IOT BASED AUTOMATIC MEDICINE REMINDER

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Abstract: IoT(Internet of Things) contains a large number of interconnectivity between different systems, giving free access of selected data for development of technology. Implementation of an IoT project is a very difficult task mainly due to large number of devices, various technologies and services that are included in the system. In this paper, we focus on making of Simple Medicine Reminder using Arduino. This paper hence provides information about Components, Connections and Working of Automatic Medicine Reminder[2].

Keywords - **medicine, reminder, Arduino, automatic, patient, digital era, machines, loved ones, healthy, fit, ill, time, RTC module, LCD display, Breadboard, Potentiometer, Resistors, Jumper wires, push buttons, pins, digital watches.**

1.   INTRODUCTION

If the matter is about our beloved ones, we always speak about their good health and we want them to stay fit. When they fall ill, due to forgetting to take their medicine on time, we will become worried about them, wouldn't we? In hospitals, everyday new patients get admitted due to accidents, health issues, etc. and it becomes a huge task to remind the patients to eat their medicines on time. It requires our(human beings) efforts and strength to remind them to eat medicine on time. As the present developed generation does not accept this, we go for technology to help us in these small-small tasks, like reminding patients to take medicine at their specified time. Smart Medicine Reminder can be used by sick people at their homes, Doctors, i.e., in hospitals, etc.[3]
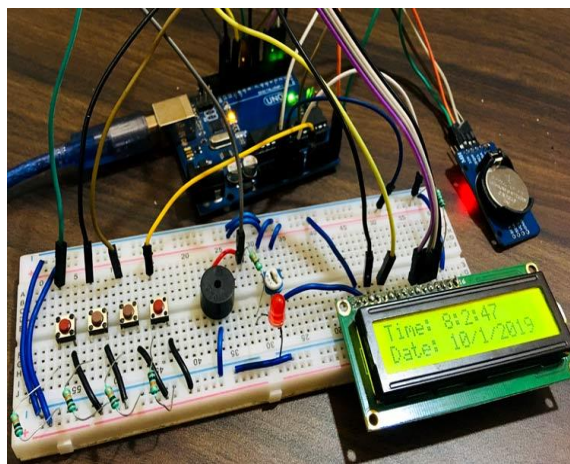
fig.1.1 medicine reminder using arduino uno

If we talk about reminding patients to take medicine using an IoT concept, different methods can be used:
1. Show message on screen.
2. Notifications on mail-id or phones.
3. A mobile application.
4. Using a buzzing alarm.
5. Through Bluetooth connection/ Wifi.
6. Auto-generated call.
7. Remind about next medicine time while reminding the present medicine time.

Different methods can be combined based on our needs. For keeping things easy, an Arduino Uno has been used to design a Medicine Reminder that helps its user to remember about eating medicine once or twice or thrice a day depending upon his/her need. Time of the reminder is set by pressing different push buttons. This system display's present Time and Date.

2. PARTS NECESSARY FOR DESIGNING AN AUTOMATIC MEDICINE REMINDER USING ARDUINO UNO
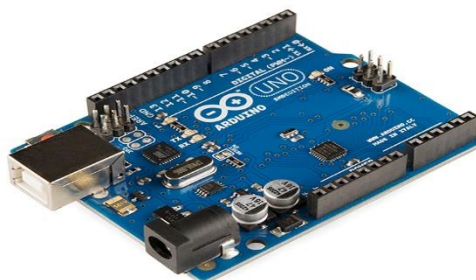The parts required to make our Automatic Medicine Reminder includes-
2.1 Arduino Uno

fig.2.1 arduino uno

A micro-controller board built using the concept of ATmega328P. Consists of 14 different input / output digital pins(six pins as P W M outputs), 6 inputs which are analog, 16 MHz ceramic resonator, USB connection, power jack / connection point, an ICSP header and one button for reset. This can be powered on by connecting to personal computer using U S B cable. It can also be started using A.C. – to – D.C. power adapter or a battery.
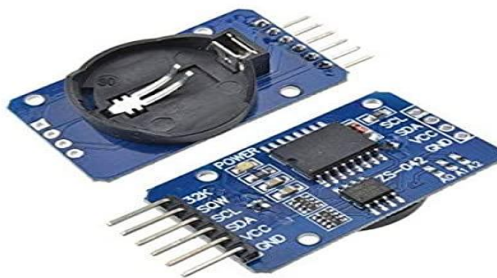
2.2 RTC(DS3231) module

fig.2.2 rtc ds3231 module

Contains I2C real-time clock(RTC), an pre-built temperature sensor and crystal, both are low-cost and precise. This device contains a battery input and stores the precise time. RTC keeping track of years, months, dates, days, hours, minutes and seconds. This device has am / pm indicator and works based on 12 hour or 24 hour format.

2.3 16x2 LCD Display

fig.2.3 16 x 2 l c d display
16 x 2 L C D name is given so because, it has 16 columns and 2 rows.

