Solar Grass Cutter

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Abstract: *A Solar grass cutter is a machine that uses sliding blades to cut a lawn, that help human to cut grass automatically. Even more sophisticated devices are there in every field. Due to rapid development, many robots have turn into an autonomous robot. Power consumption becomes essential for future. The movement or the path of the Solar grass cutter is based on a path planning technique. Solar grass cutter is a very useful device which is very simple in construction. It is used to maintain and upkeep lawns in gardens, schools, college's etc.*

In our project, we are using Arduino UNO, Bluetooth module, DC motor, solar panel. For this grass cutter, Arduino UNO microcontroller is utilized as the microcontroller. Sensors are used to provide feedback from outside world. We have made some changes in the existing machine to make its application easier at reduced cost. Our main aim in pollution control is attained through this. Unskilled operation can operate easily and maintain the lawn very fine and uniform surface look. Every action of the grass cutter is monitored by the ARDUINO UNO with the help of the sensors and Bluetooth module. In our project,—Solar grass cutter is used to cut the different grasses for the different application

Keywords: Solar grass cutter

I. INTRODUCTION

Solar energy is a renewable source of energy. Its sources are divided into two types they are passive solar source and active solar source. These sources are completely depending upon how the solar energy is captured and it is distributed and also on how it is converted to the solar power. As we know the solar energy is free energy and it can be utilized easily. By using this solar energy, we operate solar grass cutter.

In the market there are many different grass cutters are available such as gasoline-based grass cutter, electrical energy-based grass cutter. The electrical grass cutter depends upon electricity and the gasoline-based grass cutter requires fuel to work. The burning of fuel in gasoline grass cutter cause air pollution as well as noise pollution. For the cutter machine large cable wire is required for cutting the grass of large area and the weight of motor is also heavy.

So, as the technology is improving, we also need to replace the traditional conventional grass cutter to the new automated solar based grass cutter. So, from the above difficulties, tried to make an automated solar based grass cutter which having battery of 12V and a solar panel which used to store the solar energy in the battery. There are total 5 DC motors are used in the device from which 4 are used for moving device from one place to another and one big motor is used for cutting of the grass. These motors are connected to the motor driver and handled by Arduino UNO.

Nowadays the automation plays very important role in the field of inventions and also automation is growing very rapidly. So, it plays very important role in the life of humans. Before, the grass cutter was handled manually that is by human contact and also, they require fuel or energy for working, Due to this there is lot of loss of fuel and energy and it causes pollution as fuel is used for running the device.

II. REVIEW OF LITERATURE

2.1 EXISTING SYSTEM

Solar Based Grass Cutter : A Review " Ms. Bhagyashri R. Patil, Mr. Sagar S. Patil" , in the paper titled "Solar Based Grass Cutter : A Review " states that , conventional grass cutter consumes non-renewable sources of energy. So in order to be an alternate green grass cutter can be powered by using solar energy.

B. Sensor Based Multipurpose Agricultural Cutter " Prof.J.P.Wagh, Aishwarya Chaudhari", in the paper titled " Sensor Based Multipurpose Agricultural Cutter " states that, the rotary mower can rotate about a vertical axis with the blade spinning at high speed and this tends to result in a rougher cut and shreds the grass leaf easily.

C. Solar based Grass Cutter with MPPT Tracking Panel " Ms. Gurav Sayali, Ms. Desai Pritam ", in the paper titled "Smart Solar based Grass Cutter with MPPT Tracking Panel " states that, adding an interfacing of automatic power bank to charge the battery instantly can help the grass cutter run for long time.

G. Rahul portrays the use of solar energy to run the electric motor used for cutting grass. Bhosale and Khadake have presented the implementation of smart solar grass cutter. This system is driven by the solar energy by using solar panel and battery. This grass cutting machine was programmable for engine speed control.

To design a Smart Solar Grass Cutter, some parameters need to be considered such as the components to be used in the project, the position of the components, the structure of the main body, the advantages and disadvantages of the design and the safety factors.

2.2 PROBLEM STATEMENT

Solar energy is a renewable source of energy. Its sources are divided into two types they are passive solar source and active solar source. These sources are completely depending upon how the solar energy is captured and it is distributed and also on how it is converted to the solar power. As we know the solar energy is free energy and it can be utilized easily. By using this solar energy, we operate solar grass cutter.

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III. METHODOLOGY AND IMPLIMENTATION

3.1 BLOCK DIAGRAM

Coming to the working of solar powered grass cutter , it has panels mounted in a particular arrangement at an angle of 45 degrees in such a way that it can receive solar radiation with high intensity easily from the sun. These solar panels convert solar energy into electrical energy as studied earlier. Now this electrical energy is stored in batteries by using a solar charger.
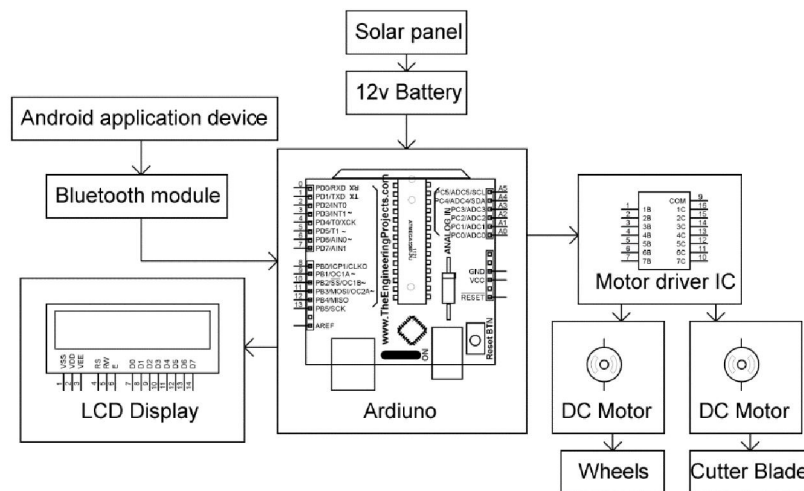
OPERATION MODULE

The main function of the solar charger is to increase the current from the panels while batteries are charging, it also disconnects the solar panels from the batteries when they are fully charged and also connects to the panels when the charging in batteries is low. The motor is connected to the batteries through connecting wires. Between these two mechanical circuit breaker Bluetooth module is provided. It starts and stops the working of the motor. Bluetooth

module is connected to android application device, though which we are moving this grass cutter inforward, backward, left, right direction. From this motor, the power transmits to the mechanism and this makes the blade to slide on the fixed blade and this makes to cut the grass.

