

From the HoD's desk

Dear Reader,

While discussing the performance of a student during a recent 'open house' meeting, I was surprised when the student mentioned that he was not able to follow what is being taught by a particular teacher. Since the teacher was very popular among majority of the students for his teaching methodology, I was curious. I was also anxious because performance of the student was very poor in the subject handled by the particular teacher. He had done extremely well in all other subjects. The student also told me that he had approached another teacher for clearing his doubts and those topics were well understood. He wanted to know if this teacher could provide him more help during study holidays. (Interestingly this teacher was not very popular among majority of the students). The student was almost in tears and told me that he needed help desperately. It could be a common experience that 'good' teachers for some students are not 'good' teachers for some others. Why does such a difference in opinion of students happen? Why do different students find different teachers to be good at teaching? Is it due to any emotional factor?

Does it have to do with something else?

Research has revealed that there are different phases in a learning cycle.

They are

- learning from specific experience of others,
- learning from observation and viewing from different angles,
- learning by theoretical analysis and
- learning by experimentation.

All these four phases need not be applicable to all. Some of us may learn by concentrating on one of these phases. It is most likely that the way in which a teacher approaches a topic depends on the way in which the teacher learns. Since different students have different learning styles, the particular learning style of a teacher may not be suitable for students who concentrate on other phases of learning.

There are methods published to find out learning styles of individuals. It is very important for both teachers and students to develop a balanced learning style involving all phases of learning to maximize the benefit from learning.



Do you know your learning style?

David Kolb published his learning styles model in 1984. The model gave rise to related terms such as Kolb's experiential learning theory (ELT), and Kolb's learning styles inventory (LSI). There are other methods also published by different research groups. These methods usually depend on questionnaires. Two popular methods are Fleming's VARK Learning Style Test and Jackson's Learning Styles Profiler (LSP).

Introducing journals:

Journal of Biomedical Nanotechnology

Journal of Biomedical Nanotechnology (JBN) is a journal which provides broad coverage in all research areas focused on the applications of nanotechnology in medicine, drug delivery systems, infectious disease, biomedical sciences, biotechnology, and all other related fields of life sciences. The journal has a distinguished editorial board. Both on line and print editions are being released.

Aim and Scope

Nanotechnology deals with functional structures and materials smaller than 100nm, which is emerging as a research area spanning several traditional scientific disciplines. In order to share original research related to applications of nanotechnology in biomedical fields, JBN is being published as an international peer-reviewed periodical that covers applications of nanotechnology in all fields of life sciences. JBN publishes original full papers and timely state-of-the-art reviews with author's photo and biography. It also publishes short communications encompassing fundamental and applied research aspects. Authors may use colour illustrations if necessary. For articles submitted in electronic form, on-line refereeing is resorted to for speeding up the review process. Authors need not pay for publishing their articles.

For submission of manuscript and to read online: <http://www.aspbs.com/jbn/>

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Observations/Comments

On learning:

Take care to ensure that technology acceleration does not defeat you

It is not meant to be an article on how to teach or how to learn. It is just a notice to all calling attention to one specialty of the present times.

This is a period of technology acceleration. In this era theory of survival of the fittest is again cent per cent true, and measure of fitness is competitiveness. There is only one *manthra* for being competitive: lifelong learning.



Students: Please understand the importance of getting equipped to engage in lifelong learning.

Teachers: Understand your role in facilitating the students to learn to learn (inclusive of learning to unlearn) and in developing in the students necessary preparedness and competence for lifelong learning.

Be aware of the implications of technology acceleration on teaching. Please be reminded that the concept of half life is

applicable very much to knowledge also. And it is all the more applicable for the case of knowledge of engineering. The topic you teach today may not have any direct significance after two or three years.

Half life of knowledge

The American Academy of Political and Social Sciences estimated, in 1986, the half life of an engineer's skills to be 2.5 years in software engineering, and 5 years in electrical engineering. In 2001 Penn State noted that the half life of one's internet/web knowledge is only 2 years.

Half life of knowledge was assessed in early 1970s to be around 15 to 20 years for different subjects. Now these numbers stand divided at least by three.

