SPEED e- NEWSLETTER

INSIDE THIS ISSUE

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to see

Moore's Law, Makimoto's Waves and the Saga of Hard-Software Co-design[1]

Main Article

While Electronics is touching almost all the facets of the societal life, we are witnessing ever increasing smart spaces and ambient intelligence being inculcated around us. To a larger extent this has led to the formation of integrated islands with proliferation of interconnected devices still facing the quandary of the basic three metrics of Electronics viz. power, speed and area. The systematic journey of Electronics over past many decades is being foreseen, mapped, envisioned and exemplified by number of visionaries. A mere remembrance of these visionaries will definitely inspire all of us and synergize the efforts in attaining the excellence in our work sphere which is the prime objective of 'SPEED'.

The foremost commandment over which we have seen the computing business traversing is the Moore's [1] visionary prophecy in 1970s related to doubling the number of transistors per two years. This prediction of exponential growth was not only seen to realize till near past, but also led to many corollaries interms of near similar augmentation of the processing speed and power which has amazed the Electronics professionals and marked the innovative growth of Intel. . However, very soon in the next decade i.e. in 1980s, the contemporary Electronics started comprehending the aftermath of the Moor's law which was coined as 'More than Moore' effect.

Around 1987, the conception of semiconductor pendulum was put forth by yet another visionary Tsugio Makimoto [2] in terms of six cycles of silicon history. With the alternate standardization and customization swinging per decade, the Makimoto waves exemplified the journey from TTL, LSI-MSI, Microprocessors-Microcontrollers, ASICs to Reconfigurable Computing. This new outlook towards the semiconductor industry was repercussion of the consumerism as against the Personal Computing dominance due to Moore's law which was mainly due to the Scientific and Defense forces. This was commencement of a major transition towards the consumer centric world and again marked the popularity and growth of Electronics in the masses at large. Naturally the Makimoto's waves were marked as the milestones in the growth of yet another successful venture i.e. Sony Corporation.

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[1] This is excerpt of an invited talk presented during the National Conference on "Recent Advances in Embedded Technology (NCRAET 2015)" on 30th January 2015 at Ramkrishna Paramhansa Mahavidyalaya, Osmanabad.

Moore's Law, Makimoto's Waves and the Saga of Hard-Software Codesign[1]…

Nevertheless Electronics being purely an intellectual prominence didn't remain restricted as the supremacy of handful of people and commercial firms. More visionaries, scientists, technocrats sharing their vision led to the value addition, new startups and industry-academia tie-up. An expert in all the above mentioned aspects Nick Tredennick popularly known as the developer of MC68000 and IBM Micro/370 took sabbatical from IBM in 1980s to teach computer organization, chip design, and the Flowchart Method at UC Berkeley. The outcome of this interaction seems significant and resulted in testimony of the history of silicon applications in three domains which coincided with the Makimoto's waves viz. fixed algorithms-fixed resources, variable algorithms-fixed resources and the third which gives the total nirvana with the reconfigurable computing and Field Programmable Gate Arrays i.e. variable algorithms with variable resources. A keynote address by Nick[3] significantly marked the 'Tredennick's paradigm shifts' which motivated many followers to walk on this path.

However with the growing complexity along with the ever changing customer mindset and the demand of time seems to be dictated more compromise and tradeoff in the trio i.e. power-speed-area. With connectivity dictating the scenario, seen the emergence of the analytical marriage of Electronics with Information and Communication Technology, which in fact surfaced a totally new variant of Electronics in the form of Electronics and Telecommunication Engineering (ETC). This new paradigm soon became talk of the day in this first and second decade of the 21st century marked as the 'knowledge era'. Designing such complex systems necessitated pronounces use of the software tools and the whole Electronic Design Automation surfaced and commenced another paradigm shift ensuring the entry of software professionals in the hardware provenance [3].