3.2 PROPOSED SYSTEM

The grass cutter machines are becomes very popular today. Pollutions is manmade, which we can see in ours daily life. Old model of grass cutter IC engine are used and hence because of its environment impact pollutions level rise IC engine driven cutter is costlier. Maintenance of such conventional machines is very much. To avoid the drawbacks. The aim of our project grass cutter. The grass cutter has been obstacle sensor for obstacle detection. Grass cutter operate automatic hence it does not require skill person to operate.

3.3 HARDWARE REQUIREMENTS

- Arduino UNO
- Bluetooth module
- LCD Display
- Motor driver IC
- DC motor 30rpm 12v dc motor
- Solar Panel
- Battery

3.4 SOFTWARE REQUIREMENTS

- Arduino
- Eagle

3.5 HARDWARE DESCRIPTION

ARDUINO

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.

Over the years Arduino has been the brain of thousands of projects, from everyday objects to complex scientific instruments. A worldwide community of makers - students, hobbyists, artists, programmers, and professionals - has gathered around this open-source platform, their contributions have added up to an incredible amount of accessible knowledge that can be of great help to novices and experts alike.
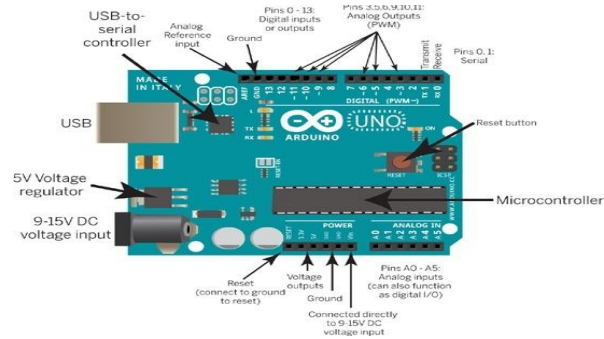
Steps to program an Arduino

Programs written in Arduino are known as sketches. A basic sketch consists of 3 parts

1. Declaration of Variables
2. Initialization: It is written in the setup () function.
3. Control code: It is written in the loop () function.

The sketch is saved with.ino extension. Any operations like verifying, opening a sketch, saving a sketch can be done using the buttons on the toolbar or using the tool menu.

The sketch should be stored in the sketchbook directory.

Click on the upload button or chose upload from the tools menu. Thus the code is uploaded by the bootloader onto the microcontroller.

Power (USB / Barrel Jack)

Every Arduino board needs a way to be connected to a power source. The Arduino UNO can be powered from a USB cable coming from your computer or a wall power supply (like this) that is terminated in a barrel jack. In the picture above the USB connection is labeled **(1)** and the barrel jack is labeled **(2)**.

Reset Button

Just like the original Nintendo, the Arduino has a reset button **(10)**. Pushing it will temporarily connect the reset pin to ground and restart any code that is loaded on the Arduino. This can be very useful if your code doesn't repeat, but you want to test it multiple times. Unlike the original Nintendo however, blowing on the Arduino doesn't usually fix any problems.

TX RX LEDs

TX is short for transmit, RX is short for receive. These markings appear quite a bit in electronics to indicate the pins responsible for serial communication. In our case, there are two places on the Arduino UNO where TX and RX appear – once by digital pins 0 and 1, and a second time next to the TX and RX indicator LEDs **(12)**.

Main IC

The black thing with all the metal legs is an IC, or Integrated Circuit **(13)**. Think of it as the brains of our Arduino. The main IC on the Arduino is slightly different from board type to board type. If you want to know more about the difference between various IC's, reading the datasheets is often a good idea.

LCD (LIQUID CRYSTAL DISPLY)

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.
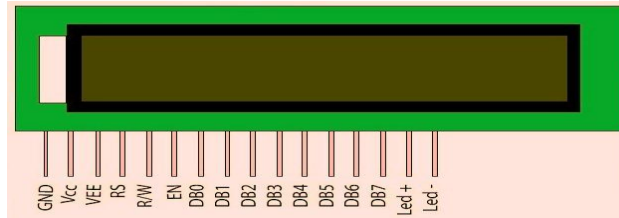
Pin No	Function	Name
1	Ground (0V)	Ground
2	Supply voltage; 5V (4.7V – 5.3V)	Vcc
3	Contrast adjustment; through a variable resistor	V_{EE}
4	Selects command register when low; and data register when high	Register Select
5	Low to write to the register; High to read from the register	Read/write
6	Sends data to data pins when a high to low pulse is given	Enable
7	8-bit data pins	DB0
8		DB1
9		DB2
10		DB3
11		DB4
12		DB5
13		DB6
14		DB7
15	Backlight V_{CC} (5V)	Led+
16	Backlight Ground (0V)	Led-

ALL LCD HAVE

- Eight(8) Data pins
- VCC (Apply 5v here)
- GND (Ground this pin)
- RS (Register select)
- RW (read - write)
- EN (Enable)
- V0 (Set Lcd contrast)

V0 (Set Lcd contrast)

Set lcd contrast here. Best way is to use variable resistor such as potentiometer. Output of the potentiometer is connected to this pin.

