

Tech eMagazine

free e-magazine that bridges industries and academia

Welcome to TecheMagazine!!!

It is a pleasure for us to publish our first edition of TecheMagazine. This is a unique technical magazine for electrical, electronics and computer science. This magazine is aimed at bridging the gap between Industries and Technical students. In every issue we assure that there will be more technical information. For this we designed the following topics.

Standards: In this we are going to explore standards and protocols like RS232, IIC, SPI, CAN, USB, TCP/IP, GSM, Bluetooth, Zigbee, WLAN, UMTS, LTE, etc

Industry Expectations: This section unleashes tips to clear your campus interviews.

SeePU: One can find the hidden processing unit of the appliances and its working. This topic covers in depth about the processors.

InCampus: This section is about events happening in college campus.

CEasy: This is to make the only existing old computer language C Easy.

WatsUP: This deals with tips and techniques for cracking UPSC, GATE, CAT, TOFEL, IELTS, etc... from those who cleared these exams.

WeeEye: This topic is about getting into from basic Electricals to advanced Power systems.

J4F is the place where you can relax from technical by technically.

We hope these topics will be informative for you. We expect your continuous support to the TecheMagazine. Post your reviews, comments to techemagazine@gmail.com.

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We are expecting to expand in other technical areas very soon.

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- Editor

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WeeEye

Why the earth hole in electric socket is large ?

Answer1: We known that,

$$R = \rho (L/A)$$

Where R= resistance , ρ = specific resistance, length an A= area of the cross section of the conductor or wire. Now, from the above expression , it shows that R is inversely proportional to the A. That is larger the area of cross section, lower will be its resistance in electrical sense.

Current always takes the shortest path. That means it easily flows in the path of the lowest resistance.

In electric socket, Earth path has the lowest resistance in the wall outlet of the ground socket hole. When the resistance path of the Earth is lowest than any utilized load circuit

during the operation, the leakage current that caused by short circuiting or by leakage path will have to flow through the earth path (Repeat again,because of the least resistance of the earth path) . So when one is in vicinity of the utilized apparatus under operation or "ON" or one touches the metallic body which has leakage or short circuit current will not flow the current through his/her body (Because his/her body has the much more higher resistance than that of the earth or ground path), Hence one will not have the electric shock due to leakage or short circuit current. Hence I comprehend that earth for the socket hole should be of larger diameter and so is of the plug. This comes with the larger diameter of the earth or ground wire than that of Live wire and neutral wire as well besides other processing of grounding methods.

Answer2:Dissimilar diameter of the three holes(Active, Neutral and ground) will give us the only one way of fitting plug into the matched socket.

Why is earth terminal of plug longer?

When plugging it into the socket, obviously, earth terminal of the plug will lead first into the hole of the of earth socket, so touching first the earth path or circuit before connecting other two terminals, live and Neutral respectively , Yes. Why? Because doing so, if any by chance, the apparatus being connected has a faulty current when it is "ON", then it will immediately pass through the ground than when at the instant when two other connections of live & neutral connections being made thus protecting the operator or somebody around the operator from getting electric shock before hand as soon the plug is connected.

Why the symbol of current is I?

I is used for current because I means Intensity of the current, or Intensity of the flowing current

Is wireless power transmission possible?

In 1891, Tesla established his South Fifth Avenue laboratory in New York. Later, he established his Houston Street laboratory in New York at 46 E, Houston Street. He lit electric lamps wirelessly at both of the New York locations, providing evidence for the potential of wireless power transmission.

In 1900, with US\$150,000 (more than \$3 million today; 51% from J. Pierpont Morgan), Tesla began planning the Wardenclyffe Tower facility.

Tesla later approached Morgan to ask for more funds to build a more powerful transmitter. But due to various reason Morgan not accepted Tesla's plan as a result that project is dropped.