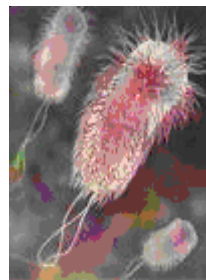
You can easily guess the impact of all these on education. Meaning of both learning and teaching has to be drastically different now.

Students: Understand that exams are only the tests - the so called developmental tests; assignment tests, class tests, series tests and university exams are all included - during the development of yourself into capable engineers. No doubt that these are important milestones in the whole process of developing you into professionals. Unless you pass successfully through these tests you don't get qualified to be subjected to qualification tests, and only through

PETROLEUM FROM MICROBES

You all know the great importance of oil/petroleum. Oil can cause war; oil can prevent war. Every nation is in search for new, renewable (non-fossil) sources. So far there is no credible alternative to fossil fuels. The idea of growing biofuel crops, which can be turned into petrol and diesel, is looking increasingly shaky. It is not yet time for all of us to forget the spur generated by 'Ramar petrol', that false claim of Ramar from Tamilnadu to have succeeded in making easy petrol from a leaf.

Now serious research is on to use microbes: engineering simple life forms like algae and bacteria so that they are turned into tiny oil producing factories. It looks they have succeeded in making a diesel equivalent using tiny bugs called e-coli. [See box]. They feed on agricultural waste such as woodchips or wheat straw. [Trials were done using sugar cane. To be economical, waste feeds are better.] They excrete crude oil. It is claimed that this type of fuel will not only be renewable but also carbon negative - meaning that the carbon it emits will be less than that sucked from the atmosphere by the raw materials from which it is made.



E. coli (medical term: *Escherichia coli*) is a common type of bacterium. These bacteria are not always harmful. Typical size: 0.5×2 micron.

Scientists also say that there is a better solution for producing bio-fuel in the rainforests of South America: from cellulose waste like sawdust and woodchips using a fungus known as 'gliocladium roseum'. They are of the view that this fungus is a better source of bio-fuel than anything currently available; it could be used to consume 400 million tons of plant waste produced every year.

- Prasanth

To reach a port we must sail, sometimes with the wind and sometimes against it. But we must not drift or lie at anchor
- Oliver Wendell Holmes

Contribute to Tutorial Session of Aptronics Review.

We are presenting a tutorial session from this issue onwards. Articles to be included in this session are invited from all members of teaching faculty of RASET. You may select any topic which you find useful to students or teachers. It could be a software tool, an engineering concept, working of a device, etc. But be sure to use a style suitable for tutorial: simple, with enough illustration and explanation leaving no room for confusion.

APPTRONJCS review

Tutorial 1: LABVIEW: While-loop and Case Structures

LabVIEW works on a data flow model in which information within a LabVIEW program, called a virtual instrument (VI), flows from data sources to data sinks connected by wires.

The data can be modified as it is passed from source to sink by other VIs. LabVIEW supports two types of VIs: internal VIs and user created VIs.

**Internal VIs are packaged with LabVIEW, and they perform simple functions like adding numbers and opening files.*

**User created VIs consist of a graphical user interface called the front panel, and a code pipeline called the block diagram.*

*Consider a simple LabVIEW program which takes a single number from the user and multiplies it by 10. Analysis of such a program reveals the following data flow structure:

- 1.The user inputs a number (data source).
- 2.The program executes an addition VI taking the user's number and the number 10 as its inputs (data sink).
- 3.The addition VI returns the result of the addition operation (data source).
- 4.The result is displayed on the screen (data sink).

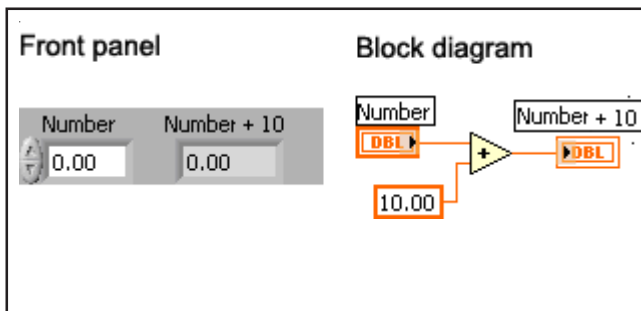
While the above example is very simple, it suffices to explain that, in LabVIEW, data always flow from data sources to data sinks according to the block diagram.