RS(Register select)

Their are two registers in every lcd
1 Command Register
2 Data Register

Command Register

When we send commands to lcd these commands go to Command register and are processed their.Commands with their full description are given in the picture below.

When RS=0   Command Register is Selected.

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Data Register

When we send Data to lcd it goes to data register and is processed their.

When RS=1   Data Register is selected.

RW(Read - Write)

When RW=1 We want to read data from lcd.

When RW=0 We want to write to lc

Interfacing LCD

Circuit Diagram of Interfacing LCD to AT89C51
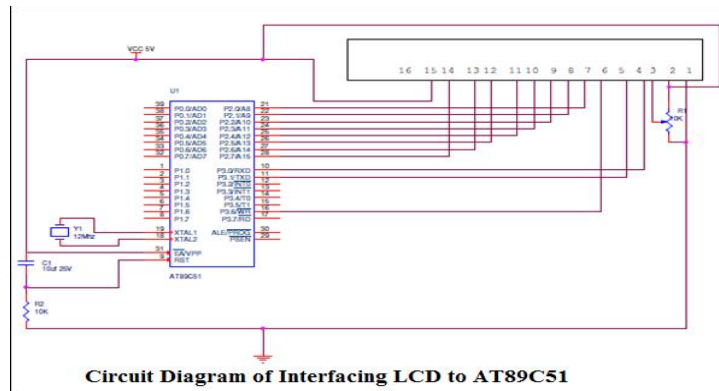
VEE pin is meant for adjusting the contrast of the LCD display and the contrast can be adjusted by varying the voltage at this pin. This is done by connecting one end of a POT to the Vcc (5V), other end to

16×2 LCD module commands

16×2 LCD module has a set of preset command instructions. Each command will make the module to do a particular task. The commonly used commands and their function are given in the table below.

Command	Function
0F	LCD ON, Cursor ON, Cursor blinking ON
01	Clear screen
02	Return home
04	Decrement cursor
06	Increment cursor
0E	Display ON ,Cursor blinking OFF
80	Force cursor to the beginning of 1st line
C0	Force cursor to the beginning of 2nd line
38	Use 2 lines and 5×7 matrix
83	Cursor line 1 position 3
3C	Activate second line
08	Display OFF, Cursor OFF
C1	Jump to second line, position1
OC	Display ON, Cursor OFF
C1	Jump to second line, position1
C2	Jump to second line, position2

LCD initialization.

The steps that has to be done for initializing the LCD display is given below and these steps are common for almost all applications.

Send 38H to the 8 bit data line for initialization

Send 0FH for making LCD ON, cursor ON and cursor blinking ON.

Send 06H for incrementing cursor position.

Send 01H for clearing the display and return the cursor.

Sending data to the LCD.

The steps for sending data to the LCD module is given below. I have already said that the LCD module has pins namely RS, R/W and E. It is the logic state of these pins that make the module to determine whether a given data input is a command or data to be displayed.

Make R/W low.

Make RS=0 if data byte is a command and make RS=1 if the data byte is a data to be displayed.

Place data byte on the data register.

Pulse E from high to low.

Repeat above steps for sending another data.

BLUETOOTH

As a world leader in short-range wireless connectivity, Laird offers the widest range of high-performance classic Bluetooth and Bluetooth Low Energy (BLE) modules for data and audio applications. With over a decade of experience in the development and production of Bluetooth wireless modules and associated development kits
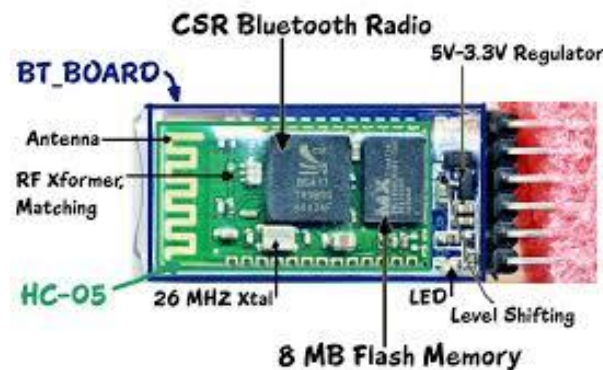
Setting up the HC-05 is as easy as ABC. All you need to know is the pin configuration. The HC-05 has 6 pins: wakeup, VCC, GND, TXD, RXD and State. Right now I will only deal with 3 pins, which are VCC, GND and TXD .

Here is how you should connect the Bluetooth module to your Microcontroller.

HC-06>>> Microcontroller

VCC>>>>3.3v

GND>>>>GND

TXD>>>>RXD

RXD>>>>TXD

The HC-05 acts as a serial port through which you can send and receive data. So using a serial terminal or a Bluetooth customized application on your computer or phone, you can control and monitor your project. I used Teraterm as the serial terminal.

Before, uploading the code to the Microcontroller., disconnect the HC-05 module, since it shares the tx/rx pins and will interfere with the upload. Connect it back once the code has been uploaded successfully

This code allows you to switch on and off an LED using by sending a command to the Microcontroller.via Bluetooth.
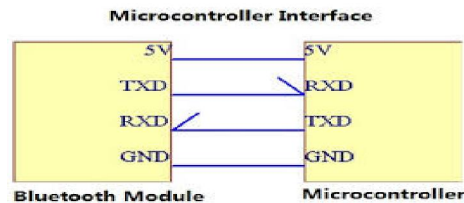
See, we haven't written any code for Bluetooth communication. So, that's because Bluetooth communication is implicitly Serial Communication. And in Arduino, what you can do with the Serial Monitor in In the Definition part, we declare the LED variable that accepts 12 (in other words the Digital PIN). And the char input that we will further use for accepting the user's instructions.

