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THINK : Teaching (that) Helps Improvise Native Knowledge

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.Personal Information

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Category of Nomination	**Distinguished Facilitator**	

(THINK) Teaching(that) Helps Improvise Native Knowledge

(Native : inherent, natural, or innate: a native strength)

CORE IDEA: "Geniuses are not made but they can be developed."

- **Teaching Learning Practices:**

With the above core idea, we at DDU Computer Engineering Department, plan to bring inherent strength of students to the real practice in the field of computer engineering.

Students, from the first year of B.Tech Computer Engineering, are found a lot enthusiastic at our institute. They need continuous direction to move forward in the field and follow learning practices that improvise their native knowledge.

We, as a team at DDU, tried various teaching practices and use of technology to quench the thirst.

- **Leveraging Technology relevant to courses :**

Moodle (Learning Management System), IITB Spoken Tutorials, Gmail Plus, CareerCup

Teaching (that) Helps Improvise Native Knowledge

- **"reThink Week # [1..12]"**

- Lab practical list: core and plus topics

- Projects and program exercises

- Learning from exam

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- Do and don'ts in computer programming

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To brain storm real time interview questions and improve problem solving skills
"reThink" # 1Given a time, calculate the angle between the hour and minute hands clockwise.

reThink Week # 1

"reThink" # 1

Given a time, calculate the angle between the hour and minute hands clockwise.

Example Answers to verify your solution,

3:27 58.5 degree

7:35 17.5 degree

H is an integer in the range 0–11. M is an integer in the range 0–59.

Output:

```
[jpandya@JMP programs]$ ./a.out
Enter hour(s)3
Enter minute(s)27

Hangle 90.000000
Hangle 13.500000
Mangle 162.000000Angle is -58.500000[jpandya@JMP programs]$ ./a.out
Enter hour(s)15
Enter minute(s)27

Hangle 90.000000
Hangle 13.500000
Mangle 162.000000Angle is -58.500000[jpandya@JMP programs]$ ./a.out
Enter hour(s)7
Enter minute(s)35

Hangle 210.000000
Hangle 17.500000
Mangle 210.000000Angle is 17.500000[jpandya@JMP programs]$ ./a.out
Enter hour(s)19
Enter minute(s)35

Hangle 210.000000
Hangle 17.500000
Mangle 210.000000Angle is 17.500000[jpandya@JMP programs]$
```

hourminAngle

```
//Program to find angle between hour hand and minute hand at a given time
/* Jigar.M.Pandya
     Date: 13/01/2014

Approach: Start with an example like 3:27 We can draw a picture of a clock by selecting
where the 3 hour hand is and where the 27 minute hand is
By playing around with these examples, we can develop a rule:
»    Minute angle (from 12 o'clock): 360 * minutes / 60
          If in 60 minutes minute hand travels 360 degree
          then in 1 z minutes how much?

          Ans is 360 * z minutes / 60

»    Hour angle (from 12 o'clock):

     360 * (hour % 12) / 12 + 360 * (minutes / 60) * (1 / 12)
     This is divided into two parts:

     If in 12 hours hour hand travels 360 degree
     then in x hour how much ?

     Ans is 360 * hour / 12 ;
          hour % 12 is done just to make it valid for inputs like 15.27

     Another for top minutes,
     If in 60 minutes hour hand travels 360/12 degree
     then in y minutes how much ?


     Ans is 360 * 1/12  * y minutes / 60



»    Angle between hour and minute: (hour angle - minute angle) % 360
By simple arithmetic, this reduces to 30 * hours - 5 5 * minutes

Here % 360 is performed to round back result within 0-360.
```

$\text{T}_{\text{eaching(that)}}$ H_{elps} $\text{I}_{\text{mprovise}}$ N_{ative} $\text{K}_{\text{nowledge}}$

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Core and Plus Part in Practical List :

For example, to learn Strings in C,

•Core includes all topics but concept related simple programming exercise

•Plus includes real time problem to match the topic knowledge. i.e. a bank check computerized

amount print

Lab 6:

    Core:

- Write a program that reads a string from keyboard and determines whether the string is palindrome or not. A string is a palindrome if it can be read from left and right with the same meaning. i.e. madAm, anna. Ignore capitalization.
- Write a program to read line of text from the keyboard and print out the number of occurrences of given sub string using function strstr from library.
- Write a program to decide and displaywhether student is eligible to enroll to CPC or not. Take input firstname, middlename, lastname and branch. If student branch is any one from ["Computer","Mechanical","Information"] then display welcome message as "Welcome <initial>. You are enrolled as <fullname>." Max fullname allowed is 25 characters. (use string library functions)

Plus:

- Write a program that reads cost of item in the form RRRR and converts the value to a string of words that express the numerical value in the words. i.e. 3549 can be read as Three Thousand Five Hundred Forty Nine.