But still there are may research going on in this subject, some of them are listed in wikipedia page http://en.wikipedia.org/wiki/Wireless_energy_transfer

As Electrical engineers if we should start digging in deep with the Tesla's idea, then for sure wireless power transmission is possible.



*If you have electrical, electronic and
computer queries?
to get answers from technical
experts mail us
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CEasy

In this edition, we are going to see the history and why this language is in use. As many of you know this is not only for a computer technician, but it is also primary programming language in inter-disciplined students curriculum.

History of C:

AT & T Bell Labs is famous for its well known products in semiconductor industries. In AT&T Bell labs, Ken Thompson involved in a project of developing an operating system. Assembly Level programming is used for developing first operating system called UNIX. Due to the programming and portability issue, using this OS is cumbersome. Meanwhile Dennis Ritchie wanted to develop a language from the languages like B, BCPL present



Ken Thomson and Dennis Ritchie with their computer system

during that period to fix these issues. Thus C was born in the year between 1969 and 1973. Ken Thomson and Dennis Ritchie rewrote UNIX in C.

Later due to extensive features many started to adapt C, this leads to development of many flavour in C. The original official C language was the "K & R" C, the nickname coming from the names of the two authors of the original "The C Programming Language". In 1988, the

American National Standards Institute (ANSI) adopted a new and improved version of C, known today as "ANSI C".

In 1990, the ANSI C standard was adopted by the International Organization for Standardization (ISO), which is called C90. The terms 'C89', 'C90' and 'C99' are the ISO standards of C programming language. C11 is the latest standard from ISO. In every standard contains many revisions to the syntax and the internal workings of the language.

C is extensively used in the Embedded industry.

Hello World!!!

All programming language starts with the Hello World Program. This is because in K&R book he explained with a model code called 'Hello World' to explain the concepts. We also start our exploration with Hello World

```
main()
{
    printf("Hello World\n");
}
```

Since C is a structured programming language, every code starts execution from main function. The opening curly brace indicates the beginning of the definition of the main function. Next we call printf function which is used to print the respective string in console. Main is the user defined function whereas printf is the function defined in the system library (stdio).

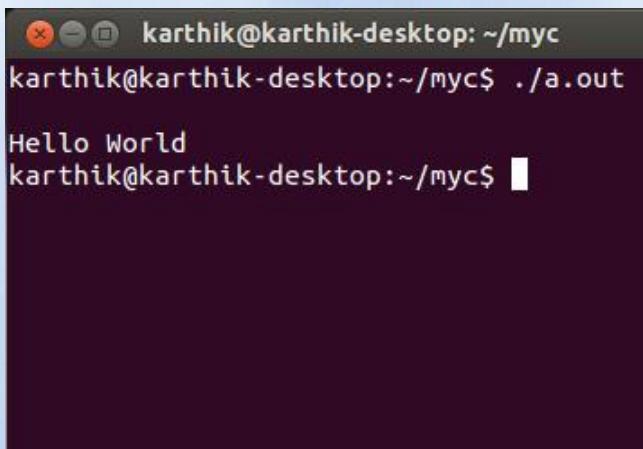
GCC:

GNU C Compiler (GCC) is widely used C compiler in Real Time developed by Free Software Foundation. GCC was originally written as the compiler for the GNU operating system. The GNU system was developed to be 100% free software, free in the sense that it respects the user's freedom. For latest version visit <http://gcc.gnu.org/>

Compiling HelloWorld

Save the code in the file hello.c, then compile it by typing:

```
gcc hello.c
```



A terminal window titled "karthik@karthik-desktop: ~/myc". It shows the command "gcc hello.c" being run, followed by the output "Hello World" when the executable "a.out" is run.

```
karthik@karthik-desktop:~/myc$ gcc hello.c
karthik@karthik-desktop:~/myc$ ./a.out
Hello World
karthik@karthik-desktop:~/myc$
```

This creates an executable file a.out, which is then executed simply by typing its name. The result is that the characters "Hello World" are printed out, preceded by an empty line.

