



DEPARTMENT OF ELECTRONICS

**DEEN DAYAL UPADHYAYA
COLLEGE**

(University of Delhi)

organizes

15 Days Hands-on Workshop

on

“Trends for Algorithmic Experimentation and Prototyping”

Under the Aegis of DBT Star College Scheme

May 28 - June 15, 2018



सत्यमेव जयते
DEPARTMENT OF BIOTECHNOLOGY
GOVERNMENT OF INDIA

REPORT

Department of Electronics, Deen Dayal Upadhyaya College (University of Delhi) organized 15 days' hands on workshop on **“TRENDS FOR ALGORITHMIC EXPERIMENTATION AND PROTOTYPING”** under the aegis of **DBT Star College Program** from May 28, 2018 to June 15, 2018 at DDUC. Its aim was to explore the AVR microcontrollers and its interfacing as much as possible in 15 days and to give students a platform to learn the basics of programming an AVR microcontroller which is used in every field from tea vending machines to home office automation.

Embedded System is a strong area of study having application in almost every sector. With a microcontroller as its heart, it creates several opportunities as well as challenging tasks. Automobile, Aerospace, Medical Instrumentation, Banking, Mining, Industry Automation, Personal Computing, Telecommunication, Space Research, Agriculture/Farming, Defense are a few application areas of embedded systems. Embedded systems and Robotics industry is expected to grow by 60% by 2020 in India

Prototyping is basically a test bed for demonstration, providing the viability of the idea and illustrating conceivable applications. Prototyping is also essential as a development environment for rigorous experimentation and testing. Thus the workshop was basically a platform for students to develop various algorithms, physically design, experiment and debug the circuits for a theoretical design i.e. create and test a prototype.

In this workshop the AVR studio IDE was used to create prototypes on ATmega32 Microcontroller in the embedded system environment. Integrated Development Environments (IDEs) such as AVR Studio are software applications that provide the interface platform to the engineer to build the application on the microcontroller to do the desired task at hand. A total of 31 students including 3 from Hansraj College and 3 from Maharaja Agrasen College and 1

from Army Public School Gorakhpur participated in this workshop. Mr. Nitin Sharma and Mr. Ravi were the resource persons from i3indiy Technologies, the Industry Academia Partner along with Dr. Manoj Saxena, Dr Poonam Kasturi, Ms Neha, Mr Naveen and Mr Ajit extending their help to the students during the lab sessions.

The objective of the workshop was to bridge the gap between the industry requirements and college studies using complete practical approach. It was a 90 hours course with 6 hours per day. The basics of embedded software that includes embedded c, basic concepts of AVR microcontroller, Hardware assembling, interfacing of various devices with AVR microcontroller were covered. It was an Industry Oriented Training Program that covered Basic as well as Advance aspects through 44 Practicals, 23 Minor Projects and 5 Major Projects. The workshop started with the introduction to embedded systems, microcontrollers, GPIO programming, interfacing LEDs, SSDs, LCDs, Motors etc to intermediate complicated devices like Stepper motor, 4x4 keypads, and introduced the day to day technologies and protocols which surround us.

Practicals covered during the workshop were from basic such as LED blinking, LED matrix interfacing, seven segment display, LCD display to advance concepts like controlling of ac appliances remotely using relays. Various minor Projects including temperature sensor, white line sensor rovor, Touchscreen control robot, stop watch, touch screen control, keypad controlled rovor, digital piano and many more were covered. Major projects included ATM Prototype, remote controlled wireless robot, Digital clock, RFID based door lock system, , Visitor counter, PC controlled ROBOT movement and many more. The interconnection of wireless devices using internet and embedded programming was also covered. The event was executed in groups among which several healthy competitions were conducted.

More than 60 assignments were performed by the students. Students were able to get theoretical as well as practical knowledge with many new practicals and projects being done every day during workshop.