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To passionate about programming, in varieties of fields like games, graphics, geography, maths, government, security, etc provide frequently updated list

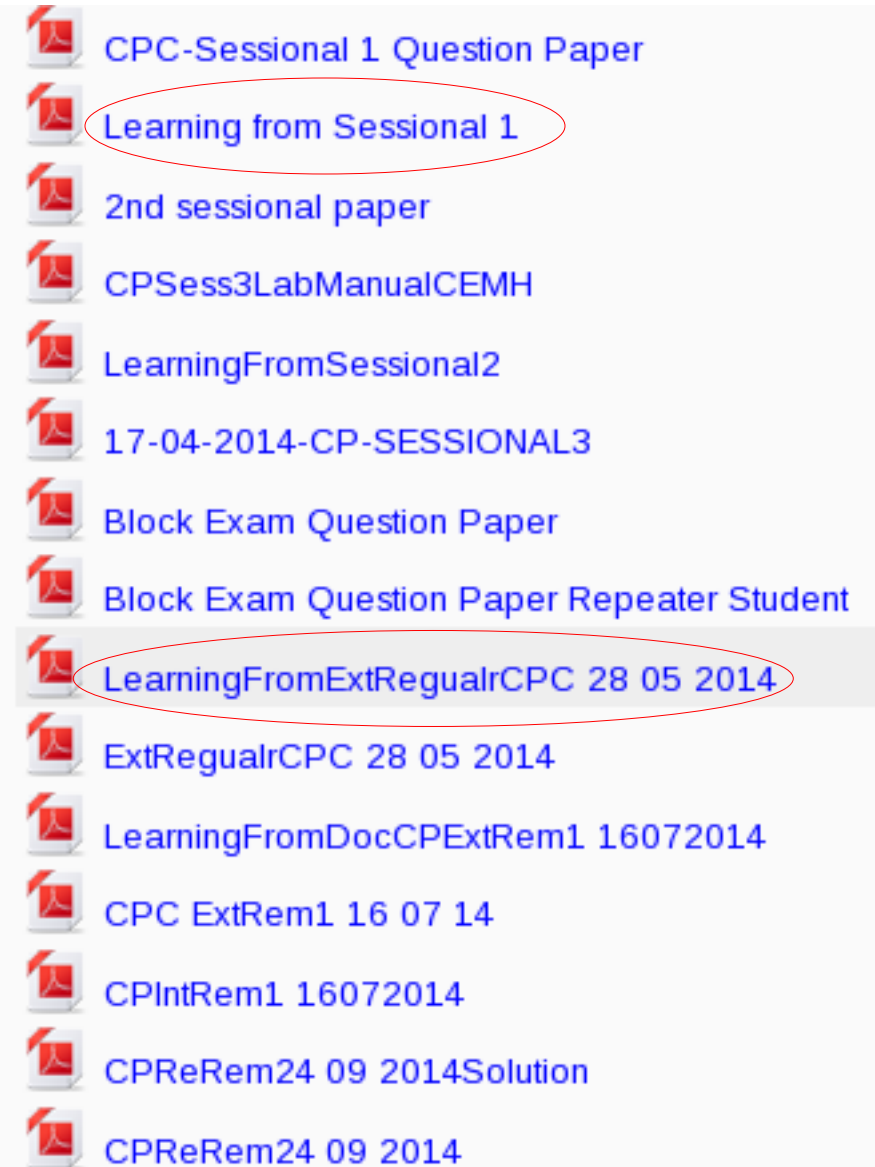**Projects**

This is updated frequently.