MOTOR DRIVER IC

L293D is a dual H-bridge motor driver integrated circuit (IC). Motor drivers act as current amplifiers since they take a low-current control signal and provide a higher-current signal. This higher current signal is used to drive the motors.

Pin diagram
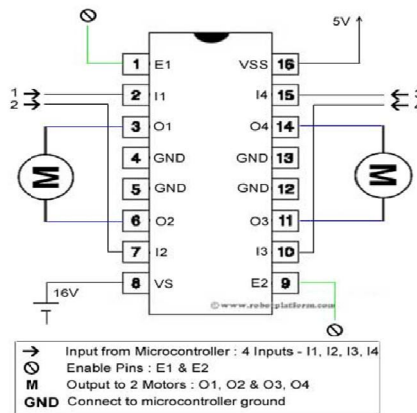
Pin Description:

S1	S2	S3	S4	Motor
1	0	0	1	Clockwise
0	1	1	0	Anti-Clockwise
1	1	1	1	Stop
0	0	0	0	Stop

DC MOTOR

A DC motor in simple words is a device that converts direct current(electrical energy) into mechanical energy. It's of vital importance for the industry today, and is equally important for engineers to look into the **working principle of DC motor** in details that has been discussed in this article. In order to understand the **operating principle of dc motor** we need to first look into its constructional feature.
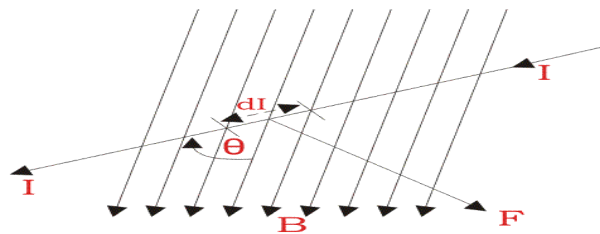
$$dF = dq(E + vB)$$

For the **operation of dc motor**, considering E = 0

$$dF = dq \times v \times B$$

i.e. it's the cross product of dq v and magnetic field B.

$$dF = dq\frac{dL}{dt} \times B \qquad \left[V = \frac{dL}{dt}\right]$$

Where dL is the length of the conductor carrying charge q.

$$dF = dq\frac{dL}{dt} \times B$$

$$or, \ dF = IdL \times B \qquad \left[Since, \ current \ I = \frac{dq}{dt}\right]$$

$$or, \ F = IL \times B = ILB\sin\theta$$

$$or, \ F = BIL\sin\theta$$

From the 1st diagram we can see that the construction of a DC motor is such that the direction of current through the armature conductor at all instance is perpendicular to the field.

The torque produced is given by,

$$Torque = (force, \ tangential \ to \ the \ direction \ of \ armature \ rotation) \times (distance)$$

$$or, \ \tau = F \cos \alpha \times w$$

$$or, \ \tau = BILw \cos \alpha$$

SOLAR PANEL

Photovoltaic principles:

The photo- voltaic effect can be observed in nature in a variety of materials that have shown that the best performance in sunlight is the semiconductors as stated above. A solar cell consists of

- Semi –conductor in which electron hole pairs are created by the absorption of incident solar radiation.
- Region containing a drift field for charge separation.
- Charge collecting front and back electrodes.

Photovoltaic effect

The photo-voltaic effect can be described easily for p-n junction in a semi-conductor. In an intrinsic semi-conductor such as silicon, each one of the four valence electrons of the material atom is tied in a chemical bond, and there are no free electrons at absolute zero. If a piece of such a material is doped on one side by a five valance electron material, such as arsenic or phosphorus, there will be an excess of electrons in that side, becoming an n-type semi-conductor.

SPECFICATIONS:

Array size : 67×60cm
Maximum Power : 50W
Maximum Voltage : 12V
Maximum Current : 2.9A
No of modules : 1 Type : Poly crystalline

BATTERY

The batteries are used as a storage device for solar energy which can be further converted into electrical energy. To be economically attractive the storage of solar electricity requires a battery with following particular combination of properties:
(1) Low cost
(2) Long life
(3) High reliability
(4) High overall efficiency

VOLTAGE REGULATORS

The most commonly used regulating modes will be covered. The linear regulator is the basic building block of nearly every power supply used in electronics. The IC linear regulator is so easy to use that it is virtually foolproof, and so inexpensive that it is usually one of the cheapest components in an electronic assembly.

VOLTAGE REGULATOR IC 7805:

7805 is a **voltage regulator** integrated circuit. It is a member of 78xx series of fixed linear voltage regulator ICs. The voltage source in a circuit may have fluctuations and would not give the fixed voltageoutput.
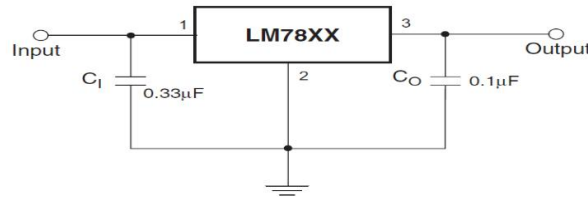
PUSH BUTTONS
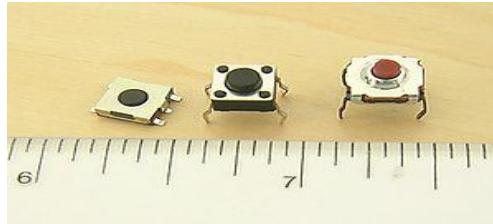
A push-button (also spelled pushbutton) or simply button is a simple switch mechanism for controlling some aspect of a machine or a process. Buttons are typically made out of hard material, usually plastic or metal. The surface is usually flat or shaped to accommodate the human finger or hand, so as to be easily depressed or pushed. Buttons are most often biased switches, though even many un-biased buttons (due to their physical nature) require a spring to return to their un-pushed state

Uses:

In industrial and commercial applications push buttons can be linked together by a mechanical linkage so that the act of pushing one button causes the other button to be released. In this way, a stop button can "force" a start button to be released. This method of linkage is used in simple manual operations in which the machine or process have no electrical circuits for control.