We too use this compiler in all our demo codes in future editions.

In real world do we use printf?

Yes,
of course, Generally to test the working of our code.

From next edition we will start exploring C in depth...

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Industry Expectations

RESUME - FRESHERS

To get into the company the first and foremost thing needed is the RESUME. This paper is going to explain who you are and what is your attitude. It is the responsibility of the candidate to carefully mould their resume.

Use only simple words throughout your resume.

A resume should contain brief but sufficient information to tell a prospective employer:

- Who are you
- What type of job you would like to do
- What can you do
- What you have done
- What you know

The Resume is to be written within two to three pages including the following topics:

The first part could contain your name and your contact details.

Objective: This should reflect your attitude. Do not use rhyming word in your objective and it cannot exceed three lines.

Educational Qualification: This could be a table if possible. It gives a clear picture of your qualification. Do include your course, institution, percentage and year of passing for sure.

Achievements: This section puts light on what you have done. You could include your professional achievements in your college days. E.g. Organizing an event, Coordinating a sport meet, etc,

Technical Skills: This section proves what you know. Be sure that you do not make a mess. Include the skills that you are sure of, else it may create a bad impression on you.

Areas of Interest: This is optional, but still it gives the interviewer a clear vision of which subject you are strong enough.

Co-curricular activities: This can include your workshops attended, mini projects done during your school and college.

Certifications: This section has been a compulsory in this competitive corporate now. To have an additional qualification adds point to your resume. The type of certification you do is more important. It should be recognizable globally.

Trainings: This section describes the seminars you have attended. This can also be webinars attended online.

Hobbies: This is an important section. Do include your hobbies and your general interest. The employers go in hunt for cool persons now-a-days than book worms.

Professional Strength: This gives the overview of your attitude. Make sure of the interesting traits you possess. This commonly includes team player, managing stress, etc.

Personal Profile: This includes your personal details such as your name, your father's name, nationality, gender, languages known.

While specifying the languages known, include whether you could read, speak and write those languages. Being specific in a resume is more important than being generic.

Declaration: This has become optional now. You could give a declaration that everything you specified is true to your knowledge.

Your last section is having your signature at the bottom right corner.

THE INTERVIEW PROCESS

Employers can avoid most hiring mistakes by simply spending a little more time preparing for the interview in advance. To do a wonderful job of preparing for interviewing and present one's company professionally the following points must be considered:

Before the Interview

- 1) Determine your options - Which skills are vital as opposed to convenient.
- 2) If other people are going to be involved in the interview process, make sure they have taken the time to prepare for the interview. Each person should have a couple of overlap questions to provide insight on the prospective employee's responses.
- 3) Have company information available for candidates.
- 4) Allow plenty of time for the interview.
- 5) Have detailed information about the candidate.

During the Interview

- 1) Interview the person, not the skill set. Ask questions that are, broad, open-ended, job-related, objective, meaningful, direct, clear, understood & related.
- 2) Be open and honest with the candidate.
- 3) Tell the candidate what to expect in the hiring process.
- 4) Tell them your expectations: career advancement, training, duties, experience expected the direction the department is headed in.
- 5) Show the candidate where they would fit into the organization.
- 6) Don't concentrate about money.