- Maze Game - Simple example of Jigsaw
- Mathematical Sets - C Library
- Design and Implement Tic Tac Toe Game.
- Implement Linux Commands for learning design, implementation, testing and optimization.
- Matrix Library
- Conceptualize Kaun Banega Crorepati Game
- 21 Match Sticks Game
- Election Software System
- snakes and ladders board game
- Sudoku Game
- Elevator and smartness!
- Railfence cypher - Security Algorithms
- Chain Reaction
- Conway's Game of Life
- Implement a general purpose medical software

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Sharing Soft Copy of question papers with "Context based Solution -> Document for learning from exam"

- Weak students get chance to look at actual simplest solution
- Intermediate student catches their mistakes
- Expert student get idea of solutions by other student and faculty members

CPC-Sessional 1 Question Paper

Learning from Sessional 1

2nd sessional paper

CPSess3LabManualCEMH

LearningFromSessional2

17-04-2014-CP-SESSIONAL3

Block Exam Question Paper

Block Exam Question Paper Repeater Student

LearningFromExtRegualrCPC 28 05 2014

ExtRegualrCPC 28 05 2014

LearningFromDocCPExtRem1 16072014

CPC ExtRem1 16 07 14

CPIntRem1 16072014

CPReRem24 09 2014Solution

CPReRem24 09 2014

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•A vital step towards setting the goal for student

•From the beginning of course, student are encouraged to prepare for certificate by IITs.

•More than 100 out of 120 earned Linux OS and Programming certificates 2013-14 B.Tech CE Year1.

Want to be IIT certified for Linux?

Want to be IIT certified for Linux?

Goto

http://spoken-tutorial.org/

Download Video Tutorial:

http://files.spoken-tutorial.org/disc-source/

http://files.spoken-tutorial.org/disc-source/linux-english-hindi.zip

Aim to complete "Softwre Traning and Certification Program" http://www.spoken-tutorial.org/ by IIT Bombay.

	C and C++	
3	**Basic and Intermediate Levels**	Powerful features, simple syntax, and portability make **C** a preferred language am applications. Widely used in the development of operating systems.

http://files.spoken-tutorial.org/disc-source/c-and-c-plus-plus.zip

http://c.learncodethehardway.org/book/

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Many times students understand and follow better, if things are listed clearly with bullets like sticky note

Open issues to learn from discussion and findings ...

This is updated frequently.

=> int i=4,j=4, arr[i][j]; //Is it valid? -- Completed. Yes in C99 compiler standard. No in Ansi-c. See varibale length array topic.

=> getchar(), scanf() sometimes do not read new input as leftover chars from previous functions in stdin buffer. -- Completed. See topic related to it.

=> fflush(stdin) not working in gcc Linux?

Do and don'ts in computer programming

This list is updated frequently:

Students, please follow coding standards in any programming language all the times. Otherwise be ready to see th serious matter. Learn coding standards from below list of "Do and don'ts in computer programming" :

DO

- Use indentation at all places

- Write program header comment, internal logic comment in brief, start and end of the loop purpose

- Choose appropriate names for identifiers like variable, function, etc.

- Write more and more functions even for small but independent task

DON'T

- Do not use magic numbers. (Try to use define for any numbers who has a meaning with proper name all capital.)

-Do not do more than required things. i.e. finding second lagest from array need not require to sort the array.

- Do not give identifier name of lenght one like I, m. No meaning. Try to atleast give 3 or more length name.

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Write a shell script to display and store to a file, 2 power n series using for loop. Here, n is entered by user. Do not use multiplication operator. In shell script shows inappropriate result for n=63, why that happens. correct answer examples, pow(2,62) is 6116860184273879 04. pow(2,63) is 9223372036854775808. You may use for ((i = 1 ; i <= $n; i++)) or for i in `seq 1 $n`. : Sagar Sheth (CE Student)

write a shell script to display all factors of inpu
learn that "factor" is an existing command as
factors.

[jpandya@JMP ~]$ factor 50
50: 2 5 5
[jpandya@JMP ~]$ factor sdf
factor: `sdf' is not a valid positive integer
[jpandya@JMP ~]$

: Padmaja Amin (CE Student)

NAME
    unlink - delete a name and possibly the file it refers to

SYNOPSIS
    #include <unistd.h>

    int unlink(const char *pathname);

...
[jpandya@localhost programs]$ man 3 unlink
No entry for unlink in section 3 of the manual
[jpandya@localhost programs]$

Thanks to Shaunak who pointed some requirement and I revisited K&R.