Naturally software seems to be dominating the scenario; one can't go away with the giants in this field like Bill Gates. Articulated as "Gates travels in the slipstream behind Moore's Law"[5], the statement popularly known as Gate's law necessities doubling of relative computation time per 24 months. This is no doubt an indication of compensation of the

Moore's law. This ever increasing software getting down to the processor has resulted in the 'Von Neumann Syndrome' as depicted by Reiner Hartenstein. This has left us only with the option of exploring none other than the 'reconfigurable computing' domain with its niche 'hard-software' and 'soft-hardware' dimensions. With internet connectivity at its peak evident by the Metcalfe's law [8] which initially was formulated for the compatible communicating derives but holding good for the increasing value of a telecommunications network that is proportional to the square of the number of connected users of the system (n^2) is seen to be verified with the proposition of social networking and web 2.0. However, very soon the scene will be saturated with the ever increasing communicating devices which primarily intend to communicate with human being. This will drive the 'Internet of Things' more into the applications touching societal life. There is none other than the 'Reconfigurable Computing' which can be harnessed as a potential and apt platform for hosting interesting applications which are all set to transform the prospects of masses at large. We working in academia should take a note of all these activities and brain storm in forums like SPEED in shaping our student community so as to foster the skills and techniques which are essentially the combination of structural and procedural programming.

References

[1] G. Moore, 'Moore's Law and Intel Innovation', Intel,2015. http://www.intel.com/ content /www/us/en/ history / museum-gordon-moore-law.html.

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[4] R. Kamat, Harnessing VLSI system design with EDA tools. Dordrecht: Springer Science+Business Media B.V., 2012.

[5] Research.microsoft.com, 'Moore_Law', 2015. http://research.microsoft.com/ enus/um/ people/gray/moore_law.html.

[6]http://hartenstein.de/4SlashdotDec07.pdf.

[7]R.Hartenstein,tp://hartenstein.de/4Slashdot Dec 07.pdf.

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Editorial …..

It gives me immense pleasure in presenting SPEED-eNewsletter after a long gap.

The technologies and inventions in electronics field are expanding at a rapid rate. No doubt it is the result of the hard work of great minds since ages. The history of any science inspires its future generations. The technology behind any new work has to be shared with the whole society, the whole world. Keeping this goal in mind, SPEED-eNewsletter has been started.

SPEED, Society for Promotion of Excellence in Electronics Discipline is a registered society established in the year 2010 for promoting excellence. The SPEED-eNewsletter is the first step towards providing an approachable platform in the pathway to excellence. Previous issues of Newsletter have set up the benchmark to fulfill the fundamental aim of the Association to exchange information, knowledge and expertise among members of the association.

The primary goal of the eNewsletter is to initiate the dialog between people interested in Electronics field and spread all over Maharashtra. It provides a platform to exchange information, knowledge and ideas among students, academicians and researchers. Sharing the various activities of common interests conducted in this regard motivates others.
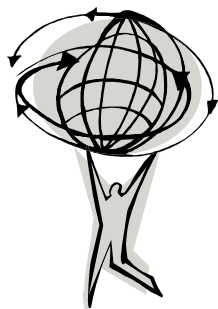
I am thankful to all the members of Editorial Committee of SPEED-eNewsletter for their contribution and untiring efforts put in for bringing out this eNewsletter.

…… Dr. Deepa Ramane

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NEWS and EVENTS at COLLEGES

Poster presentation and PPT presentation at KES's Pratibha College of Commerce & Computer Studies, Chinchwad: organized for B.Sc.(CS) students on 15 Jan 2015.
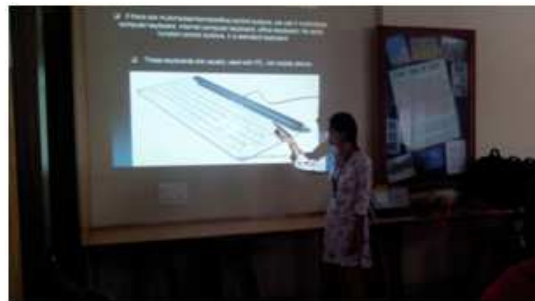
Activities organized at St. Mira's College For Girls:

- Electronics department organized a industial visit to Science Museum ,Pimpri and a visit to Autocluster exhibition on PCB manufacturing.
- Electronics department organized two Guest lectures viz. on *"While entering in to IT world"* by Iqubal Zamadar from Cognizant technology, Florida on 12/9/2014 and by Dr. Rajkamal, former vice chancellor, Indore University on topic *"Mobile Computing"* on 20/9/2014.
- Intercollegiate event "Teklogica" organized on 6/1/2014 and 7/01/2014.

