

## Week 3 Exercises

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### Lecture 4

#### Note IV.28

***Supernecklaces.***

A "supernecklace" of the 3rd type is a labelled cycle of cycles (see page 125). Draw all the supernecklaces of the 3rd type of size  $n$  for  $n = 1, 2, 3$ , and 4. Then develop an asymptotic estimate of the number of supernecklaces of size  $n$  by showing that

$$[z^n] \ln \left( \frac{1}{1 - \ln \frac{1}{1-z}} \right) \sim \frac{1}{n} (1 - e^{-1})^{-n}$$

*Hint:* Take derivatives.

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Created Wed 10 Apr 2013 11:43 PM IST

Last Modified Tue 20 Jan 2015 9:45 PM IST

