# इयdoku लahabharat 

Episode-2
$18^{\text {th }}-20^{\text {th }}$ October

## Irregular Variations by Rohan Rao

Submission Page : http://logicmastersindia.com/SM/?test=SM201410
Discussion Thread : http://logicmastersindia.com/t/?tid=877
About Sudoku Mahabharat : http://logicmastersindia.com/SM/
F. A. Q. : http://logicmastersindia.com/t/?tid=381

Registration, if required : http://logicmastersindia.com/register.asp

## About this Episode

Apart from classic Sudokus of different sizes, this episode focuses on Sudokus with irregular shapes, namely Irregular Sudoku, Surplus Sudoku, Scattered Sudoku, Toroidal Sudoku and Chain Sudoku.

## How to participate?

- Understand the rules of different Sudokus that will appear in this episode. This Instruction Booklet has rules for each Sudoku.
- Download the password protected Sudoku booklet (will be uploaded before the test starts). The Sudoku booklet contains the actual Sudokus to be solved. It is password protected, so you won't be able to open it.
- Any time after $18^{\text {th }}$ October (but before $20^{\text {th }}$ October), login at the submission page using your LMI userid and password.
- LMI uses GMT time zone. Please check the submission page for exact timing.
- Click on "Start". At this time, password for pdf will be shown and timer will start.
- You can either solve online using flash interface or print the pdf and solve on paper.
- Each Sudoku will be marked with two arrows
- If solving on paper
- Fill the answer form with digits along the marked arrows
- Click submit button
- If solving online
- After solving the Sudoku, click on "Submit" button below the grid
- Each Sudoku grid has different submit buttons

If you are participating at LMI for first time, you must check the F.A.Q. at http://logicmastersindia.com/t/?tid=381.

## Points Table and Scoring

Points typically indicate difficulty of the Sudokus and time required to solve them. While the organizers have made best efforts to match them, your personal experience and preference may differ.

This test uses instant grading where a solver can submit any individual sudoku and receive confirmation that the solution is correct or not. Each incorrect submission

| Standard 6X6 | $1,1,1,1$ |
| :--- | :--- |
| Standard 8X8 | 3 |
| Standard 9X9 | $5,5,5$ |
| Irregular 6X6, 9X9 | 2,11 |
| Surplus 6X6, 9X9 | 3,13 |
| Scattered 6X6, 9X9 | 4,10 |
| Toroidal 6X6, 9X9 | 3,12 |
| Chain 6X6, 9X9 | 3,17 | reduces the sudoku's potential score. The first, second, third, and fourth incorrect submission reduces the potential score to $90 \%, 70 \%, 40 \%$, and $0 \%$ respectively.

## Bonus

If you submitted all sudokus correctly, you can have bonus points 1 point per minute saved, computed upto seconds.

## General Rules

To make the rules less repetitive, you will see following line "Apply standard Sudoku rules" in most Sudoku rules. This means "Place a digit from 1 to N , where N is the size of the grid, in each empty cell so that each digit appears exactly once in each row, column and outlined region."
These outlined regions could be 3X3 boxes, or other shapes.
Each Sudoku will be marked with, at max, 2 lettered arrows. If you are solving on paper, you need to submit the digits in these arrows, in order, including the givens. For example, the answer key for the Sudoku at the right is 162897453,517698432 .

| 3 | 8 | 7 | 4 | 6 | 5 | 1 | 2 | 9 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 9 | 5 | 4 | 2 | 3 | 1 | 7 | 6 | 8 |
| 1 | 6 | 2 | 8 | 9 | 7 | 4 | 5 | 3 |
| 2 | 9 | 3 | 1 | 4 | 6 | 8 | 7 | 5 |
| 8 | 7 | 1 | 5 | 2 | 9 | 3 | 4 | 6 |
| 5 | 4 | 6 | 3 | 7 | 8 | 9 | 1 | 2 |
| 7 | 2 | 5 | 9 | 8 | 4 | 6 | 3 | 1 |
| 6 | 1 | 9 | 7 | 5 | 3 | 2 | 8 | 4 |
| 4 | 3 | 8 | 6 | 1 | 2 | 5 | 9 | 7 |

## About the Sudoku Booklet

The password protected Sudoku booklet will have 8 pages. If you are planning to solve on paper, we advise you to have a printer accessible with enough paper.