MIT Group of Institutes, MAEER's Arts, Commerce & Science College, Kothrud:

Department of Electronic Science has organized one day workshop on "**PCB Designing and soldering**" for the students of F.Y.B. Sc.(Computer Science) in Aug. 2014. In this workshop students build various electronics mini projects and got the basic idea about PCB designing, soldering and testing.

"Let us work towards Excellence in Electronics for the betterment of society"

- Deepa Ramane

Students' Zaroka : Winning Electronics Projects and Poster

Remote Controlled Quadcopter

Students of Electronic Science department of Abeda Inamdar Sr. College, Pune namely Shaikh Tausif Nisaroddin, Shaikh Taufiq Nisaroddin, Khindkar Rohit Mahadev have designed and built *Remote Controlled Quadcopter*, a multirotor helicopter that is lifted and propelled by four rotors.

It has four fans fitted on four arms. Each arm has one motor and a propeller at their ends. Two of the propellers rotate clockwise and the other two rotates in the opposite direction i.e. anticlockwise and this keeps the machine stable in the air. The motors are controlled remotely. Because of this quadcopter is operated from ground. The mobile camera fitted on the device captures the surrounding pictures and send it to the user on earth. It has got wide range of applications being an unmanned aerial vehicle. The device works on the ground as well and adults can use it for remote photography. It can also be used in Agriculture, in Rescue operations and so on.

The project has won the first prize in intercollegiate project competition at St. Mira College for Girls' and also at Abeda Inamdar College, Pune.

Students and staff with model

Light Code Reader

Light Code Reader is the project done by Miss Karishma Takale and Ruchira Solanki, students of F. Y. B. Sc. of Modern College, Shivajinagar, Pune. The model is used to communicate between two users where the telephone/ mobile signals are not available.

Here alphabets A to Z are coded in the form different color patterns. Since each alphabet has unique color pattern associated with it, by looking at color pattern one can recognize the transmitted alphabet. In the model four color lights are used to transmit color code. The lights are made ON and OFF to indicate the alphabets A to Z.

This type of data transmission is used in marine ships. The employers on ships have been trained for unique light codes.

The project is prize winner at Modern College, Shivajinagar, Pune.

Color code for alphabets and colored light bulbs generating color code for transmission.

Intercollegiate **Poster – Competition Winners** of St. Miras College, at Kalamadi College of Science.
Poster on "Imaginary Electronics and Imaginary Gadgets "

SPEED ACTIVITIES DURING YEAR 2014

To achieve goals and objectives of SPEED, the organization is organizing various events for academicians, researchers and students. Below is a report of various activities conducted by SPEED during year 2014.

LAUNCHING OF SPEED JOURNAL OF RESEARCH IN ELECTRONICS

To promote research activities SPEED has started **SPEED Journal of Research in Electronics (ISSN 2349-8226)** which will be published twice in a year. The first issue of it, was released on 10th September 2015 at National Conference on "Advances in electronics and its Interdisciplinary Applications" at Fergusson College, Pune.