Front Panel

Every user created VI has a front panel that contains the graphical interface with which a user interacts. The front panel can house various graphical objects ranging from simple buttons to complex graphs. Various options are available for changing the look and feel of the objects on the front panel to match the needs of applications.

Block diagram

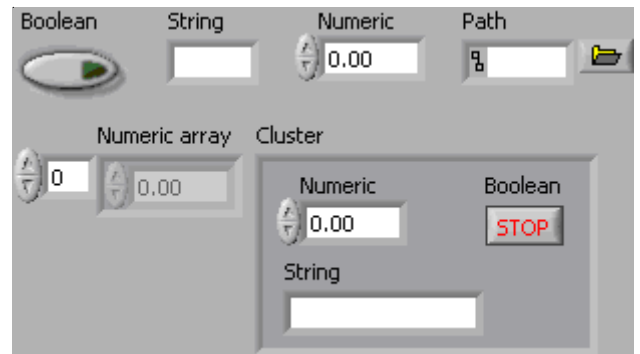
Nearly every VI has a block diagram containing some kind of program logic that serves to modify data as it flows from sources to sinks. The block diagram houses a pipeline structure of sources, sinks, VIs, and structures wired together in order to define this program logic. Most importantly, every data source (and sink as well) from the front panel has analogous source (and sink) on the block diagram. This representation allows the input values from the user to be accessed from the block diagram. Likewise, new output values can be displayed on the front panel by executing the code in the block diagram.



Controls

The most common form of a data source in LabVIEW is control. This element appears as a graphical element on the front panel of VI that can receive input from a user or another VI. As stated previously, any data source is represented by a symbol on the block diagram so that its value can be read and used in the code pipeline. Controls make no exception to this rule.

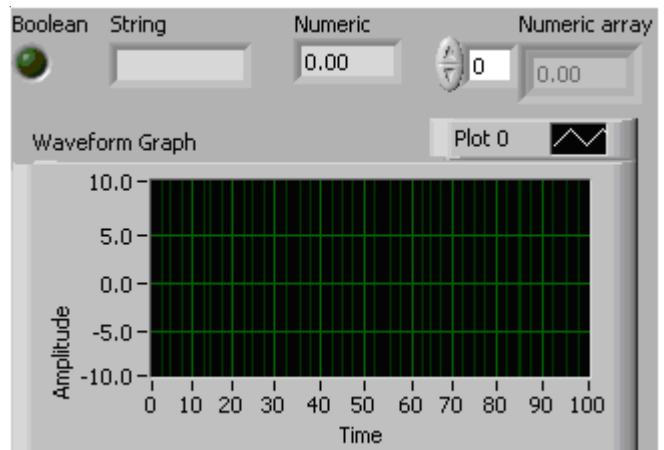
Every control has an associated data type that determines what kind of data flows from it on the block diagram. Every data type also has an associated colour shown on the block diagram.



Indicators

The most common form of a data sink in LabVIEW is indicator. This element appears as a graphical element on the front panel of a VI that can display output to a user or to another VI. As stated previously, any data sink in LabVIEW also has a symbol that appears on the block diagram so that its value can be updated in the code pipeline.

Every indicator also has an associated data type that determines what kind of data can be written to it on the block diagram.