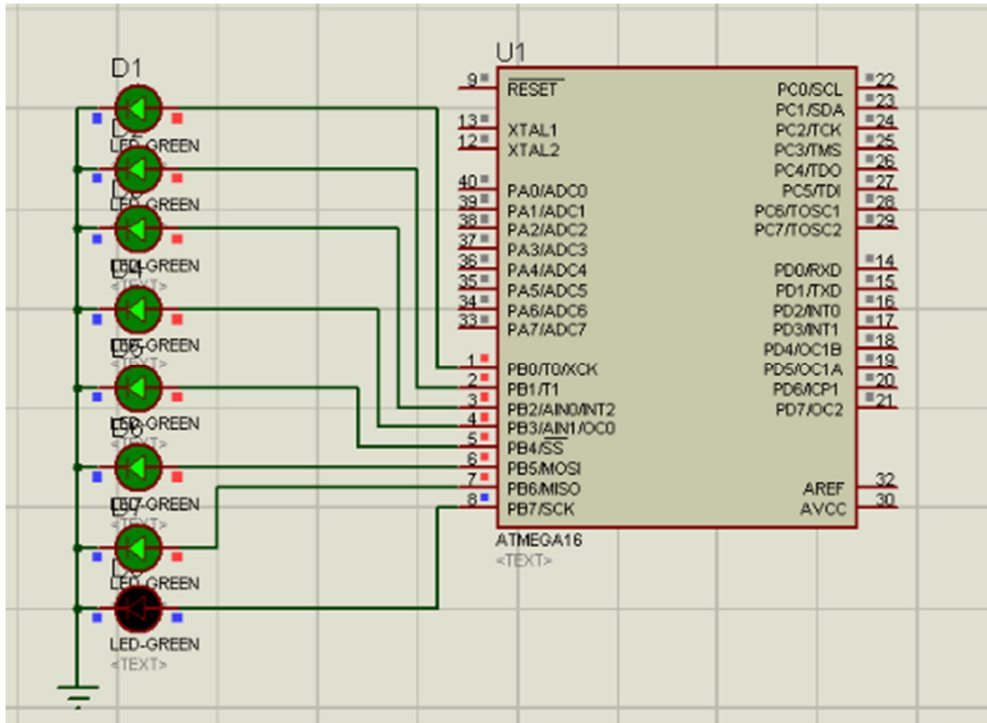
INAUGURATION OF THE WORKSHOP



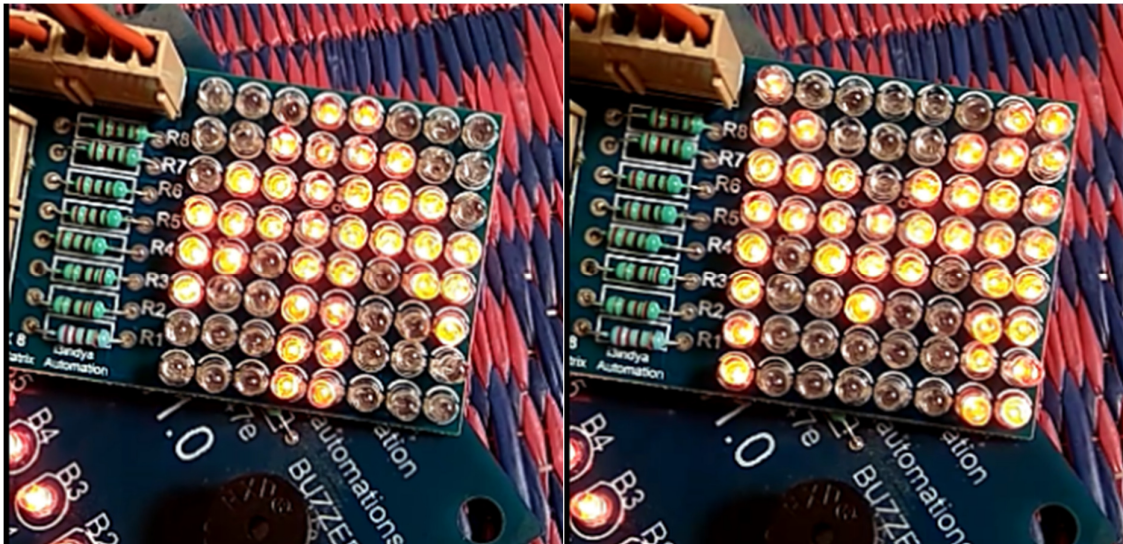
WORKSHOP IN PROGRESS