Pushbuttons are often color-coded to associate them with their function so that the operator will not push the wrong button in error. Commonly used colors are red for stopping the machine or process and green for starting the machine or process.

Push to ON button:

Fig 4.7(a): push on button

Initially the two contacts of the button are open. When the button is pressed they become connected. This makes the switching operation using the push button.
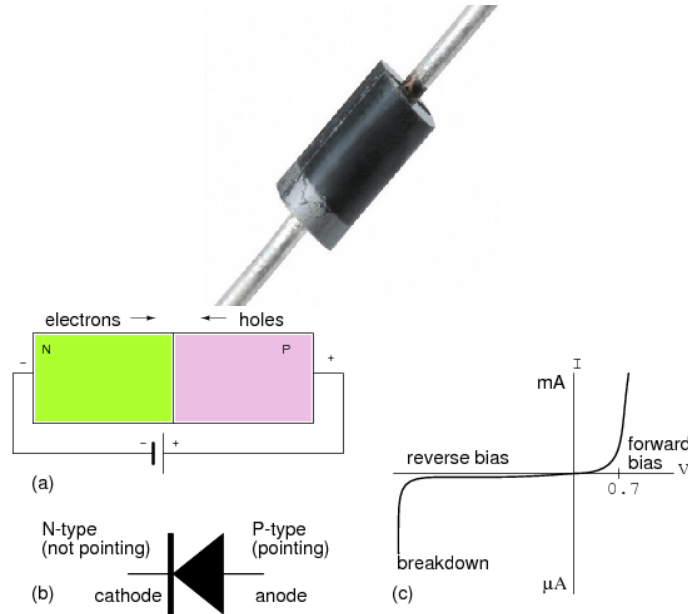
1N4007

Diodes are used to convert AC into DC these are used as half wave rectifier or full wave rectifier. Three points must he kept in mind while using any type of diode.

Maximum forward current capacity

Maximum reverse voltage capacity

Maximum forward voltage capacity

The number and voltage capacity of some of the important diodes available in the market are as follows:

Diodes of number IN4001, IN4002, IN4003, IN4004, IN4005, IN4006 and IN4007 have maximum reverse bias voltage capacity of 50V and maximum forward current capacity of 1 Amp.

Diode of same capacities can be used in place of one another. Besides this diode of more capacity can be used in place of diode of low capacity but diode of low capacity cannot be used in place of diode of high capacity. For example, in place of IN4002; IN4001 or IN4007 can be used but IN4001 or IN4002 cannot be used in place of IN4007.

PN JUNCTION OPERATION

Now that you are familiar with P- and N-type materials, how these materials are joined together toform a diode, and the function of the diode, let us continue our discussion with the operation of the PNjunction. But before we can understand how the PN junction works, we must first consider current flow inthe materials that make up the junction and what happens initially within the junction when these twomaterials are joined together.

Current Flow in the N-Type Material

Conduction in the N-type semiconductor, or crystal, is similar to conduction in a copper wire. Thatis, with voltage applied across the material, electrons will move through the crystal just as current wouldflow in a copper wire. As an electron leaves the crystal, an electron from the negative terminal of the battery willenter the crystal, thus completing the current path. Therefore, the majority current carriers in the N-typematerial (electrons) are repelled by the negative side of the battery and move through the crystal towardthe positive side of the battery.

RESISTORS

A resistor is a two-terminal electronic component designed to oppose an electric current by producing a voltage drop between its terminals in proportion to the current, that is, in accordance with Ohm's law:

$$V = IR$$

A resistor is a two-terminal passive electronic component which implements electrical resistance as a circuit element. The reciprocal of the constant of proportionality is known as the resistance R, since, with a given voltage V, a larger value of R further "resists" the flow of current I as given by Ohm's law:

$$I = \frac{V}{R}$$

Units

The ohm (symbol: Ω) is the SI unit of electrical resistance, named after Georg Simon Ohm. An ohm is equivalent to a volt per ampere. Since resistors are specified and manufactured over a very large range of values, the derived units of milliohm (1 mΩ = 10^{-3} Ω), kilohm (1 kΩ = 10^{3} Ω), and megohm (1 MΩ = 10^{6} Ω) are also in common usage.

Adjustable resistors

A resistor may have one or more fixed tapping points so that the resistance can be changed by moving the connecting wires to different terminals. Some wire wound power resistors have a tapping point that can slide along the resistance element, allowing a larger or smaller part of the resistance to be used.

Potentiometers

A common element in electronic devices is a three-terminal resistor with a continuously adjustable tapping point controlled by rotation of a shaft or knob. These variable resistors are known as potentiometers when all three terminals are present, since they act as a continuously adjustable voltage divider. A common example is a volume control for a radio receiver.
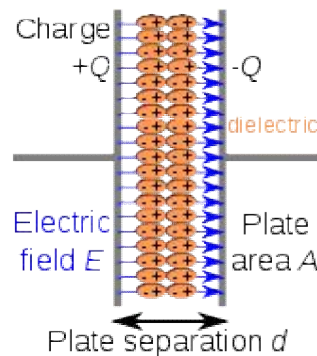
CAPACITORS

A capacitor or condenser is a passive electronic component consisting of a pair of conductors separated by a dielectric. This field stores energy and produces a mechanical force between the plates. The effect is greatest between wide, flat, parallel, narrowly separated conductors.

Capacitors are widely used in electronic circuits for blocking direct current while allowing alternating current to pass, in filter networks, for smoothing the output of power supplies, in the resonant circuits that tune radios to particular frequencies and for many other purposes.