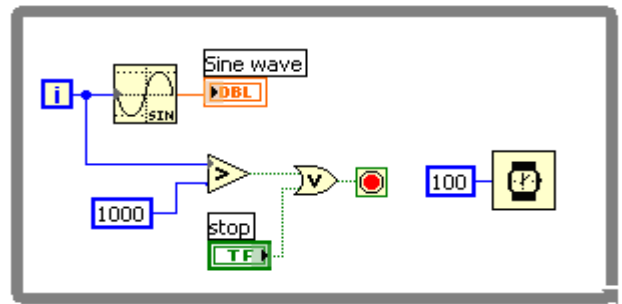
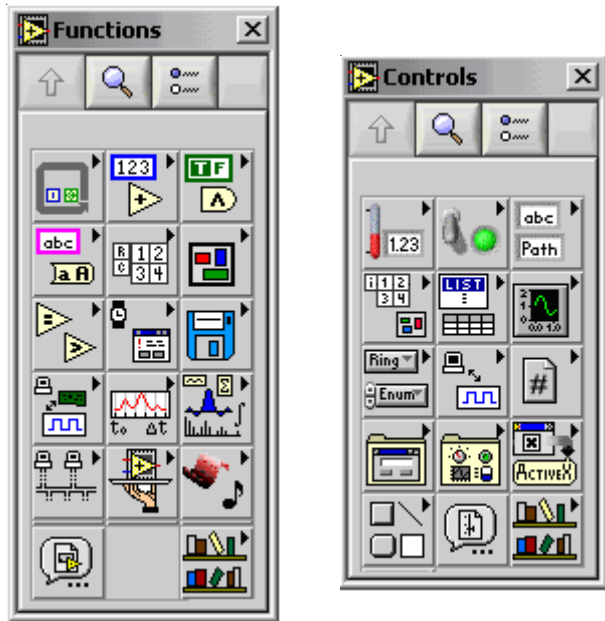


Typical indicators and their associated data types.

Palettes

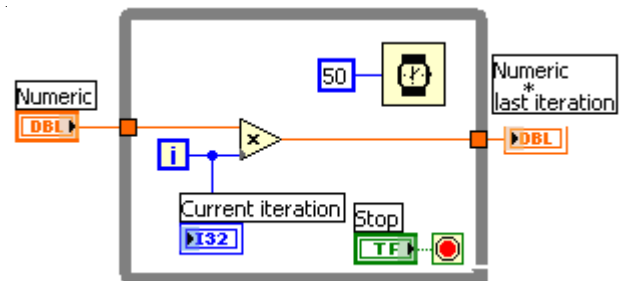
There are two palettes: one for front panel controls and indicators; the second for block diagram(sometimes called back panel) VIs. We can select either one window along with the respective palette(front panel or back panel, by pressing

Ctrl + E), or both windows together with both palettes (by pressing Ctrl + T). The palettes have their contents separated into sub-categories containing controls, indicators, and VIs.



A while-loop that stops when the loop iterator passes 1000 or when the user presses the stop button.

Almost all structures in LabVIEW, including while-loops, can have inputs and outputs. Wires that pass into and out of while-loops form small connection points called tunnels on the structure.



Input and output loop tunnels. The while loops takes a numeric value through an input tunnel and multiplies it times its current iteration value. When the loop is stopped, the value of the last multiplication is passed through an output tunnel and displayed in another indicator.

Structures

In addition to controls, indicators, and VIs, the block diagram can also contain a number of programming structures that modify the sequence of data flow on the block diagram. These structures, in general, perform traditional functions like looping or case-selection, but services that have no clear counterparts in text based programming languages are also sometimes provided.

LabVIEW 7 Express supports six different structures named while-loops, case structures, event structures, for-loops, sequence structures and formula nodes. We will discuss about while-loops and case structures in this issue, and the rest in the next issue.

While-loops

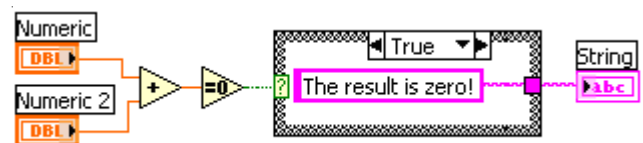
One of the most common structures you find on a block diagram is the while-loop. Much like in text-based languages, execution of while loop continues till a given boolean condition is met.

The while-loop is typically used in LabVIEW to continue some operation until either the user or some code event indicates that the operation should stop.

LabVIEW works in a real time environment. Both front panel and back panel functions are involved in this. Special attention is required to ensure that this does not lead to congestion in the processor. Normally this is taken care by introducing a small delay, of the order of a few ms, in the loop. We will see later how exactly this solves the issue.