Closing the Interview

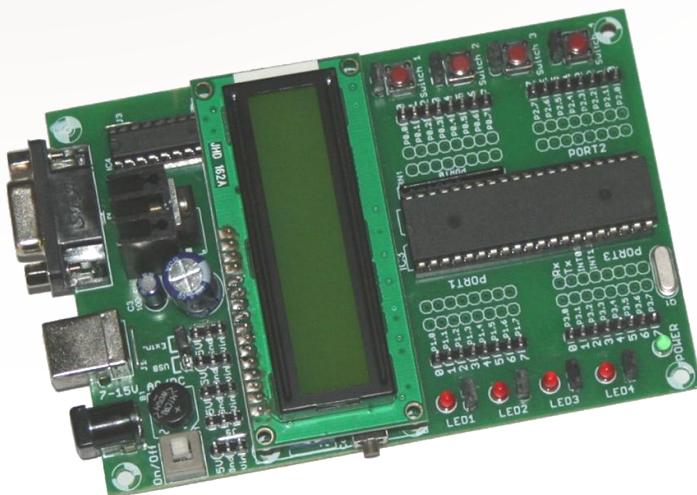
- 1) Insure that you and the candidate have concluded on common ground.
- 2) Ask if she/he has any other questions.
- 3) At the end of the interview, if you are interested in the candidate, let them know.
- 4) Review the next steps with a clear and honest timetable (and stick to it).
- 5) Be friendly and honest to the end of the interview; don't give false encouragement or go into details for rejection.

After the Interview

- 1) Take time to update the next person in the interview process.
- 2) Discuss the candidate's reaction and interest.
- 3) Rate the applicant on a 1-5 scale as a potential employee.

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Standards

In this topic, we are going to explore various standards and protocols used in day-to-day life. In this edition we explore some basics.

What is Communication protocol?

A communication protocol is a set of rules for devices that have to exchange electronic messages. Protocols tend to have rules for voltages, the amount of time signals last, carrier signal frequencies and/or wavelengths, and much more. When two or more devices follow the rules of a given protocol, they should be able to communicate and exchange information.

What is Protocol Stack?

Communications protocols deal with many issues, and so are generally broken into layers, each of which deals with a manageable set of responsibilities and supplies needed capabilities to the layers above and below. When you place the layers on top of each other, you get what is called a protocol stack, rather like a stack of pancakes or a stack of plates.

What is the difference between Synchronous and Asynchronous?

Asynchronous Communication (independent transmit & receive clocks)

- Asynchronous transmission uses start & stop bits which are added at the start & end of data segments.
- Limited data rate, typically less than 64 kbps.
- No clock signals used.
- Requires start and stop bits which provides byte timing and increases overhead.
- Parity often used to validate correct reception.

Ex: UART

Synchronous Communication (synchronised transmit & receive clocks)

- Clock Signals Used.
- Synchronous Transmission does not have start and stop bits for sending data segments so, a faster transmission speed is achieved.
- Synchronous transmission provides 64 or 128 Kbps speed.

Example: I2C and SPI

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IEEE Standards and its Descriptions:

<i>Name</i>	<i>Description</i>
IEEE 802.1	Bridging (networking) and Network Management
IEEE 802.2	
IEEE 802.3	Ethernet
IEEE 802.4	Token bus
IEEE 802.5	Defines the MAC layer for a Token Ring
IEEE 802.6	MANs (DQDB)
IEEE 802.7	Broadband LAN using Coaxial Cable
IEEE 802.8	Fiber Optic TAG
IEEE 802.9	Integrated Services LAN (ISLAN or isoEthernet)
IEEE 802.10	Interoperable LAN Security
IEEE 802.11	Wireless LAN (WLAN) & Mesh (Wi-Fi certification)
a/b/g/n/j/ac	
IEEE 802.12	100BaseVG
IEEE 802.13	Unused
IEEE 802.14	Cable modems
IEEE 802.15	Wireless PAN
IEEE 802.15.1	Bluetooth certification
IEEE 802.15.2	IEEE 802.15 and IEEE 802.11 coexistence
IEEE 802.15.3	High-Rate wireless PAN
IEEE 802.15.4	Low-Rate wireless PAN (e.g.ZigBee,WirelessHART,MiWi, etc.)
IEEE 802.15.5	Mesh networking for WPAN
IEEE 802.15.6	Body area network
IEEE 802.16	Broadband Wireless Access (WiMAX certification)
IEEE 802.16.1	Local Multipoint Distribution Service
IEEE 802.17	Resilient packet ring
IEEE 802.18	Radio Regulatory TAG
IEEE 802.19	Coexistence TAG
IEEE 802.20	Mobile Broadband Wireless Access
IEEE 802.21	Media Independent Handoff
IEEE 802.22	Wireless Regional Area Network
IEEE 802.23	Emergency Services Working Group
IEEE 802.24	Smart Grid TAG

WatsUP



Erasmus Mundus

What is Erasmus Mundus?