By launching of the journal, SPEED has provided unique opportunity for the researchers to publish their research article or review articles related to the field of Electronics Science and Technology. All the domains in the field of Electronics including fundamentals, theoretical aspects, modeling and simulations, materials, devices, sensors, actuators, control strategies, hardware designs, algorithms and soft ware, smart systems, communication electronics and ever expanding applications of electronics would form the scope of this journal.
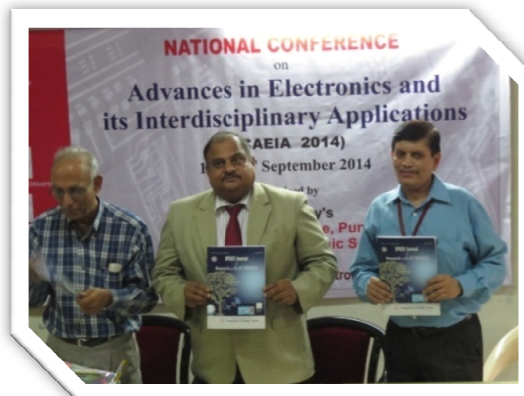
Launching of SPEED journal by Dr. S. Anathkrishanan,
Dr. R.G. Pardeshi, Dr. N.M. Kulkarni

ORGANISATION OF NATIONAL CONFERENCES

SPEED has associated with organization of two National Conferences across Maharashtra held at Pune and Akluj.

➢ **National Conference on "Advances in Electronics and its interdisciplinary Applications" at Pune**
National Conference on "Advances in Electronics and its Interdisciplinary Applications" was held on 19th -20th September 2014 at Fergusson College, Pune in association with SPEED. Chief guest of the conference, **Dr. Raghunath Shevgaonkar, Director IIT, Delhi** inaugurated the conference and delivered the key note address. Other eminent personalities who delivered talks were **Prof. Rajkamal,** Former VC, Devi Ahilya University, Indore on **Future Embedded System, Dr. S. S. Sadistap**, Senior Principal Scientist, CEERI, Pilani on **Advances in Embedded Instrumentation Applications for Society, Mr. Abhay Patwardhan,** GM, Mahindra Reva, Bangalore on **EV-The future of mobility, Dr. Mahesh Jiwani,** Dept. of Electronics, Saurashtra University, Rajkot on **S-MAD: Sensor based Mobile Application Development, Mr. Prafulla Wadaskar**, Marvell India, Pune on **Smart IOT devices: Overview, Awareness & Project Ideas**. Six experts from industry as well as from academia participated in panel discussion on Analog and Digital systems: Pros and cons.

[From left : Prof. J. V. Khedkar, Prof. A. D. Shaligram, Prof. R. K. Shevgaonkar, Shri. K. D. Shaligram, Dr. R. G. Pardeshi, Dr. N. M. Kulkarni]

In all 36 researchers presented their research work in the conference in 5 oral presentation sessions while 72 researchers presented their research in poster form.

The prize winners of various categories are

(a) **Best Robotics Explorer:** i) Akhay Sande, Kishor Lande, Pooja Gawali, Purnata Badhe, Rutuja Kumbhar

ii) Vaibhav Khaldhone,Tushar Sant, Anand Ajabe, Anagha Purohit, Sonali Kulkarni, Pritesh Shah

(b) **Three IEEE best oral presentation Awards**

i) 1st prize : shared by Dr. Supriya Patil and Mr. Vijay Labade

ii) 2nd prize - MR. Chetan Kasar

iii) 3rd prize - Mr. Manoj Kukade

(c) **Three IEEE best poster presentation Awards**

i) 1st prize: Ms. C. G. Mokashi

ii) 2nd prize :shared by Ms. Yogita Khandge, and Ms. Kalpana Kulkarni

iii) 3rd prize - Dr. Neha Deshpande

➢ *National conference on Advances in Wireless Sensor Network and Its Applications at Akluj:*

UGC sponsored National conference on "Advances in Wireless Sensor Network and Its Applications" is organized by the Post Graduate Department of Electronics, Shankarrao Mohite Mahavidyalaya, Akluj, in association with SPEED, IEEE SSCS and CASS, India Chapter, on12th and 13th December, 2014. Total 176 participants were present to make the National event graceful.

Considering wide spectrum of applications of WSN a common platform was made available by this conference. In the response to the announcement, reviewers committee selected 53 papers for Oral presentation and 62 papers for Poster presentation. The conference was inaugurated with the auspicious hands of Hon. Prof. N. N. Maldar, Vice Chancellor, Solapur University, Solapur. Hon. Ranajitsinh Mohite Patil, Former MLC, Govt. of India presided over the function.