Case structures

This is another common structure in LabVIEW. As in text-based languages, the case structure executes a block of code based on the value of a certain variable. A case selector located on the case structure is wired to a data source. The value fed into the case selector decides what the case executes. Only one case is shown at a time, but any case can be seen by clicking on the arrows to the left or to the right of the case name.



The use of a case structure as a simple Boolean if-statement. If the two numbers entered by the user add to zero, then a string message is displayed on the front panel saying so. If the two numbers do not add to zero, then a string message is displayed stating that they do not. The false case of the case structure is not shown.

- Allen Joseph

APPTRONJCS review

On e_governance – 1.

Hope you have all come across the usage *e-governance*. It [I mean the usage, not the subject.] looks to be quite fashionable these days. What they mean is only the employment of computers to various spheres of governance; it could be governance of the state itself (governmental activities/functions) or of private or public sector firms. The word governance itself is used to mean much more than what it normally sounds. To my mind, e-governance cannot be meaningful and appropriate unless it involves the use of engineering management skills. I would like to elaborate this topic a little making use of an example from my own experience.

The Case:

It happened around ten years back. I was then at Thiruvananthapuram. I was on a second attempt to get my voter's card. First attempt got aborted by the sheer shock of seeing the long snake like queue. I was determined not to fail again, and so took one day's leave from office, and reached the specified office specified by the local authority around 08.15h. I was a little surprised to see that a queue had already been formed to a length of about 50m. I told myself again: no question of failing again, so be in queue.

The office staff were quite enthusiastic [You don't generally expect such enthusiasm with government staff! By the by, do you expect employees of private firms to be generally enthusiastic?] They reported for duty at 09.30h. I could reach the window opening to show my face by 10.15h. [You may start wondering about the efficiency of the office; fellows in a 50m queue getting their work done in 45 minutes! No. The work at that window was only to see if the fellow's name is there in the register to proceed with the remaining part of the work.] What I saw there at the window was again a little surprising. A young guy was at the job on a raised chair just at the window, his head slightly bent down, sweat dropping down from his chins. A cup of tea, for which he is definitely paying, remained untouched on the window sill, waiting there for not less than ten minutes though not in any queue! I told him a comedian's dialogue from an old Malayalam play by Ponkunnam Varkey, which could be translated as: "We may wait for our food, but never make food to wait for us".



never make food to wait

"Why don't you have your tea?", I asked the young guy. "No sir, that would be enough for these people in the queue to initiate a quarrel", he replied.

I got really embarrassed. I had never faced a similar situation before. Here is a government servant who hesitates to spent

in order not to cause a delay to his customer. I did not spend any time to praise him there, though I wanted to. But I forced him to take his tea, which he finished off in just one breath! I handed over my slip to him. The slip gave a number using which he should help to search out the required details about me for preparing the voter's card, from the thick register he had on the sill. He looked at the slip, and said: "Sorry sir, I am helpless, this is not the slip required. I know that this is the one which was issued first. Later they changed it."

I felt really bad. I know that it is of no use to start blaming the system(if there is one!) which raises all such confusions. How can I make sure that I go back from here after successfully completing the mission? That was the concern for me. I was a little annoyed too. But I was not to show up that. "Where can I get the new slip", I asked the young sincere lad at the window.

"You can collect it from the village office near your residence", he replied.

I rushed to the village office. There the reception was different, not of course different from normal expectation. In about ten minutes, I could manage to get a new slip. I rushed back to the other office, 12 km away. The queue was more snaky by that time. All my experience at ISRO and other places helped me to manage the situation, to somehow convince those in the queue that I had to leave the queue from the front for no cause of mine. I handed over the new slip to the poor tired young guy at the window. With all patience in the world he turned the pages of the register back and forth a few times to ensure that he doesn't make a mistake. My name was missing. He reported the fallacy to me with apology as though it was his fault. My experience with printing of books easily made me realise that it cannot be just my name alone; a forum must be missing, which would mean four pages in an A4 size register. So I asked him to see if more are missing. Yes, was the reply. I got the range of the accession numbers, along with the page numbers(for redundancy) which were missing from the register. I got clarified that those could be available only with the same village office where I had gone to get my number. I said: "Ok, I will come back with the information".