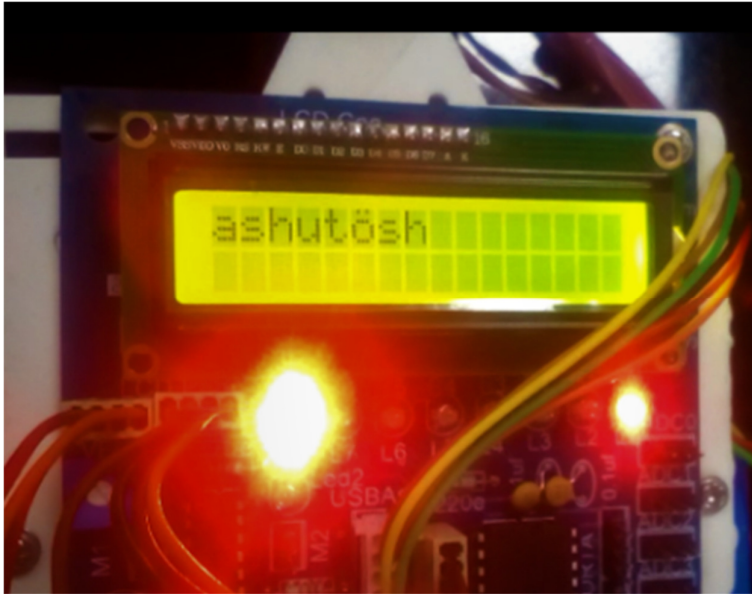
WORKSHOP OUTPUTS



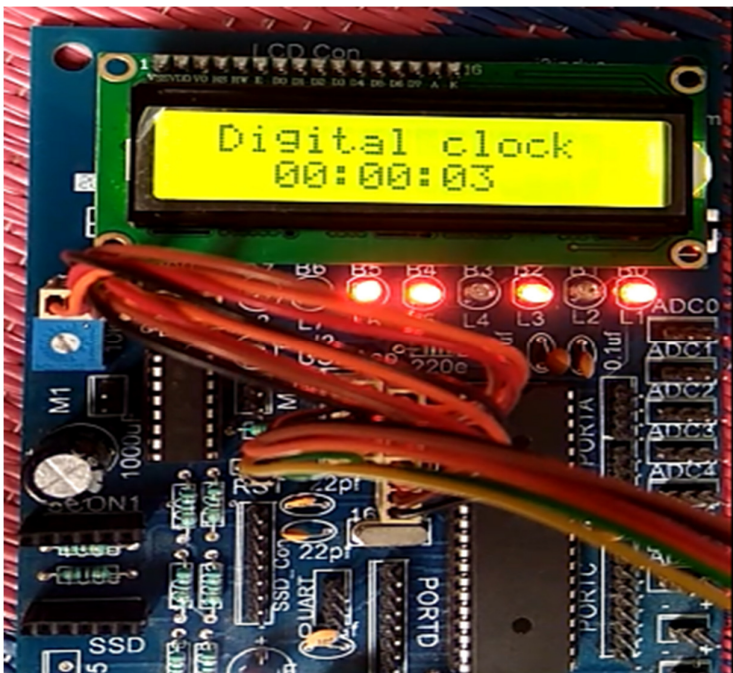
Proteus Diagram to simulate the hardware for LED Pattern