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• Student enjoy real fundamentals and used in real operating systems. Here, to explain pointer to function concept, real time linux kernel threads and callback function example is taken.

Pointer to function:

2.4.2 Kernel Threads

Kernel threads are processes started directly by the kernel itself. They delegate a kernel function to a separate process and execute it there in "parallel" to the other processes in the system (and, in fact, in parallel to execution of the kernel itself).15 Kernel threads are often referred to as (kernel) daemons. They are used to perform, for example, the following tasks:

☐ To periodically synchronize modified memory pages with the block device from which the pages originate (e.g., files mapped using mmap).

☐ To write memory pages into the swap area if they are seldom used.

Pointer to function can be also helpful in implementing kind of call back function mechanism (i.e AJAX)

callback

• Setting a model to show importance of knowledge sharing as well as giving credits

$\text{T}_{\text{eaching}(\text{that})}$ H_{elps} $\text{I}_{\text{mprovise}}$ N_{ative} $\text{K}_{\text{nowledge}}$

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Highlighting Computer friends i.e. logs, manual pages, etc.

How to get help on C functions in Linux?

`man 3` `<functionname>`

📄 get help using man 3

I heard of static and dynamic library! What's that?

Static Linking and Static Libraries is the result of the lin... need more space on disk and main memory. Examples ...

Dynamic linking and Dynamic Libraries

My interest to know what is .h and where is this printf function source code?

📄 WhatisHeaderFileAndWhereisCSourceCodeofPrintf

📄 2013 LOSP TOPIC 6 BasicFi...

📄 vi cheat sheet

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Differnt job titles and related tasks

How to match brackets to identify block?

Many times during programming, we will lik[...]

Moving to matching braces in vi

Courtesy: http://vim.wikia.com/wiki/Moving_
% key
The % key can be used for the following:

- To jump to a matching opening or clos[...]

Space–time tradeoff

Space–time tradeoff

From Wikipedia, the free encyclope[...]
In computer science, a space–time
conversely, the computation time ca[...]
change—hard drive space has for s[...]

How to improve program performance?

How to improve program performance?

This is updated frequently.

- Do only those steps which are required. Identify code which is doing ex[...]

- Carefully write statements inside loop. If you do not need certain statem[...] loop times than it becomes a big problem.

- Use shorthand and mutli-assignment statements where ever possible.

Compiling and deployment tools

The GNU make utility and Makefiles and other de[...]

There is a UNIX tool called make that is commonly used to co[...] is a lot of power in the make tool, but what I want to introduce [...] (e.g. in line 1 of the output from the prime number program ab[...]

The make utility uses a special plain-text file that you write tha[...] Makefile as a **recipe** for making your program (i.e. linking an[...]

A simple Makefile for our prime number program above migh[...]

Contents of file named "makefile":

```
go: go.c primes.c
        gcc -o go go.c primes.c

$ make
```

Other latest tools:

```
Ant For java

Chef:
http://www.getchef.com/chef/
```

CruiseControl, for Java and .NET

Courtesy: http://en.wikipedia.org/wiki/List_of

- Hudson, an extensible continuous integration engine
- Jenkins, an extensible continuous integration engine, fork[...]

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•Created AIKEN format based text file and imported into moodle for online quiz and practice of programming questions and review correct answers.

```
Are the outputs of the following same? <i> echo "$SHELL" <ii> echo '$SHELL'
A. yes
B. no
C. depends on shell
D. none of these
ANSWER: B
```

Page: 1 2 (Next)

Download table data as [Comma separated values text file ▴▾] [Download]