Theory of operation

Capacitance

Charge separation in a parallel-plate capacitor causes an internal electric field. A dielectric (orange) reduces the field and increases the capacitance.

A simple demonstration of a parallel-plate capacitor

Examples of dielectric mediums are glass, air, paper, vacuum, and even a semiconductor depletion region chemically identical to the conductors.

The capacitor is a reasonably general model for electric fields within electric circuits. An ideal capacitor is wholly characterized by a constant capacitance C, defined as the ratio of charge ±Q on each conductor to the voltage V between them:

$$C = \frac{Q}{V}$$

Sometimes charge build-up affects the capacitor mechanically, causing its capacitance to vary. In this case, capacitance is defined in terms of incremental changes:

$$C = \frac{dq}{dv}$$

Energy storage

Work must be done by an external influence to "move" charge between the conductors in a capacitor. When the external influence is removed the charge separation persists in the electric field and energy is stored to be released when the charge is allowed to return to its equilibrium position.

Current-voltage relation

The current i(t) through any component in an electric circuit is defined as the rate of flow of a charge q(t) passing through it, but actual charges, electrons, cannot pass through the dielectric layer of a capacitor, rather an electron accumulates on the negative plate for each one that leaves the positive plate, resulting in an electron depletion and consequent positive charge on one electrode that is equal and opposite to the accumulated negative charge on the other. Thus the charge on the electrodes is equal to the integral of the current as well as proportional to the voltage as discussed above. As with any anti derivative, a constant of integration is added to represent the initial voltage v (t_0). This is the integral form of the capacitor equation,

LED

LEDs are semiconductor devices. Like transistors, and other diodes, LEDs are made out of silicon. What makes an LED give off light are the small amounts of chemical impurities that are added to the silicon, such as gallium, arsenide, indium, and nitride.

When current passes through the LED, it emits photons as a byproduct. Normal light bulbs produce light by heating a metal filament until it is white hot. LEDs produce photons directly and not via heat, they are far more efficient than incandescent bulbs.
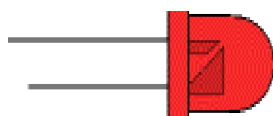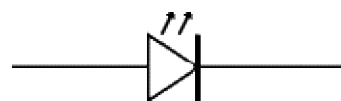
Fig 4.12(a): Typical LED   Fig 4.12(b): circuit symbol

Types of LED'S

LEDs are produced in an array of shapes and sizes. The 5 mm cylindrical package is the most common, estimated at 80% of world production. The color of the plastic lens is often the same as the actual color of light emitted, but not always. For instance, purple plastic is often used for infrared LEDs, and most blue devices have clear housings. There are also LEDs in extremely tiny packages, such as those found on blinkers and on cell phone keypads. The main types of LEDs are miniature, high power devices and custom designs such as alphanumeric or multi-color.
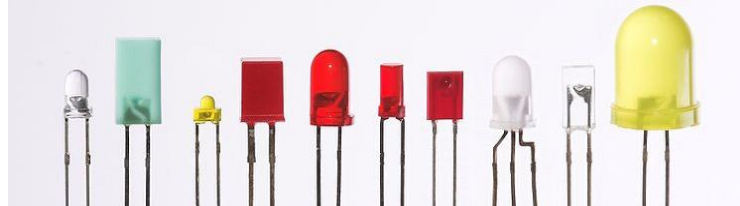

Fig 4.12(c) Different types of LED'S

Colors and materials of LED'S

Conventional LED'S are made from a variety of inorganic semiconductor materials, the following table shows the available colours with wavelength range, voltage drop and material.

White LED'S

Light Emitting Diodes (LED) have recently become available that are white and bright, so bright that they seriously compete with incandescent lamps in lighting applications. They are still pretty expensive as compared to a GOW lamp but draw much less current and project a fairly well focused beam.
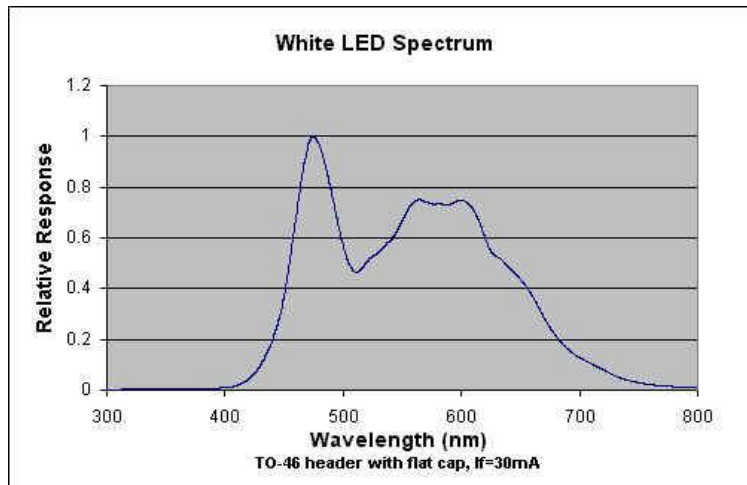
3.6 SOFTWARE DESIGN
ARDUINO ID

Arduino IDE is an open-source software, designed by Arduino.cc and mainly used for writing, compiling & uploading code to almost all Arduino Modules.

It is an official Arduino software, making code compilation too easy that even a common person with no prior technical knowledge can get their feet wet with the learning process.

It is available for all operating systems i.e. MAC, Windows, Linux and runs on the Java Platform that comes with inbuilt functions and commands that play a vital role in debugging, editing and compiling the code.

A range of Arduino modules available including Arduino Uno, Arduino Mega, Arduino Leonardo, Arduino Micro and many more.

Each of them contains a microcontroller on the board that is actually programmed and accepts the information in the form of code.

The main code, also known as a sketch, created on the IDE platform will ultimately generate a Hex File which is then transferred and uploaded in the controller on the board.