The Sudoku booklet will look exactly like next 8 pages in this instruction booklet. The font sizes, cell sizes, colors, borders, shading, margin will be identical. We recommend you to print few pages of this instruction booklet. You can avoid any last minute surprise during the test.


This grid is for testing how the printout looks.

## Standard Sudoku

Place a digit from 1 to 6 in each empty cell so that each digit appears exactly once in each row, column and 2X3 box.


| c) 1 point |  |  |  |  | $\nabla$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 |  | 3 |  |  |  |
| 6 |  | 4 |  |  |  |
| 3 |  | 2 |  |  |  |
|  |  |  | 3 | 1 |  |
|  |  |  | 1 | 5 |  |
|  |  |  | 2 | 4 |  |



| 1 point |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\qquad$      <br>  1 3 4 5  <br>  2   3  <br>  5   6  <br>  4 6 2 1  <br>       |  |  |  |  |  |

Standard Sudoku

3 points
Place a digit from 1 to 8 in each empty cell so that each digit appears exactly once in each row, column and 2X4 box.

## Standard Sudoku

5 points
Place a digit from 1 to 9 in each empty cell so that each digit appears exactly once in each row, column and 3X3 box.


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Standard Sudoku

5 points
Place a digit from 1 to 9 in each empty cell so that each digit appears exactly once in each row, column and 3X3 box.

## Standard Sudoku

5 points
Place a digit from 1 to 9 in each empty cell so that each digit appears exactly once in each row, column and 3X3 box.


## Irregular

 Sudoku2 points
Place a digit from 1 to 6 in each empty cell so that each digit appears exactly once in each row, column and outlined region. Each outlined region is marked by thick borders.

## Irregular Sudoku

11 points
Place a digit from 1 to 9 in each empty cell so that each digit appears exactly once in each row, column and outlined region. Each outlined region is marked by thick borders.


## Surplus <br> Sudoku <br> 3 points

Place a digit from 1 to 6 in each empty cell so that each digit appears exactly once in each row and column. Digits 1 to 6 must appear at least once in each of the outlined regions with seven cells.

## Surplus Sudoku

## 13 points

Place a digit from 1 to 9 in each empty cell so that each digit appears exactly once in each row and column. Digits 1 to 9 must appear at least once in each of the outlined regions with ten cells.


## Scattered Sudoku

4 points
Place a digit from 1 to 6 in each empty cell so that each digit appears exactly once in each row, column, outlined region and the six grey cells.

## Scattered Sudoku

10 points
Place a digit from 1 to 6 in each empty cell so that each digit appears exactly once in each row, column, outlined region and the nine grey cells.


## Toroidal Sudoku

3 points
Place a digit from 1 to 6 in each empty cell so that each digit appears exactly once in each row, column and outlined region. Some of the outlined regions wrap between the top and bottom edges, and/or the left and right edges of the grid.

## Toroidal Sudoku

## 12 points

Place a digit from 1 to 9 in each empty cell so that each digit appears exactly once in each row, column and outlined region. Some of the outlined regions wrap between the top and bottom edges, and/or the left and right edges of the grid.


## Chain Sudoku

3 points
Place the digits
from 1 to 6 in every row, every column and every chain of connected circles


## Chain Sudoku

## 17 points

Place the digits from 1 to 9 in every row, every column and every chain of connected circles.



| $4^{\text {Standard }}$ |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 4 | 6 | 3 | 5 |
| 5 | 6 | 3 | 4 | 2 | 1 |
| 4 | 1 | 2 | 3 | 5 | 6 |
| 3 | 5 | 6 | 1 | 4 | 2 |
| 2 | 3 | 1 | 5 | 6 | 4 |
| 6 | 4 | 5 | 2 | 1 | 3 |

Standard

| 4 | 1 | 5 | 3 | 2 | 6 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| 6 | 2 | 3 | 4 | 5 | 1 |
| 1 | 3 | 2 | 5 | 6 | 4 |
| 5 | 6 | 4 | 2 | 1 | 3 |
| 3 | 5 | 6 | 1 | 4 | 2 |
| 2 | 4 | 1 | 6 | 3 | 5 |

Standard

| 8 |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 8 | 5 | 6 | 4 | 1 | 2 | 7 | 3 |
| 7 | 1 | 2 | 3 | 8 | 5 | 6 | 4 |
| 1 | 4 | 5 | 6 | 2 | 8 | 3 | 7 |
| 3 | 7 | 8 | 2 | 5 | 6 | 4 | 1 |
| 6 | 3 | 4 | 5 | 7 | 1 | 2 | 8 |
| 2 | 8 | 1 | 7 | 3 | 4 | 5 | 6 |
| 4 | 2 | 3 | 1 | 6 | 7 | 8 | 5 |
| 5 | 6 | 7 | 8 | 4 | 3 | 1 | 2 |