The European Union aims at enhancing the quality in higher education in various fields through Scholarships for the deserving students. Erasmus Mundus programmes lead to academic cooperation between Europe and the rest of the world.

Erasmus Mundus is the named after the Dutch scholar 'Desiderius Erasmus', who studied in different monastic schools in Europe in the 15th century. 'Mundus' in Latin means 'world', meaning the name 'Erasmus Mundus programme' stands for the international version of the Erasmus programme. It was created on 5 December 2003, gazetted on 31 December 2003 in the official journal of the European Union and became an official programme on 20 January 2004. Most of the programmes are called **European Master** and lead to a **joint or double master degree**.

What are the Erasmus Mundus actions?

- It comprises three actions:
- Joint programmes
- Partnerships
- Attractiveness projects

What is a Joint Programme?

Erasmus Mundus supports Joint Programmes that are operated by consortia of higher education institutions from the EU and elsewhere in the world. They provide an integrated research course at two or more higher education institutions belonging to different countries.

What are all covered in Scholarships?

Erasmus Mundus funds a number of scholarships for students and academics studying or teaching on Erasmus Mundus Masters Courses. Scholarships cover participation costs, subsistence costs, and

insurance for the duration of the study period. Many students also have the right to a contribution to travel costs. To be precise, it covers entire costs for the Master degree.

Here is the web-link for the funded programmes in various fields!

http://eacea.ec.europa.eu/erasmus_mundus/results_compendia/selected_projects_action_1_master_courses_en.php

Two Joint programmes are elaborated here so as to give examples of how the programmes would be...!

1. What is EMARO?

European Master on Advanced RObotics, is an integrated Masters course in Advanced Robotics conducted by three European institutions (in *France, Poland & Italy*) and three Asian institutions (in *Thailand, Japan & China*). In this programme, the students has to spend their first year of the course in one institution in Europe (i.e., either in France, Poland or Italy) and their second year in the any other institution including the ones in Asia. The Students will be awarded Double Master degree from both the institutions.

The web-link for this programme is,

<http://emaro.irccyn.ec-nantes.fr/index.php>

2. What is EMECS?

The European Master's Course in Embedded Computing Systems (EMECS) is designed to educate Bachelor graduates from Electrical & Computer Engineering and Computer Science as well as graduates from related disciplines to become experts in the field of Embedded Computing Systems. The participating institutions are:

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to
give best
to you

 University of Kaiserslautern (TUK), Kaiserslautern, Germany
Department of Electrical & Computer Engineering
<http://www.eit.uni-kl.de/en/home/>

 Norwegian University of Science and Technology (NTNU), Trondheim, Norway
Faculty of Information Technology Mathematics and Electrical Engineering
<http://www.ntnu.edu/ime>

 University of Southampton (UoS), Southampton, United Kingdom
School of Electronics and Computer Science
<http://www.ecs.soton.ac.uk/>

The students need to spend their first year in one of the above institutions and their second year in any of the other institutions as in every other European Master program.
The web-link for this programme is,

<http://mundus.eit.uni-kl.de/>

SeePU

Today in electronics lecture, my professor announced to submit a mini project for this semester in electronics. While coming back in public bus from the college, my friend Arjun and myself noticed that the Bus Conductor is giving tickets using his hand held ticketing machine. We decided to do a model of that machine as a mini project using 8051 microcontroller. We have chosen the 8051 microcontroller, since Arjun had a good experience in developing codes using SDCC. After we reached home, we googled and got some required models of circuit designs. Then we went to a nearby electronics shop and purchased the components required for building that circuit. We started soldering the components with the general purpose Board. I

