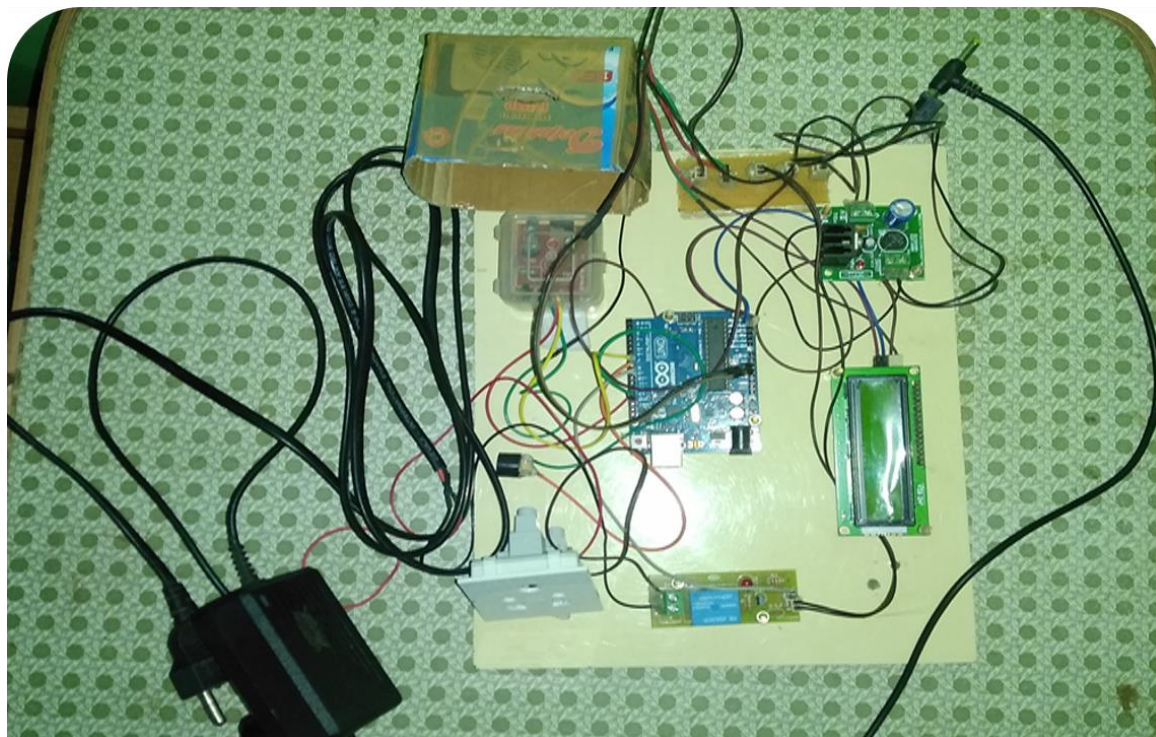


Fig. 1.12 – Project Module

- **Challenges faced:**

1. When power is passed to arduino the ON/OFF light must glow.
2. IR Sensor must be connected properly to Bread Board & arduino.
3. If object is within IR Sensor range then object must be detected otherwise not detected.
4. Input Voltage must be DC
5. If Regulator module is connected to DC, then operation indicator must be glow.
6. Output Voltage must be 5v DC.

- **Conclusion:**

After overall deployment and testing of our project. we thus conclude that , we successfully satisfied the expected requirements of the utility of Coin base Mobile charging system . We affluented the normal requirements and also achieved enhancements through various sensors. we have generated the results of a create-and-design research aimed at providing a Coin Based Mobile Charger using Arduino, Coin Sensor and relay. This plays a vital role in charging the mobile phones. It will be very useful and can be implemented in many areas.. A Robust and accurate handling were the key features and live streaming are the eye catcher..!

- **Future Scope:**

The Future Scope of any project can be thought as the ability to extend the current project with more enhancements and creative ideas as well as simplifying the business logic.

Project Future Scopes are as follows:

- Use of Solar panel as input power supply
- Use of coin acceptor to get coin
- Use of online payment
- Use of GPS Module to get current station location
- Use of android app to get location of station

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