Standard

| 5 | 1 | 3 | 6 | 2 | 4 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| 2 | 6 | 4 | 5 | 3 | 1 |
| 1 | 3 | 2 | 4 | 6 | 5 |
| 6 | 4 | 5 | 3 | 1 | 2 |
| 4 | 2 | 6 | 1 | 5 | 3 |
| 3 | 5 | 1 | 2 | 4 | 6 |

Standard

| 4 | 6 | 5 | 3 | 2 | 1 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| 2 | 1 | 3 | 4 | 5 | 6 |
| 6 | 2 | 1 | 5 | 3 | 4 |
| 3 | 5 | 4 | 1 | 6 | 2 |
| 5 | 4 | 6 | 2 | 1 | 3 |
| 1 | 3 | 2 | 6 | 4 | 5 |

Standard

| 4 | 1 | 2 | 6 | 7 | 3 | 9 | 8 | 5 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 8 | 3 | 7 | 9 | 1 | 5 | 4 | 6 | 2 |
| 6 | 9 | 5 | 4 | 8 | 2 | 1 | 3 | 7 |
| 2 | 5 | 9 | 8 | 3 | 1 | 7 | 4 | 6 |
| 7 | 8 | 1 | 5 | 6 | 4 | 3 | 2 | 9 |
| 3 | 4 | 6 | 2 | 9 | 7 | 5 | 1 | 8 |
| 9 | 7 | 3 | 1 | 2 | 6 | 8 | 5 | 4 |
| 1 | 2 | 4 | 7 | 5 | 8 | 6 | 9 | 3 |
| 5 | 6 | 8 | 3 | 4 | 9 | 2 | 7 | 1 |

Standard
Standard

| 3 | 8 | 7 | 4 | 6 | 5 | 1 | 2 | 9 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 9 | 5 | 4 | 2 | 3 | 1 | 7 | 6 | 8 |
| 1 | 6 | 2 | 8 | 9 | 7 | 4 | 5 | 3 |
| 2 | 9 | 3 | 1 | 4 | 6 | 8 | 7 | 5 |
| 8 | 7 | 1 | 5 | 2 | 9 | 3 | 4 | 6 |
| 5 | 4 | 6 | 3 | 7 | 8 | 9 | 1 | 2 |
| 7 | 2 | 5 | 9 | 8 | 4 | 6 | 3 | 1 |
| 6 | 1 | 9 | 7 | 5 | 3 | 2 | 8 | 4 |
| 4 | 3 | 8 | 6 | 1 | 2 | 5 | 9 | 7 |

Irregular


Irregular

A | 6 | 7 | 3 | 8 | 1 | 9 | 4 | 5 | 2 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 1 | 2 | 9 | 7 | 6 | 5 | 8 | 4 | 3 |
| 9 | 8 | 5 | 3 | 2 | 7 | 1 | 6 | 4 |
| 3 | 6 | 4 | 1 | 7 | 8 | 9 | 2 | 5 |
| 8 | 4 | 7 | 5 | 9 | 2 | 6 | 3 | 1 |
| 5 | 1 | 8 | 4 | 3 | 6 | 2 | 9 | 7 |
| 2 | 9 | 1 | 6 | 5 | 4 | 3 | 7 | 8 |
| 7 | 3 | 2 | 9 | 4 | 1 | 5 | 8 | 6 |
| 4 | 5 | 6 | 2 | 8 | 3 | 7 | 1 | 9 |

| 9 | 6 | 8 | 5 | 4 | 7 | 1 | 2 | 3 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 4 | 3 | 7 | 2 | 1 | 6 | 8 | 9 | 5 |
| 2 | 1 | 5 | 9 | 8 | 3 | 7 | 6 | 4 |
| 7 | 4 | 1 | 6 | 2 | 9 | 3 | 5 | 8 |
| 5 | 9 | 2 | 8 | 3 | 1 | 4 | 7 | 6 |
| 3 | 8 | 6 | 4 | 7 | 5 | 9 | 1 | 2 |
| 1 | 2 | 9 | 3 | 6 | 8 | 5 | 4 | 7 |
| 6 | 7 | 3 | 1 | 5 | 4 | 2 | 8 | 9 |
| 8 | 5 | 4 | 7 | 9 | 2 | 6 | 3 | 1 |