About SDCC:

Small Device C Compiler (SDCC) is a open source cross compiler. SDCC is a retargettable, optimizing ANSI - C compiler suite that targets the Intel MCS51 based microprocessors (8031, 8032, 8051, 8052, etc.), Maxim (formerly Dallas) DS80C390 variants, Freescale (formerly Motorola) HC08 based (hc08, s08) and Zilog Z80 based MCUs (z80, z180, gbz80, Rabbit 2000/3000, Rabbit 3000A). Work is in progress on supporting the Microchip PIC16 and PIC18 targets. It can be retargeted for other microprocessors. For download

<http://sdcc.sourceforge.net/index.php>

have a little idea over soldering but Arjun is an expert in that!

After finishing the soldering works, Arjun started his coding in SDCC. Since I am new in 8051 programming, I asked him the need to use this. He explained me that we are using 8051, since it has an internal RAM & ROM, a Timer and the IO ports, unlike our other general purpose micro processors. When I asked him about the need for SDCC, he explained that SDCC is a cross compiler which is used to convert our code in our computer to

Intel hex format. He also added, that HEX Format is nothing but our OPCODE in sequence, which we are used to program into the microcontroller via the programmer kit. He

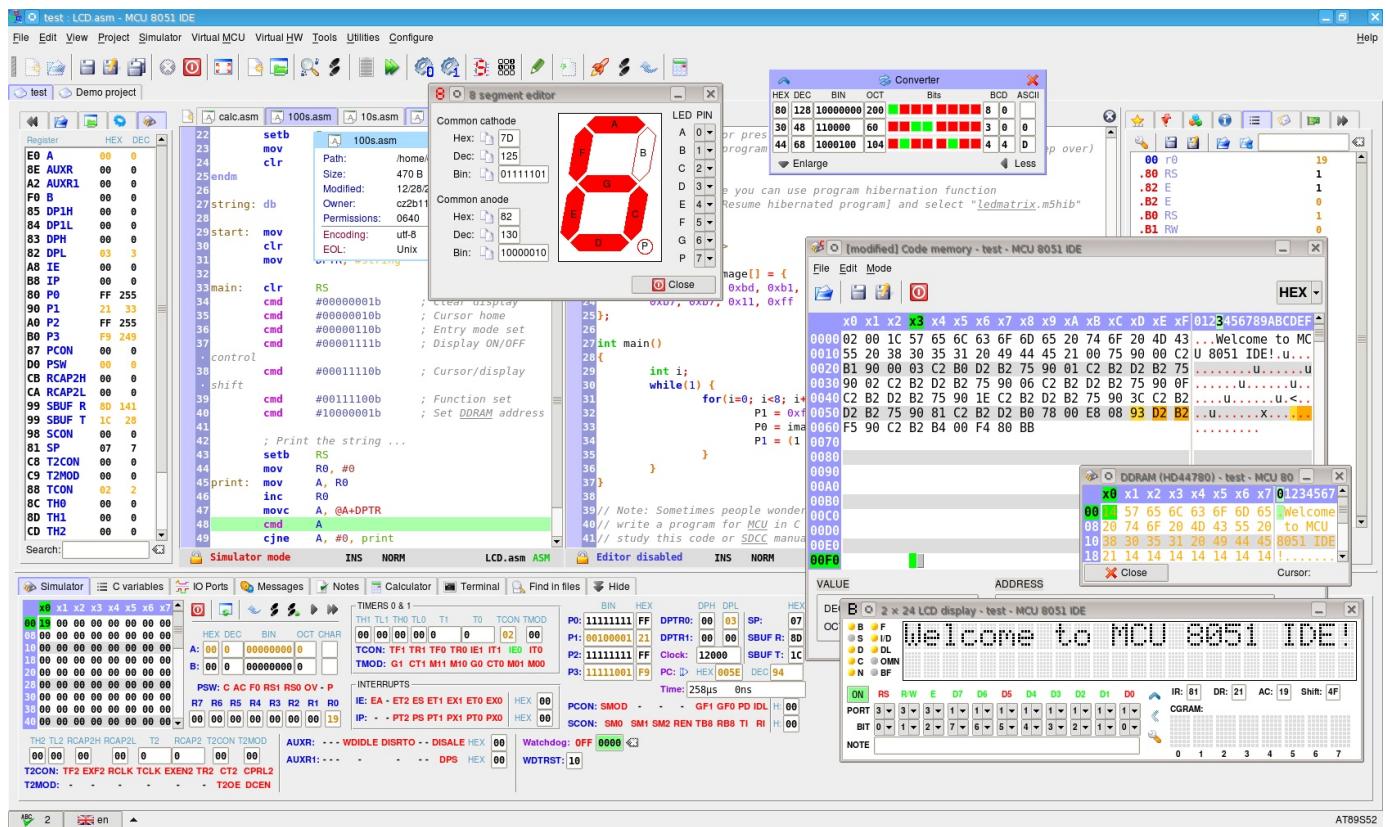
Why using AT89S52 instead of 8051?