		First name / Surname	State	Started on	Completed	Time taken	Grade/10	Q. 1 /0	Q. 2 /0	Q. 3 /0	Q. 4 /0	Q. 5 /0	Q. 6 /0	Q. 7 /0	Q /0
☐		DIVYA PATEL Review attempt	In progress	10 December 2013 9:47 AM	-	-	-	✓ 0	✓ 0	✓ 0	✓ 0	✓ 0	✓ 0	✓ 0	✗
☐		NEVIL KOTHARI Review attempt	In progress	10 December 2013 1:18 PM	-	-	-	-	-	-	-	-	-	-	-
☐		SANKET KATARIYA Review attempt	In progress	12 December 2013 9:06 AM	-	-	-	-	-	-	-	-	-	-	-
☐		BHARGAV DAVE Review attempt	In progress	13 December 2013 12:13 PM	-	-	-	-	-	-	-	-	-	-	-
☐		SHAUNAK THAKER Review attempt	Finished	14 December 2013 4:26 AM	14 December 2013 4:30 AM	3 mins 31 secs	1	✓ 0	✓ 0	✗ 0	✓ 0	✓ 0	✓ 0	✓ 0	✓

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File   Edit   View   History   Bookmarks   Tools   Help

M Circle "Students-BY2013" - jigarp...   +

https://mail.google.com/mail/u/0/#circle/Students-BY2013

circle:students-by2013

+Prof. J...

Mail ▾

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COMPOSE

☐ ☆ 📁	Shaunak Thaker	Inbox	Permutations of string - Sir I read two algorithms to pr			Jan 3
☐ ☆ 📁	Chaitya, me (3)	Inbox	SPOJ add reverse problem - #include<stdio.h> int re			12/13/14
☐ ☆ 📁	Chaitya, me (5)	Inbox	Interesting topics - I got it sir. Hard work pays. Thank			12/5/14
☐ ☆ 📁	Shaunak, me (2)	Inbox	Huffman code - Keep going. Sent from my iPhone > (			11/13/14
☐ ☆ 📁	Prabhakar Niraula	Inbox	Projects in DSA sem-3 - Respected Sir, Kindly consid		📎	11/12/14
☐ ☆ 📁	Chaitya Shah	Inbox	iOS 8 and OS X - iOS 8 is out.... https://appleseed.ar			9/18/14
☐ ☆ 📁	Crupanshu, me (2)	Inbox	Hoffman coding - Improve as below: - User do not lik		📎	9/12/14
☐ ☆ 📁	Chaitya, me (2)	Inbox	Binary search algorithm - Binary search does not sor			9/12/14
☐ ☆ 📁	Shaunak, me (3)	Inbox	huffman encoder and decoder - - Display the coding		📎	9/10/14
☐ ☆ 📁	Shaunak Thaker	Inbox	program having floating point exception - Problem sta		📎	8/28/14
☐ ☆ 📁	Shaunak Thaker	Inbox	Programming problem - link to the problem http://www			8/25/14
☐ ☆ 📁	Shaunak Thaker	Inbox	huffman coding		📎	8/25/14
☐ ☆ 📁	Chaitya, me (3)	Inbox	Graph application - yes sir i checked it out thank you			8/20/14
☐ ☆ 📁	Shaunak, me (11)	Inbox	moodle problem 2 - Sir I have written the code for inf		📎	7/24/14
☐ ☆ 📁	Crupanshu, me (2)	Inbox	program for sparce matrix - See attached program. Ir		📎	7/9/14
☐ ☆ 📁	Gunjan Patel	Inbox	help for a program! - Sir, I was working on a 2d array		📎	5/15/14

Inbox
Starred
Important
Sent Mail
Drafts (2)
▾ Circles
   ○ Friends
   ○ Family
   ○ Acquaintances
   ○ Following
   ○ **Students-BY2013**
[Imap]/Drafts
Deleted Messages
FEP
MobileAppDev
Notes
Research
Sent Messages
More ▾

Conclusion

- Overall students' participation in the subject was noteworthy during this course of activities.

- Students admitted improvement in native knowledge

- Students found performing better in the later semester courses

- More practical oriented and are now able to relate theory topics to real world or practically in the computer engineering field at least.

- Use of moodle, IITB spoken tutorial, email communication, etc are now generating knowledge base.

- Faculties are putting efforts into adding new fruitful content to the course instead wasting time in maintaining same old content every year.

- With the innovative teaching and learning practices, **below statement is not completely true anymore.**

  "Teacher having five years of experience in a subject means having 1 year of experience five times."

References

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http://www.codechef.com/

https://www.google-melange.com/gsoc/homepage/google/gsoc2015

https://campusconnect.infosys.com

THANK YOU

www.infosys.com