Surplus

| 1 | 2 | 3 | 4 | 5 | 6 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| 5 | 3 | 1 | 2 | 6 | 4 |
| 6 | 1 | 4 | 5 | 2 | 3 |
| 3 | 4 | 2 | 6 | 1 | 5 |
| 2 | 5 | 6 | 3 | 4 | 1 |
| 4 | 6 | 5 | 1 | 3 | 2 |

Surplus

| 8 | 1 | 5 | 3 | 9 | 4 | 7 | 2 | 6 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 4 | 2 | 7 | 8 | 6 | 5 | 1 | 9 | 3 |
| 9 | 4 | 6 | 1 | 7 | 8 | 2 | 3 | 5 |
| 6 | 3 | 2 | 9 | 5 | 7 | 8 | 4 | 1 |
| 7 | 5 | 8 | 4 | 3 | 1 | 9 | 6 | 2 |
| 1 | 8 | 3 | 6 | 2 | 9 | 4 | 5 | 7 |
| 5 | 6 | 4 | 7 | 1 | 2 | 3 | 8 | 9 |
| 2 | 7 | 9 | 5 | 4 | 3 | 6 | 1 | 8 |
| 3 | 9 | 1 | 2 | 8 | 6 | 5 | 7 | 4 |

Scattered

| $\sqrt{3}$ |  |  |  |  |  |  | 2 | 5 | 1 | 4 | 6 |
| :--- | :--- | :--- | :--- | :--- | :--- | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 6 | 4 | 5 | 2 | 3 |  |  |  |  |  |  |
| 4 | 5 | 3 | 2 | 6 | 1 |  |  |  |  |  |  |
| 2 | 1 | 6 | 4 | 3 | 5 |  |  |  |  |  |  |
| 5 | 3 | 2 | 6 | 1 | 4 |  |  |  |  |  |  |
| 6 | 4 | 1 | 3 | 5 | 2 |  |  |  |  |  |  |

Scattered

| 6 | 9 | 4 | 2 | 3 | 7 | 5 | 1 | 8 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 5 | 6 | 8 | 9 | 4 | 1 | 7 | 2 | 3 |
| 3 | 2 | 1 | 7 | 5 | 8 | 6 | 4 | 9 |
| 9 | 5 | 7 | 3 | 6 | 4 | 2 | 8 | 1 |
| 1 | 3 | 2 | 6 | 8 | 9 | 4 | 5 | 7 |
| 4 | 8 | 9 | 1 | 7 | 5 | 3 | 6 | 2 |
| 7 | 4 | 5 | 8 | 9 | 2 | 1 | 3 | 6 |
| 2 | 7 | 3 | 5 | 1 | 6 | 8 | 9 | 4 |
| 8 | 1 | 6 | 4 | 2 | 3 | 9 | 7 | 5 |

Chain


Toroidal


Toroidal

| 4 | 2 | 7 | 1 | 9 | 8 | 6 | 5 | 3 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 1 | 5 | 3 | 6 | 2 | 4 | 7 | 8 | 9 |
| 2 | 4 | 9 | 8 | 1 | 3 | 5 | 6 | 7 |
| 6 | 3 | 5 | 4 | 7 | 2 | 1 | 9 | 8 |
| 7 | 1 | 8 | 9 | 5 | 6 | 3 | 4 | 2 |
| 3 | 6 | 2 | 7 | 4 | 9 | 8 | 1 | 5 |
| 8 | 9 | 1 | 3 | 6 | 5 | 2 | 7 | 4 |
| 5 | 7 | 4 | 2 | 8 | 1 | 9 | 3 | 6 |
| 9 | 8 | 6 | 5 | 3 | 7 | 4 | 2 | 1 |

Chain
(1) (2)-(3)-6 (4)-9)-7 8
(8) (3)-4) 7) (5) (6) (2) 9
(7)-6) (5) (1) (4) (3) (2) 2
(5) 7) (6) (2) 8 (3) (9-4) 1
(3) 1) 9 (8) (7) (2) (5) 6
(2)-4) 8 (1)-9) (5)-6) (3) 7
(4)-9-7) 5 - 6 (1) (2) 3
(6)-5-1-(3-2) (7) 8-9 (4)
(9)-8-(2)-4-(3)-7-6