Prof. A. D. Shaligram, Head Department of Electronics, SPPU, Pune in his key note address traced the recent developments in the field of Wireless Sensor Network and focused on the opportunities for the young scientist and students in the field of WSN. Prof. R. K. Kamat talked about "Shifting Paradigms of Biomedical Instrumentation Towards FPGAs". Invited Talk by Prof. G. M. Naik, Head Department of Electronics, Goa University, Goa was on "Body Area Wireless Sensor Network For Health Monitoring." During his talk, he traced the applications of WSN for health

monitoring. In the beginning, Prof P. N. Vasambekar, Head Department of Electronics, Shivaji University, Kolhapur emphasized on the suitability of the ferrite materials for sensing and monitoring the environmental gases in his talk on "Soft ferrites Gas Sensor". Mr. Abhay Tambe from Reanu Microelectronics Pvt. Lt Pune, a multinational electronics industry, delivered a talk on "Restricting the Usage of Smart Phone while Drive". He demonstrated the use of Wireless technology for mobile communication and also emphasized use of RTOS kernel to develop the GUI for WSN. This talk is followed by a talk of Mr. Prafulla Wadaskar from Marvel Group of Industries on "Wireless Sensor – Technologies, products and Tools". He demonstrated the mote designed to realize the facets of WSN.

Workshop on "Basics of Video Clips and Animation"

SPEED has organized one day workshop for **"Basics of Video Clips and Animation"** on 15th February, 2014 at Department of Communication Studies, SPPU, Pune. 43 students of UG/PG from various colleges participated in the event.

Dr. P.B. Buchade, Secretary, SPEED inaugurated the workshop. He explained the role of SPEED in electronics education. Dr. Mrs. Neha Deshpande, Organizing secretary of the workshop, explained the concept and need of the animation and video competition in Electronics.

First session was conducted by Prof. Akash Dhopeshwarkar from Dept. of Comm. Studies, SPPU. Students were overwhelmed while learning the technical aspects of video clip making.

Second session was conducted by Mr. Rajesh Khele, Director, Animationwala.com. The students enjoyed learning basics of animation techniques during this session.

Dr. A. D. Shaligram, Chairman, SPEED supported the event on all fronts, from conceptual to technical level.

Mrs. Madhavi Reddy, Head, Department of Communication Studies kindly supported the event from the beginning.

Mrs. Varsha Bapat, (Modern College, Ganeshkhind), Mrs. Kalpana Kulkarni (Fergusson College) and Mrs. Jayashri Bengali (Kaveri College) worked as the organizing committee members.

Animation Competition VIA-NeMation

SPEED has conducted VIA-NeMation, an animation competition for UG/PG Electronic Science and Computer Science students. The competition was conducted in view of rapidly expanding world of 3D and it's career opportunities in fields – including architecture, games, product and industrial design, civil engineering, and short video films, films and television animation. It allowed the participants to step into a real world production environment where creative output must be accomplished within specific timeframes, resources and design constraints. The students got the opportunity to interact with and get feedback from high-profile judges with successful careers in the said field.

A team of 3 to 4 members had submitted an original animated clip of 2 to 5 minutes based on the story ideas along with the source files. The clips were judged by Mr. Rajesh Khele, Director, Animationwala.com.

The Team from Fergusson College, Pune won the first prize and LAD College, Nagpur team won the second prize.

Electronics Excellence Examination (EEE)

Every year to judge the talent of students in electronics subject, SPEED is conducting Electronics Excellence Examination (EEE) for F.Y. / S.Y.B. Sc. (General) & F.Y./ S.Y. B.Sc. (Computer Science) students . The 100 marks examination is of 1 hour duration having 50 multiple choice questions covering basics of electronics subject.

This year examination is conducted at various college centers on 3rd December 2013 and nearly 500 students appear for the examination.

