

DAILY ASSESSMENT REPORT

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Course:	VLSI CAD PART 1	USN:	4AL17EC091
Topic:	Week 4	Semester & Section:	6 th Sem 'B' Sec
Github Repository:	swastik-gowda		

FORENOON SESSION DETAILS

Image of session

Kernels and Co-Kernels of Function F

- Kernel** of a Boolean expression F is:
 - A **cube-free** quotient k obtained by (algebraically) dividing F by a **single cube c**
 - This single cube c also has a name: it is a **co-kernel** of function F

quotient Q

expression F

divisor D

remainder R

$F = D \cdot Q + R$

kernel k if cube-free

expression F

c = 1 cube

remainder R

$F = c \cdot k + R$

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Summary

- Don't Cares are implicit in the Boolean network model**
 - They arise from the graph structure of the multilevel Boolean network model itself
- Implicit Don't Cares are **powerful** !**
 - They can greatly help simplify the 2-level SOP structure of any node
- Implicit Don't Cares require **computational work** to go find**
 - For this example, we just "stared at the logic" to find the DC patterns
 - We need some **algorithms** to do this automatically!
 - This is what we need to study next!

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Report – Report can be typed or hand written for up to two pages.

As we noted in the lectures, all of multi-level logic optimization is based on scripts that heuristically optimize a Boolean network model of your design. Thus, SIS has many commands and many options. For simplicity, we are using a standard, default synthesis script called the RUGGED script to optimize your designs.

SIS can also read logic design in many different file formats. But conveniently for us, it can read the same format that the ESPRESSO 2-level optimizer tool uses, the so-called PLA format. So, we will let you edit files in the ESPRESSO truth table format, and those can be uploaded and optimized by SIS.

The new information you need is how to read a SIS output result, since the result is an optimized Boolean network model, each of whose nodes is an optimized 2-level SOP form. Let's look at a few small examples to see how to read a SIS result.

EXAMPLE 1: 2 functions of 4 variables

Here are two functions named s1 and s0, each a function of input variables a1 a0 b1 b0. This is specified in the ESPRESSO PLA format:

```
.i 4  
.o 2  
.ilb a1 a0 b1 b0  
.ob s0 s1  
0000 00  
0001 00  
0010 00  
0011 00  
0100 00  
0101 01  
0110 10  
0111 11  
1000 00  
1001 10  
1010 01  
1011 00  
1100 00  
1101 11  
1110 00  
1111 00  
.e
```