assured me, that he will explain the HEX format later.

Features of 8051:

- 1) 128 bytes of RAM
- 2) 128 user defined flags
- 3) it consist of 16 bit address bus
- 4) **it also consist of 32 general purpose registers each of 8 bits**
- 5) it also consist of 3 internal and two external interrupts
- 6) it consist of 16-bit program counter and data pointer
- 7) 8051 can process 1 million one-cycle instructions per second
- 8) ROM on 8051 is 4 Kbytes in size
- 9) it also consist of Two 16 bit Timer/ Counter

P1.0	1	40	VCC
P1.1	2	39	P0.0 (AD0)
P1.2	3	38	P0.1 (AD1)
P1.3	4	37	P0.2 (AD2)
P1.4	5	36	P0.3 (AD3)
P1.5	6	35	P0.4 (AD4)
P1.6	7	34	P0.5 (AD5)
P1.7	8	33	P0.6 (AD6)
RST	9	32	P0.7 (AD7)
(RXD)	10	31	EA/VPP
(TXD)	11	30	ALE/PROG
(INT0)	12	29	PSEN
(INT1)	13	28	P2.7 (A15)
(T0)	14	27	P2.6 (A14)
(T1)	15	26	P2.5 (A13)
(WR)	16	25	P2.4 (A12)
(RD)	17	24	P2.3 (A11)
XTAL2	18	23	P2.2 (A10)
XTAL1	19	22	P2.1 (A9)
GND	20	21	P2.0 (A8)



We used 16X2 LCD for Displaying and micro-switches for taking input from the user. A Thermal printer is used for taking the ticket printouts. After correcting the errors in the code, he programmed the AT89S52 IC which we had and fixed it in our soldered Board. I asked him the reason for using AT89S52 instead of 8051. He had a good laughter and explained that AT89S52 is a derivative of 8051 developed by ATMEL Corporation. AT89S52 has additional features than the original 8051. This IC is a low cost and it is easily available in the market. 89xx stands for flash memory. Other versions of 8051 are 87xx,83xx. Arjun used MCU8051 IDE for coding.

After explaining the whole concepts, he powered ON the board. Later, he noticed that there are some changes needed to be done in the coding! Hence, he removed the microcontroller from the board. Arjun reprogrammed the microcontroller after modifying the code and again he fixed it on the board!! Now our mini project works as per our expectations!

For circuits and codes of this project mail us techemagazine@gmail.com (We assure you that we don't send any SPAM mail)

About MCU 8051:

MCU 8051 IDE is integrated development environment for microcontrollers based on 8051. Supported programming languages are C and assembly. It has its own assembler and support for 2 external assemblers. For C language it uses SDCC compiler.

