## 22. Computational Thinking

**Computational Thinking - Workshop Details** 

Prakash Hegade, CSE



## 22. Computational Thinking

### **Objectives:**

- To understand and appreciate the four major components of computational thinking
- To adapt human thinking principles to be an effective problem solver
- To realize problem solving with computational advantage and inculcate in course delivery

### **Background Knowledge Expected:**

- Anyone who wants to solve a problem
- Computer Science would be an added advantage

### **Participant Activities:**

The entire session will be activity based. There will be no slide show in the workshop. The participants will be required to be seated in teams of 3-4. Every team must be supplied with charts and sketch pens for the activities.

#### Qualification of Instructor Prakash Hegade:

- M. Tech. from IIIT-Bangalore
- PGSSP and research experience from IIIT-Hyderabad
- Director of Knit Arena Software Research and Services Private Limited
- Technical Lead for Transil Technologies
- 3 years of industry experience and 6 years of academic experience

#### Abstract:

We encounter problems on a daily basis and problem solving skill is one of the fundamental skill that everyone must hone. To be an effective problem solver one of the important skill is to understand and solve large, complex and poorly defined problems. One might know how to devise algorithms, analyse solutions, implement and solve problems; with a wealth of tools at disposal. But the real world has a lot of other challenges which need more than the routine thinking. The computing world has yet a lot of challenging problems that need to be solved and they go beyond traditional algorithmic thinking. Human thinking, which inspires computational thinking, on knowing helps us realize and make effective use of computational capabilities. Computational thinking involves four major steps: decomposition, abstraction, pattern recognition, and algorithms. Decomposition involves breaking down bigger problem into smaller ones. Pattern recognition helps us to look for similarities among and within the problems. It helps us recognize the internal problem patterns. We abstract the patterns to put through future use. It helps us focus on important information and discard the irrelevant ones. Algorithm brings in the design techniques to further solve the problem. This

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workshop enlightens the first three aspects of computational thinking in the REAL sense of it.

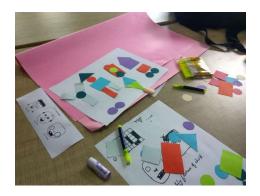
### **Detailed Outline of the Workshop:**

Session No.	Description	Time		
1.	Welcome, Motivation, Introduction and overview.	60 mins		
2.	Activity: Representation System			
	Activity discussion			
	Theme: Pattern Recognition			
3.	Activity: Zombie Parents			
	Activity discussion			
	Theme: Decomposition			
4.	Activity: Shapes and Colors	60 mins		
	Activity discussion			
	Theme: Abstraction			
5.	Activity: 12 Rules of Life (Sanskrit Adaptation)	60 mins		
	Activity discussion			
	Theme: Pattern recognition, decomposition, abstraction			
	Understanding generic machine learning			
6.	5 mini activities and discussion	60 mins		
	Theme: Computational thinking			
7.	Case Study for Homework and discussion: Natural Order	30 mins		
8.	Winding up: report writing on take-away	30 mins		

### Photographs:



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### Student Registration List:

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