Pattern generation on LED Matrix



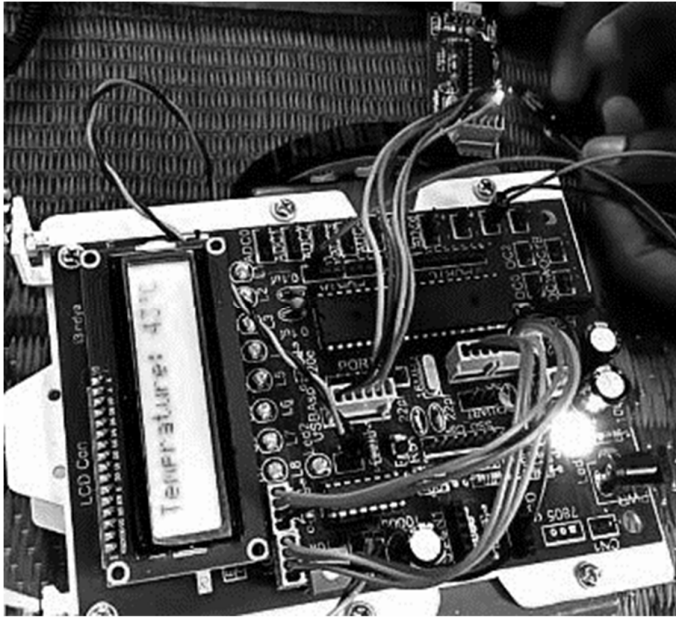
LCD interfacing



Digital Clock



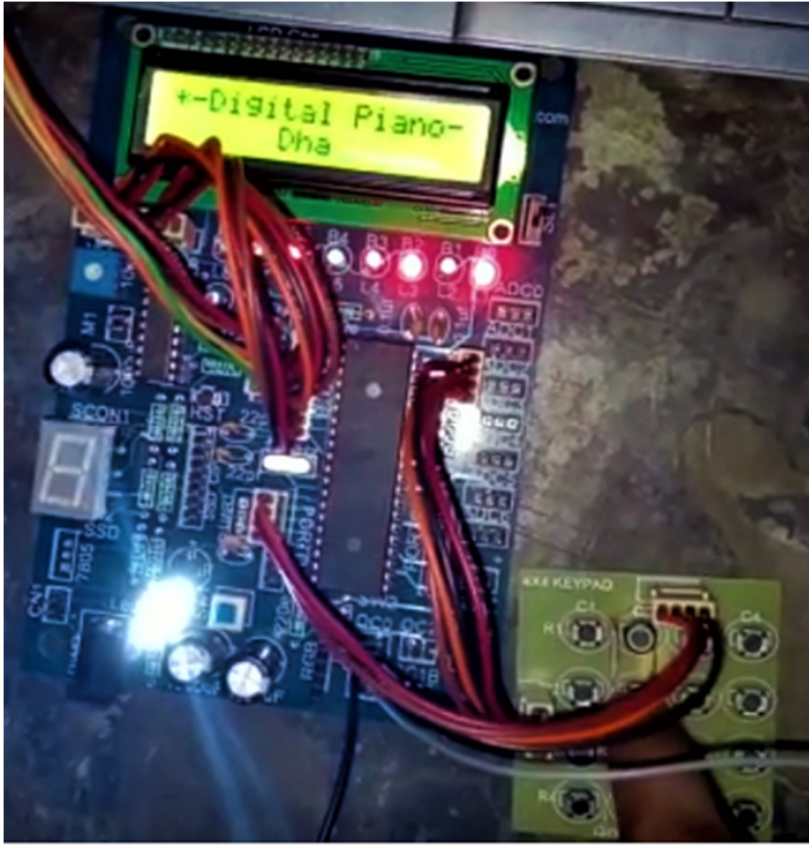
Tachometer implementation on ATmega



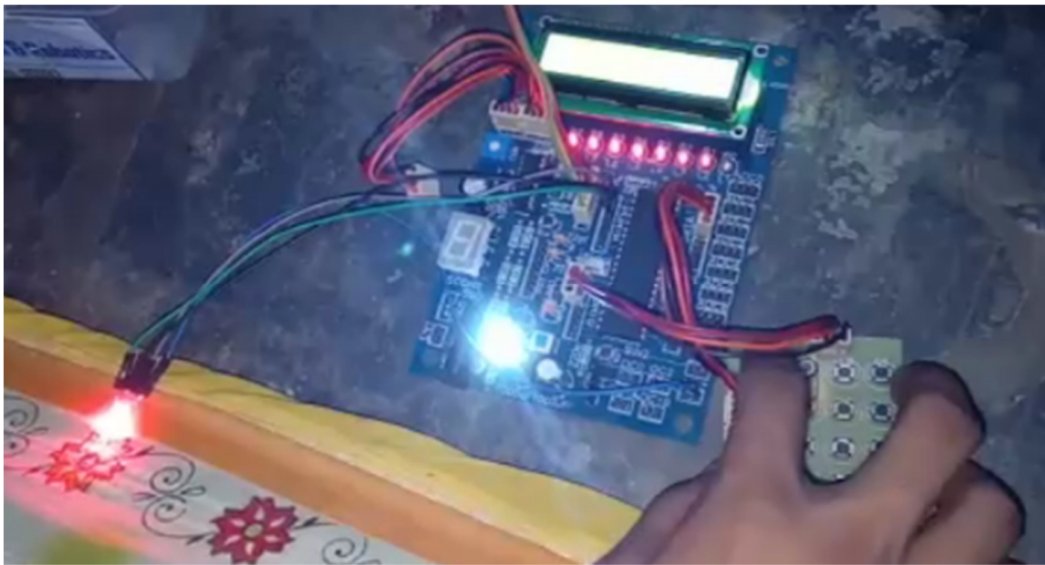
Interfacing Temperature sensor LM35 with the microcontroller