This IDE contains simulator, source code editor, assembler, HW programmer and much other tools. Simulator supports over 79 MCU primarily from Atmel.

HW programmer supports 8 ISP programmable MCUs from Atmel (AT89Sxx, AT89LSxx).

There is also support for simple hardware simulation (like LEDs, keys, etc.). To Download MCU8051 IDE

<http://sourceforge.net/projects/mcu8051ide/files/>

InCampus

*For free publishing of your
campus events in this
magazine
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J4F

<u>Top to Bottom</u>	<u>Bottom to Top</u>
<p>2. Temperature sensitive resistance semiconductor device.</p> <p>6. The number of occurrences of a repeating event per unit time.</p> <p>7. What is $(N_s-N_r)/N_s$?</p> <p>8. Magnetic loss also known as _____ loss.</p> <p>23. Type of transformer with single magnetic circuit.</p> <p>31. A component which converts electrical energy to light energy</p>	<p>10. Gateless Triac.</p> <p>11. Motor's direct test is also</p> <p>14. <u>electronic circuits</u> which perform <u>Signal processing</u> functions.</p> <p>15. The other name of resonant circuit.</p> <p>22. the tendency of a system to <u>oscillate</u> with <u>Amplitude</u> at some <u>frequencies</u> than others.</p> <p>26. A rotary <u>electrical switch</u> in electrical machine that periodically reverses the <u>current</u> direction Between the rotor and the external circuit.</p> <p>27. Non-metal, but conduct electricity.</p> <p>30. Which engine employs reaction engine?</p>

<u>Left to Right</u>	<u>Right to Left</u>
<p>1. Instrument used to vary 1-phase or 3-phase.</p> <p>4. Tone due to vibration of string.</p> <p>5. Name the scientist who invented Phonograph.</p> <p>12. Faraday Generator.</p> <p>13. Material in which valence electrons are tightly bonded to their atoms.</p> <p>16. What is the primary source of energy for earth?</p> <p>17. The graph of instantaneous voltage or Current to the time is known as _____.</p> <p>18. The calibration of technique is used to find out the _____.</p> <p>19. SI <u>derived unit</u> of electromotive, Force.</p> <p>20. Connecting part between two junction points in one network.</p> <p>25. Reactive power.</p>	<p>3. Instrument that provides time and amplitude measurements of voltage signals over a wide range of frequencies.</p> <p>9. A device exists for all <u>states of matter</u>, including solids, liquids and gases.</p> <p>20. Edison invention in 1880.</p> <p>21. Power amplifying device.</p> <p>23. It is the ratio of force per unit charge.</p> <p>24. The current law is otherwise called as ___ law.</p> <p>27. Who was the first person to use the term "Electric"?</p> <p>28. Semi-conductor that allows current in one side.</p>

Jumbled Letters

Clues

Ω Eirlplnge

A force back (or) away.

Ω nsntteira

Lasting only for short-time.

Ω acennsroe

Synchronous vibration.

Ω ASCFT

Used for transmission lines.

Ω Audcmmi

Elements used in control rods.

Ω Alnoieetis

Literal meaning is seeing at a distance.

Ω rgdi

Network for delivering.

Ω cesaccs otipn

A device which connects WLAN devices in a wireless network.

Ω lyaol

Mixture of two or more metal.

Ω kubc

Act of lowering voltage.

Ω ecclv

In AC, the change of poles, from negative To positive and back to positive.

Ω sesivap

Component does not have gain.

Ω euisnetcq

In active state.

Ω eojoie

One watt-second.

Ω shape gelna

Angular displacement between a current **and** voltage waveforms.

Ω poescolilsco

Electronic measurement tool which allows one to view a waveform.

Ω oltadmouli

Addition of information to an electronic or optical signal.

Ω rjmuep

Electrical connection between points.

Ω maueltcaruo

Processing register in 8085.