2.4 Buzzer

fig.2.4 buzzer

Also known as beeper. A sound signaling device, that is mechanical or electrical. Uses are in reminding(alarm) devices, clocks, train, watches and confirmation areas.

2.5 Led(any color)

fig.2.5 led

Light Emitting Diode, which is a type of semiconductor device and produces light if current / electricity flows into this device. Electrons here, recombine with holes and release energy as photons. Colour depends on the energy consumed to make electrons cross the band gap in the semiconductor.
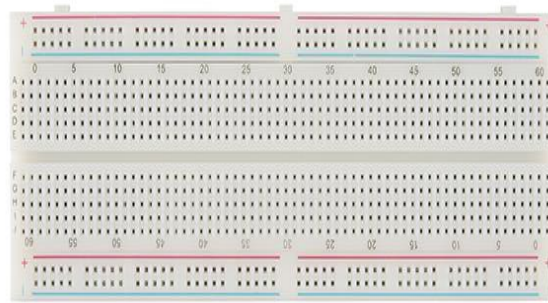
2.6 Bread board

fig.2.6 breadboard

It is a construction base for completion of circuits. Are reusable, since no need of soldering or destructing the connections. Due to this, they are used by many students and in technological universities.

2.7 Push Buttons

fig.2.7 push buttons

Works on basic switch mechanism, i.e., to control certain task or process. Are made of plastic or metal.

2.8 10K Potentiometer

fig.2.8 10 k potentiometers

Are used in changing the electrical flow of a system and resistance from 0 ohms to 10 ohms. Has a rotating knob with one turn.
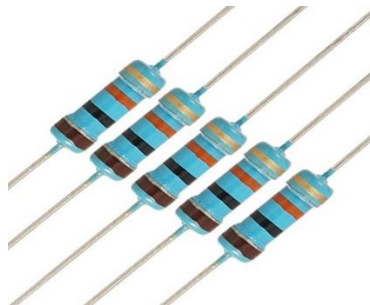
2.9 10K, 1K Resistors

fig.2.9 10k,1k resistors

Consist of different colour's for connecting in breadboard. Leads are made up of tin and copper plated over a steel wire which helps them to stay inserted in the breadboard pins.

2.10 Jumper Wires

fig.2.10 jumper wire

It is a electrical wire containing a pin or connector at both ends used to inter-connect components in breadboard internally, with different equipment's and components without need of soldering.

3. CONNECTIONS OF AUTOMATIC MEDICINE REMINDER THROUGH ARDUINO UNO CIRCUIT

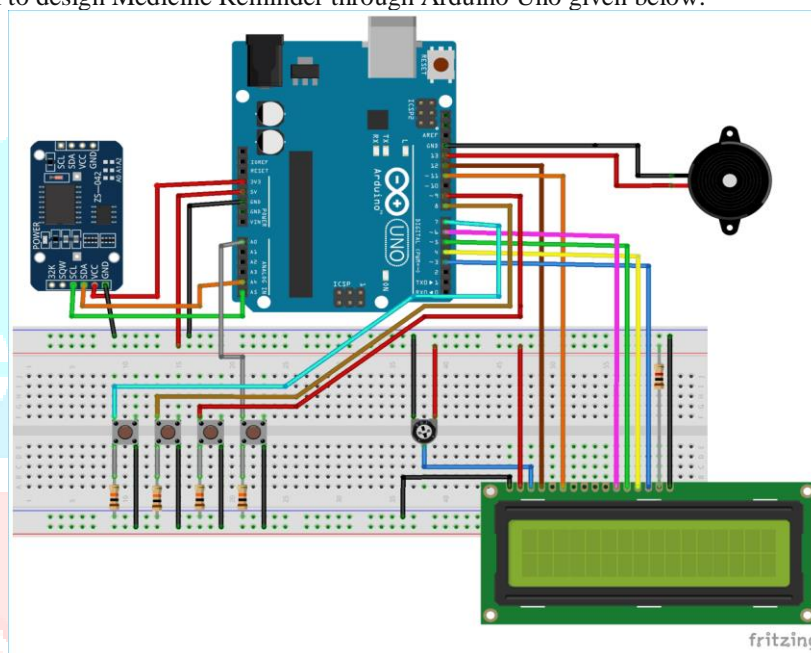Circuit diagram to design Medicine Reminder through Arduino Uno given below:

fig.3.1 circuit diagram of connections to arduino and breadboard

Let us see the connections from the pins of Arduino to various peripherals:

| Pins in Arduino	---------------->	Pins to connect to
2	------------>	D 7 pin 16 x 2 L C D Display
3	------------>	D 6 pin 16 x 2 L C D Display
4	------------>	D 5 pin 16 x 2 L C D Display
5	------------>	D 4 pin 16 x 2 L C D Display
7	------------>	Third(3rd) Push Button
8	------------>	Second(2nd) Push Button
9	------------>	First(1st) Push Button
11	------------>	E N pin 16 x 2 L C D Display
12	------------>	R S pin 16 x 2 L C D display
13	------------>	Positive(+ pin) of Buzzer and led
A0	------------>	Last / Fourth(4th) Push Button
A4	------------>	S D A pin DS3231
A5	------------>	S C L pin DS3231
3.3V	------------>	V c c pin DS3231
Gnd	------------>	Ground(Gnd)
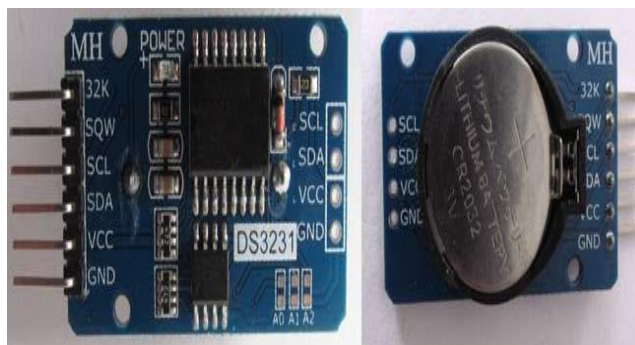
fig.3.2 rtc ds3231 module

Here RTC DS3231 is connected to Arduino and is used for reading time. Additional data can be stored since it has a 32k inbuilt memory. Powered by the 3.3 V pin of Arduino. Connected to 16 x 2 LCD Display. Buzzer helps in reminding and alerting to take medicine on time. 4 push buttons used each having different functions. 1st push button helps in reminding to eat medicine only one time a day. 2nd push button helps in reminding to eat medicine two times a day. 3rd push button helps in reminding to eat medicine three times a day. 4th push button when pushed stops the buzzer[1].

4. WORKING PRINCIPLE OF MEDICINE REMINDER

The system is powered with 5 V supply. LCD display works in 3 cycles. At its first start, it displays welcome message, "Welcome to Automatic Medicine Reminder." The second screen displays the message, "Stay Healthy, Get Well Soon." We have set the last display as a user-friendly display which helps the user by telling him/her to select any one push button out of the three to set the time of reminding to take medicine (one / two / three times a day). Time is set or changed in the program. Here, we have fixed 3 time slots, i.e., 8 am, 2 pm and 8 pm.

Here the first three push buttons have been assigned a particular time. Push button 1 pressed for reminding one time a day, that is, at 8 a.m. Push button 2 pressed for reminding two times a day, that is, at 8 a.m. and at 2 p.m. Push button 3 for reminding three times a day, that is, at 8 a.m., at 2 p.m. and lastly at 8 p.m.[6].
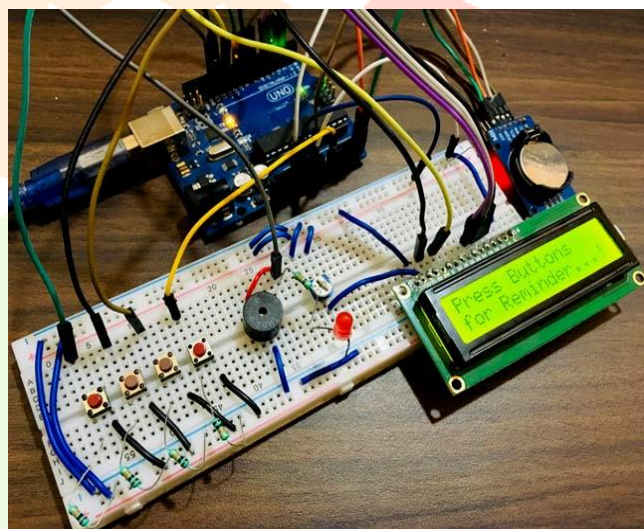

fig.4.1 final view of the automatic medicine reminder

The buzzer can be made to snooze for 10 minutes when 4th push button pressed(which is not done in this project). After user selects a push button his/her choice is saved and time is extracted from RTC module. Exactly when the time matches the desired time-slot, buzzer goes on(starts ringing) and the display shows the time along with the medicine name to be taken. Patient can stop the buzzer to go on by pressing 4th push button(Stop button). Similar procedure carried out for rest of the reminder time-slots.

5. CONCLUSION

In hospitals, everyday people get admitted due to various reasons like accidents, health issues, etc. and thus, it becomes a huge task to tell each and every patient to eat their medicines at their specified timeline. Uses up lot of human efforts. The current technology world does not accept this. So, we make use of technology to help us in these tasks. This Medicine Reminder can be used by various people like sick people at home, Doctors , i.e., in hospitals and various other similar places.

6. ACKNOWLEDGEMENT

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7. FUTURE WORK

1. In future, this project can be made as an online medicine reminder by sending emails as well as notifications on personal phones.
2. All the components used in this project can be compressed into a single chip and can be installed in digital watches to remind to take medicine as well as show health status.
3. If we place this reminder in digital watches, then the push buttons used in this project to set time will be replaced by touch screen in the watches to set time and name of the medicine to be reminded.
4. Snoozing option can be added, which will again remind the same medicine to be taken within few minutes after original medicine time, due to being busy during the dedicated time-slot.

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