TRIBUTES to Resp. Dr. R. N. Karekar (16th April 1932-26th January 2015)

Ravindra Narahar Karekar, you were born on 16th April 1932 and brought up in Kolhapur Maharashtra, India. You graduated from Kolhapur, obtained M.Sc. in Physics from Sagar University and Ph.D in Physics from University of Pune. You were honored to join faculty of Department of Physics, University of Pune and dedicated yourself for teaching and research throughout your career. You always created a caring and active learning environment, where students had opportunities to question and to gain and improve their skills. Your thorough understanding of basics and unconventional thinking made your lectures enjoyable learning process. Karekar Sir you had been working in varied research fields such as low frequency communication to study atmospheric science, solid state batteries, thin films, sensors etc. During this tenure you had shown the ability to keep pace with the fastest growing subject like Electronics with your inquisitiveness and passion for knowledge. Sir you played a key role in the establishment of "Sensors" activity in Pune University and had been a backbone of the series of Seminars named NSPTS. You "formally" retired as a Professor and Head of the Department of Physics, on 30th April 1992. Even after retirement, for more than 20 years now the university campus had experienced your pleasant presence in the class rooms and research labs. Every discussion with you Sir was a brain storming experience. A very large number of students had undergone training under your able guidance. Your thinking was rational and your teaching was "enthusiastic," "engaging," and "thought-provoking". Sir, you made yourself available and accessible to anyone who seeks some time from you. You were pursued by many, and you motivated them to reach an unimaginable height. In this world of advertisement and rat race of taking credit you always had been silent worker. You promoted an environment of selfless cooperation in research and the inclusion of young scientists into the field. Exceptional dedication, hard work and long perseverance were your qualities. You always inspired weaker section of the students to rise up and improve significantly. You were a man of action, yet your action was always grounded in perceptive analysis and thoughtful reflection. It was not surprising that you had remained a true student who had evergreen curiosity and never hesitated to learn from anybody irrespective of any bars. You will always remain in our memories as a role model.
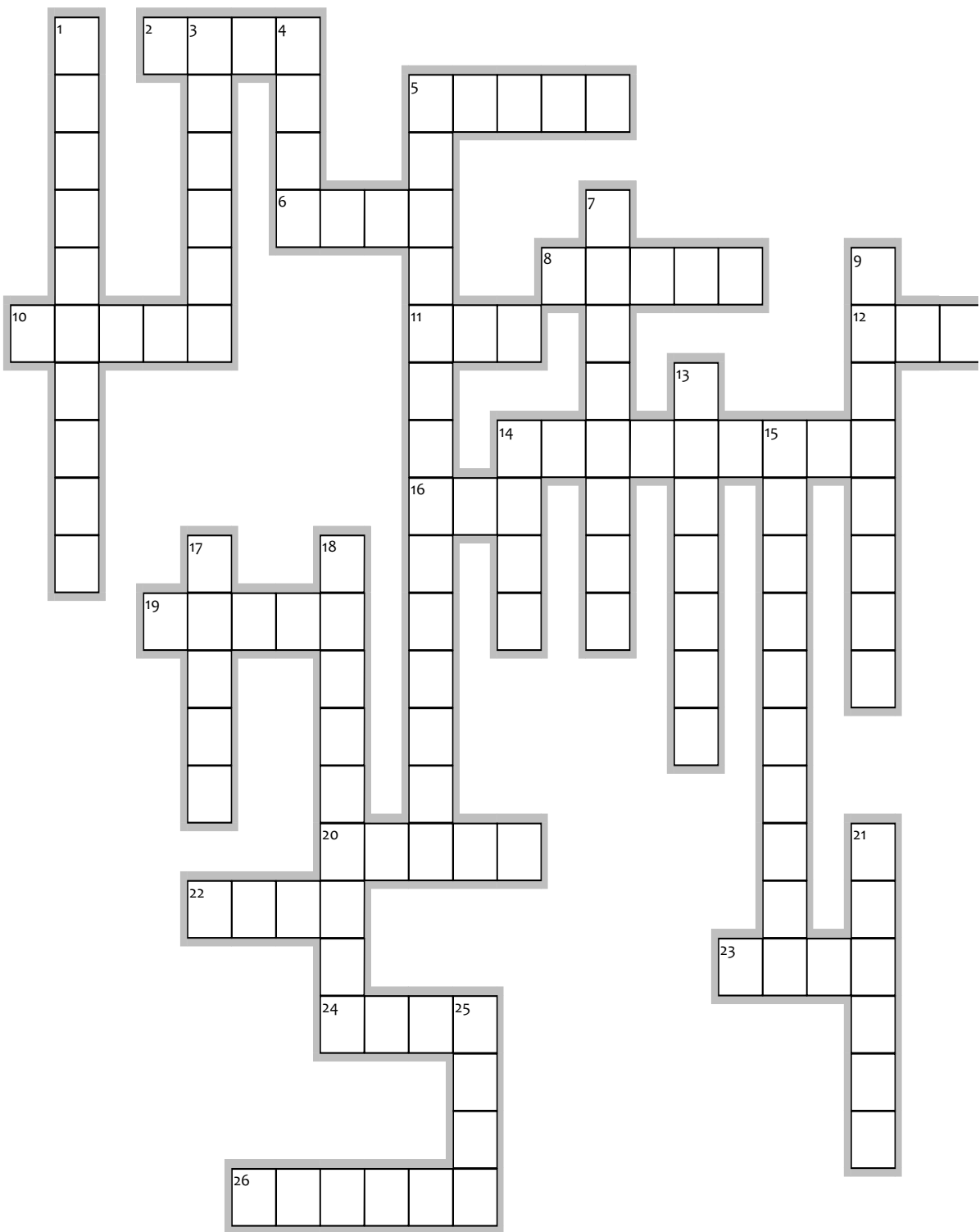
……….. By SPEED Members and all your beloved students