The IDE environment mainly contains two basic parts: Editor and Compiler where former is used for writing the required code and later is used for compiling and uploading the code into the given Arduino Module.

EAGLE
INTRODUCTION

This tutorial leads you through the steps necessary to make a simple two-sided PCB using EAGLE. This guide is operational: it shows in detail what you do and how to do it. Before you start the tutorial take 5 minutes to go through the Cadsoft EAGLE Guided tour, to get an overview. It will pay you to work through all of this guide, following the steps yourself, before attempting your first unguided PCB. A short note about the EAGLE on-line help documentation. This is pretty good but based on the command-line interface to EAGLE.

Inorder to design a PCB, you need to complete the following steps:

1. Create a schematic sheet & add components
2. Add nets to the schematic (connect components)
3. Check schematic (Electrical Rule Check or ERC)
4. Create a board outline
5. Position components on the board
6. Route tracks between the components
7. Check board (Design Rule Check or DRC)
8. Pour copper to fill empty spaces on the board
9. (optional) Add text legends to PCB layout
10. Perform Final Checks

BEFORE STARTING

Before Starting You will want (or if using EAGLE on a networked workstation need) to change the default project directory. Start the EAGLE control panel. Options->Directories gives a list of directories. Change the projects directory if necessary to something convenient that you can write, e.g. on the EEE system H:/EAGLEProjects. All new projects will be created inside this directory, and the EAGLE project navigator in the control panel uses this as a root. For more advanced use you may wish to change the other directories also. The directory changes made are saved under "My Documents" as eaglerc.usr, so normally need to be made only once.

Step 1: Schematic Creation

Make a project for your PCB design
Start the EAGLE Control Panel application.
Create a new project:
File->New->Project.
Rename the project if you wish as follows: the control panel window indicates whether a project is open with a green circle next to the project name. Click this if necessary to close the project. Then

Right-click->

Rename on the project's name

After having renamed the project you can reopen it.

Right-click on the Project name ->New->Schematic. The schematic window will open. Inside the schematic window:

File->Save as (choose a suitable name for your schematic sheet. NB - the freeware version of EAGLE allows only one sheet per design). For the first half of this tutorial you will be working with the schematic window, and can minimise the control panel window

Open component libraries

By default all the standard EAGLE libraries are open which makes it inconvenient to select your components from the EEE library. Download the design project library from the web and save it somewhere, for example (on the departmental system) to:

 h:\eagle\lbr\ee2parts.lbr

In the schematic command window (long thin box at top) type the following commands to change the open libraries:

USE -* USE h:\eagle\lbr\ee2parts.lbr

or

USE < this displays an open file dialog box to find and open your library>

 If you want to use components from the standard libraries they can all be reopened again with "USE *". However the ee2parts components have hole sizes suitable for easy hand soldering and should be used preferentially - they contain all the components needed for the design project.

Add components to your schematic

Edit->Add-> Select component

Each open library in the ADD window contains a list of components (click + if not visible). Some components have multiple packages (click on + to select the correct package). The component schematic symbol and package layout appear in the two windows to the right of the library window. Each component has a description you can check to see what it is. When you have identified the correct component and package (component & package will be visible in the two windows) click OK to start the ADD procedure (NB DONT click Drop in this box, if you do this you will lose the current component and need to re-open the library with USE to retrieve it). The ADD window will vanish and a schematic outline will track the cursor when it is over the main schematic sheet window.

 Any number of components can be added to your schematic in any order. As described above you can position and even rotate components as they are added to the schematic. However components can also be moved after adding, with the Edit->Move command, or rotated with the Edit->Rotate command. Note that these menu commands can also be selected using the buttons on the left side of the schematic sheet window. (See also Edit->Smash in Step 3a).
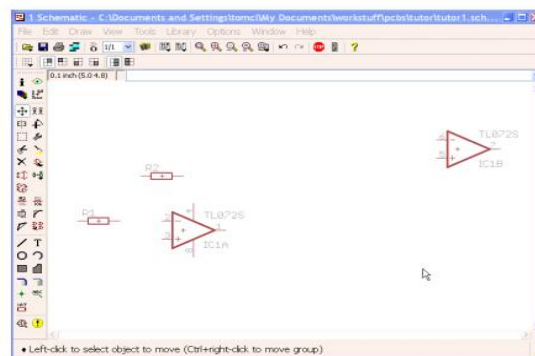

Figure 1 - schematic, with components

Add nets to schematic

Use the Draw->Net command to connect components. DO NOT use Draw->Wire.

Draw->Net

Left-mouse click on end of source pin or wire, left-mouse click when a change of direction in the wire is required, left-mouse click on the destination.

EAGLE has an excellent unlimited UNDO facility (Edit->Undo). Use this when nets go wrong. If they go very wrong use Edit->Delete (followed by right-clicks on unwanted objects) to remove unwanted nets and start again.

Step 2a Add supply connectors to the schematic

Supply connectors are a special type of component which does not exist physically on the PCB. Some ICs have supply pins which do not show on the schematic symbol. These will be automatically connected to a net with the correct supply connector (which has the same name as the pin).

Step 2b add I/O pads and test points to the layout

To get signals on and off the PCB you need either connector components or connecting wires. The best way to join wires to a prototype PCB is via terminal pads which have circuit pins soldered - wires can then be soldered to the pins. Add the PAD-TERMINAL component from the EEE library to allow wires for the V+, V- and GND supplies.Add test points (PADTESTPOINT component) to these nets.
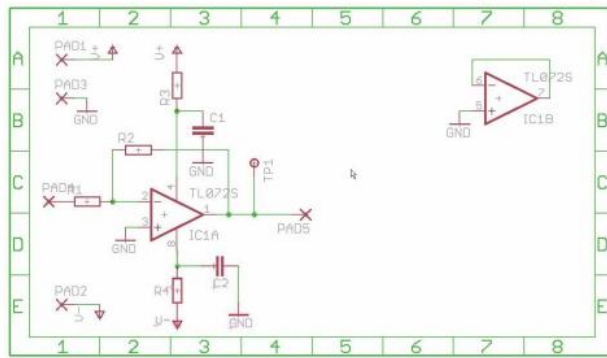

Figure 2. A schematic with nets and supply connectors added.