It was 1.30pm by now. I had not taken my lunch. It must be the case with that poor young guy too. Again I took the car. My wife, sitting on my left, had naturally the pleasure of keeping a watch on my tensed face. We rushed to the village office. Both of us together rushed in. Village officer was a lady. She could not easily accept my behaviour, and asked me with no effort to hide her irritation: "Is something wrong again?"

I said, "Yes", and explained to her what has gone wrong. I told her that four pages were missing from the register there,

APPTRONICS review

and that I had to take copies of those urgently. She said: "How is it possible? It is a big file, office peon is on leave."

I told her: "Show me the location and the identification of the file. I am healthy enough, I can bring it to your table."

At first she hesitated for a while, but finally she agreed to the proposal. I took the file from the shelf and handed it over to the officer. She turned the pages up and showed the relevant pages to me. I told her that I had to get copy of those pages. She replied negative saying that no photostat facility was available there to take copy. I told her that just at two minutes walk, facility was available, and that I could get it done. Now she turned a little more harsh to inform me that hers was a responsible government office, that no such file could be taken out.

There was no mirror to check if my face turned more red as confirmed later by my wife. I lost my normal sense of soft behaviour. I simply snatched the file from her, and told her that I was taking the file out for taking copies of those pages, and that I was mortgaging my wife for the file. Before leaving the front door my immaturity in dealing such scenes made me look back and commend that she was free to sue me in a court of law, for the offence, if she desired to do so.

I got photostat of all those three pages, rushed back to the village office, handed over the file back to the officer thanking her and asking her to see if something were missing. This time she behaved more sensible to present a nice smile only as reply. My wife would have managed some nice kitchen talks with her in those ten minutes to please her; she is of course a better manager than me.

We rushed back to the other office hoping that all problems had been solved. The pages were pinned on. Formal entries in appropriate registers were made. Photographs were taken. Then a concerned fellow informed me that my case was to be treated as an anomalous case, and that the officer concerned to attest the register for such cases was absent that day. So I had to report another day at that office to collect my voter's card!

I tried to be happy to go back home having completed my mission successfully, being sure that I need not have to be absent from my office one more day for completing the course of action.

That completes narration of an experience of mine. I know that I have not used a style that suits a science journal. For that, I must tell you that the incident by itself is not a technical or engineering one. I am using it to introduce to you the failures and complications arising, in a simple situation concerning governance, for want of engineering approach. The pity is that people don't even know that these can be managed far better by the application of simple engineering skills.



No end to the queue!

My Questions to You

How do you find the whole scenario? Don't you realise that by making people wait in queues, what ever be the reason, the country is loosing precious hours which should be used productively? Don't you think that with proper engineering approach the whole activity could be executed far better with minimal failures and problems? Do you think that engineering skills are applicable only to the design and development of devices/equipment/technology/etc.? Have you got objection in employing modern engineering methods to governance including the area of services?

that a citizen would not have been made unnecessarily to face hell of a lot of problems like these?

[Dear readers: Please react to this experience so that I can give my review and suggestions in the next issue.]

.....continued from page 2

qualification tests you get launched successfully out of the institution of education into the world of competition..

Teachers: Pay attention to all the above. Be sure that it is not just the topics which you teach matter. More important is the learning culture you impart in the students. Avoid any act which acts against this spirit .

Students: Exploit your classes, and all co curricular activities, to get equipped for lifelong learning.

Curiosity

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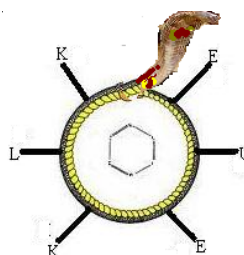
Dettol, Kleenex, Xerox, Kodak

Do you find any relation?

First correct answer will win a prize.

Answers can be mailed to meenav@rajagiritech.ac.in

Answer to the question in the previous issue



A dream of the famous scientist Kekule lead to the discovery of benzene structure.