PUZZLE
By - Hemant Yashwant Satpute

EclipseCrossword.com

PUZZLE
By - Hemant Yashwant Satpute

Across

2. Half adders can be combined to form Full adders .... additional gates. (4)

5. In a parallel Full Adder, the .... stage may be a Half Adder. (5)

6. A logic circuit which has two inputs & previous carry input and Two outputs (Sum & Carry) is .... adder. (4)

8. Full adders have a ...... input capability. (5)

10. Half adders can be combined to form a Full adder with additional....... (5)

11. The logic gate normally used to get the ...... bit in a Half adder is an EXOR gate. (3)

12. An EXOR and an ……. gates are required to build a Half adder. (3)

14. A ...... circuit would normally be used each time a carry input is required in an adder circuit. (9)

16. A Full adder circuit will have ...... outputs. (3)

19. "It is not necessary to have the same number of bits when adding or subtracting signed binary numbers in the 2's complement system" - This statement is.......... (5)

20. A Full adder logic circuit will have ...... inputs. (5)

22. "A Half adder is faster than Full Adder" - This is a .... statement. (4)

23. The binary subtraction (0 - 0) will produce Difference = Borrow =........ (4)

24. It is necessary to have the ...... number of bits when adding or subtracting signed binary numbers in the 2's complement system. (4)

26. A Half adder is ...... than Full adder. (6)

Down

1. A logic circuit with two inputs and two outputs (Difference & Borrow) is Half........ (10)

3. The ...... of a full adder are labelled as A_1, B_1 and C_{in}. (6)

4. A logic circuit which has two inputs & two outputs (Sum and Carry) is .... adder. (4)

5. A logic circuit with two inputs and previous borrow input and two outputs (Difference & Borrow) is....... (14)

7. In a...... Full adder, the first stage may be a half adder. (8)

9. The logic gate normally used to get the .... in a Half adder is an AND gate. (8)

13. A full adder has a....... (7)

14. There are ...... possible combinations for subtracting two binary numbers. (4)

15. The binary subtraction (1 - 0) will produce........ = 1 and Borrow = 0. (10)

17. Half and Full Adder circuits are two types of ...... adder circuits. (5)

18. Full adder results are typically stored in........ (9)

21. Full adder is ...... than the Half adder. (6)

25. One .... and one AND gate forms a Half adder circuit. (4)