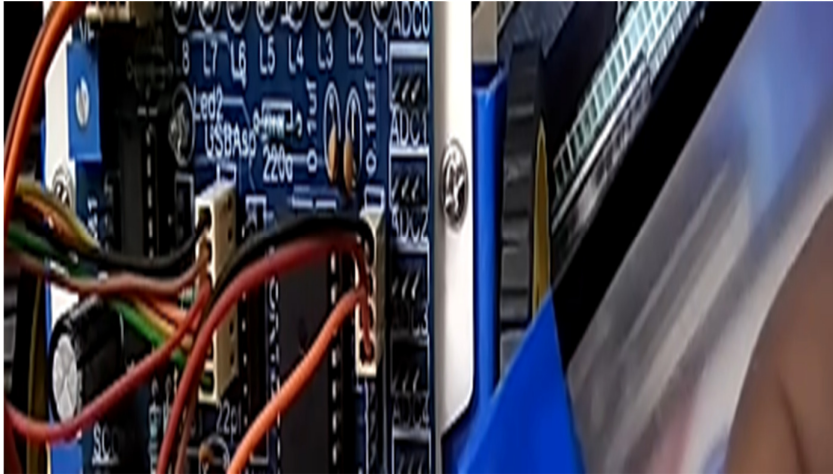
KEYPAD OPERATED ROVER



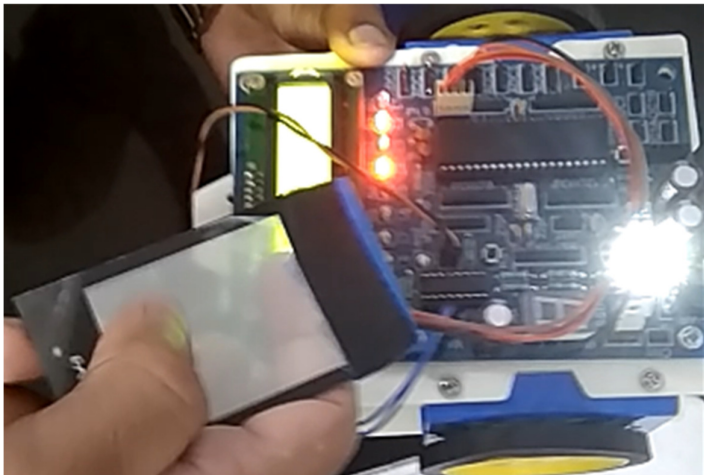
Digital Piano



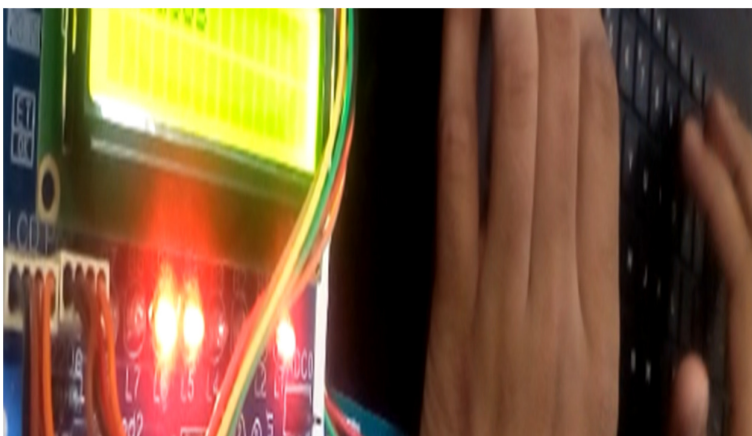
INTEGRATING KEYPAD WITH RGB LED



DISPLAYING VALUES OF TOUCH SCREEN



TOUCH SCREEN CONTROLLED LEDs/MOTORS



WRITING ON LCD USING LAPTOP KEYBOARD

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