PROTEUS

The difficulties of traditional electronics teaching and experiment lie in the difficult understanding of the teaching contents; the lack of effective links between courses; the lack of usage rate of experimental equipment; the lack of traditional experimental experiment content and programming; the lack of a good platform for MCU software teaching; the lack of comprehensive experiments and innovative experimental means [1]. It is difficult to train large numbers of qualified applied talents.

INTRODUCTION

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METHOD

Proteus is a complete development platform from product concept to design completion. Its advantages are intelligent principle layout, hybrid circuit simulation and accurate analysis, single-chip software debugging, single-chip and peripheral circuit co-simulation, PCB automatic layout and wiring. Labcenter, a British company and Proteus software developer, has been developed around the world for nearly 20 years. It is currently the most powerful and cost-effective EDA tool in more than 50 countries.
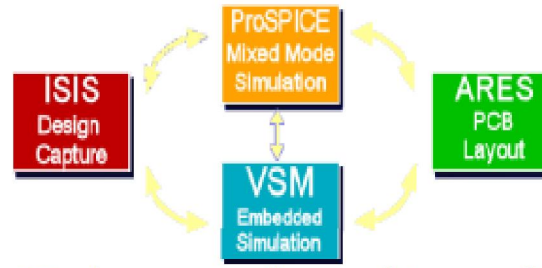
Development process

The traditional product development process is as following figure 2: firstly, the circuit diagram is designed, the layout of the circuit board is designed, and after a certain time there is a prototype, then the code is designed, the model is obtained by testing the layout of the board, the error of the prototype, the optimization of the code design and so that the model will be modified, so there will be some changes. The questions are as follows: 1. There's no physical prototype which could test the system.
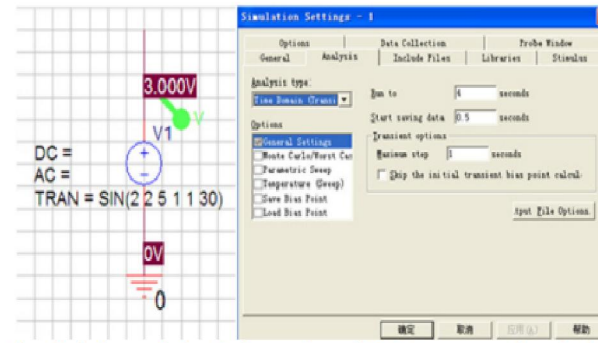
BLUETOOTH CONTROLLER
INTRODUCTION

Already thriving within the telecommunications market, wireless technology is preparing to embrace computing on an even larger scale. Presently, most people encounter wireless local area networks (WLANs) in airport lounges and tech-savvy officesFor this user has to first find a computer then wait for it to boot up, then plug in his device, and then transfer the data.

Different types of USB ash devices are used now-a-days. It is not necessary that all of these devices are supported by the computer and the operating system and their device drivers are available and installed. Carrying a computer or a laptop just for the sake of data transfer is not affordable these days in the age when people want
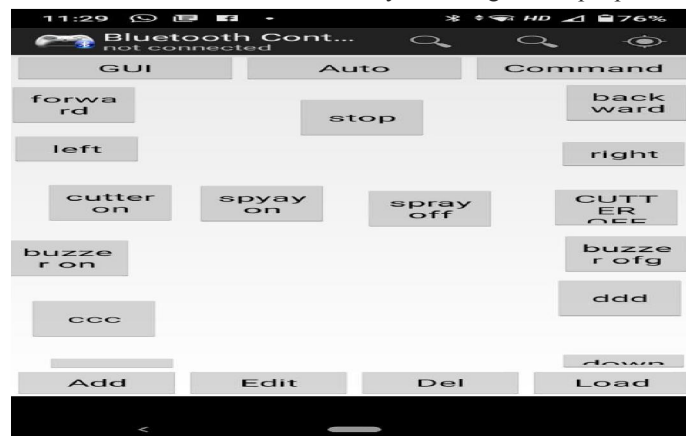
IV. RESULTS AND DISCUSSIONS

4.1 RESULTS

Our output which looks similar that we have worked on solar grass cutter as shown

4.2 ADVANTAGES

- Compact size and portable
- Easy to move from one place to another place
- Operating principle is simple.
- Non-skilled person also operate this machine

4.3 DISDAVANTAGES

- Large time required to remove the grass
- Manually operated
- Difficult to operate in rainy seasons

4.4 APPLICATION

- For cricket ground.
- The football ground.
- All garden
- All Playground

V. CONCLUSION

The design of fully automated solar grass cutter was tested successfully under manual and automatic operational modes. Compared to manual mode, the autonomous operation of the lawn mower resulted in a more efficient way of cutting the lawn, greatly reducing the cutting time by about 57%. By our design determinately we conclude that the fully automated solar grass cutter robot with impediment avoidance plays very key role in these days because to reduce pollution due to gas and petrol engines, it reduces the jeopardy for the users.

5.1 FUTURE SCOPE

- Design of blades should be done based on types of grass is used to cut.
- Add camera for give a simple way to see the location of the lawn mower.
- Attach wi-fi and Xbee module for longer distance of wireless control for the Lawn Mower.
- Size can be reduced to make it compact.
- We can use this product as floor cleaner simply changing blades by floor cleaner mop.
- Design this product on the IoT (Internet of Things).

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