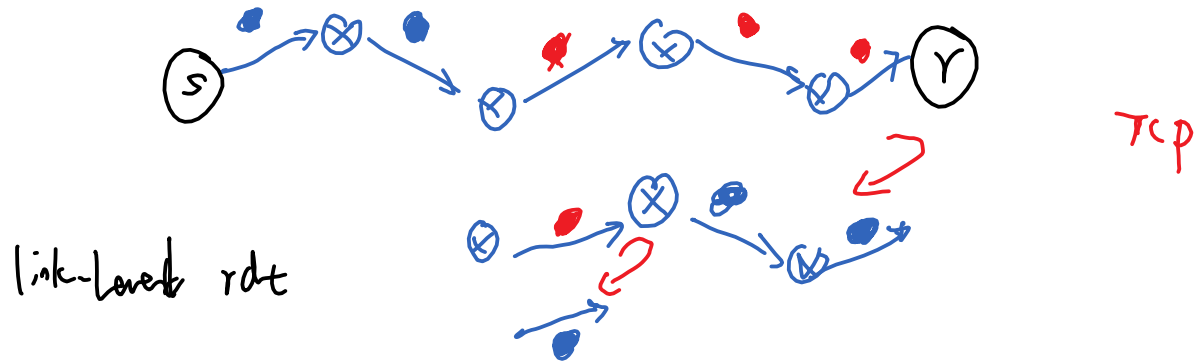
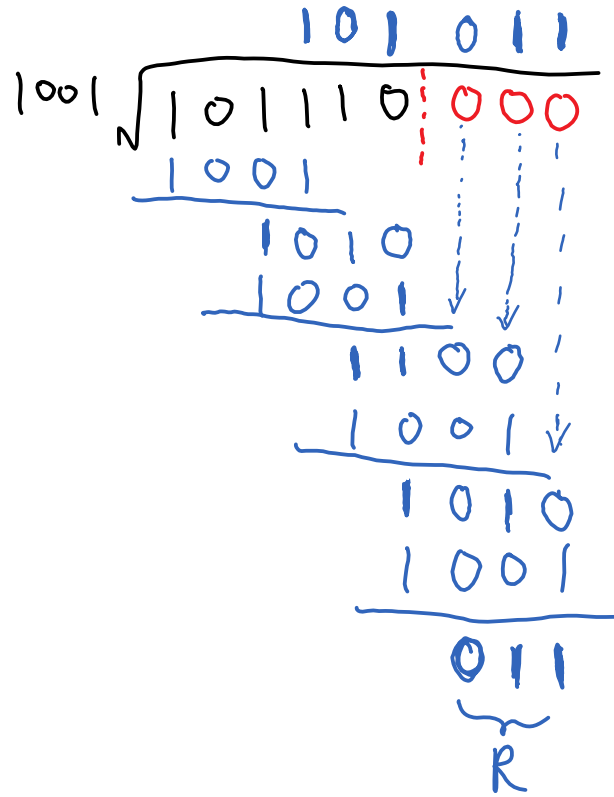
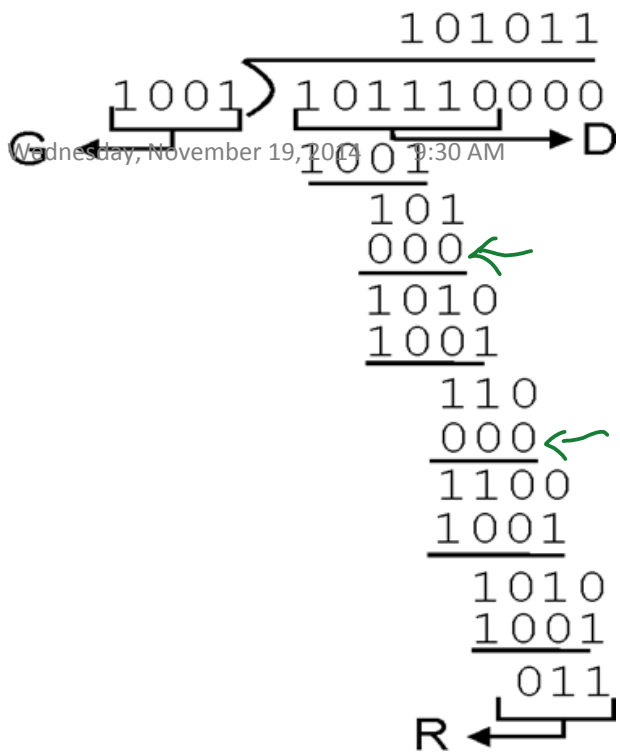


Q: why both link-level and end-end reliability?

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$$D = 1000 \quad G = 1011$$

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$$\begin{array}{r}
 \sqrt{1000} \\
 \underline{1011} \\
 1100 \\
 \underline{1011} \\
 1110 \\
 \underline{1011} \\
 101
 \end{array}$$

$$R = 101$$

$$\text{Codeword} = 1000101$$

$$D = 1010 \quad G = 10111$$

$$\begin{array}{r}
 \sqrt{1010} \\
 \underline{10111} \\
 11000 \\
 \underline{10111} \\
 1111
 \end{array}$$

$$R = 1111$$

$$\text{Codeword} = 10101111$$

• $Np(1-p)^{N-1} = f(p)$

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$\max f(p)$

$$\frac{df(p)}{dp} = N(1-p)^{N-1} - Np(N-1)(1-p)^{N-2}$$

$$p^* \left. \frac{df(p)}{dp} \right|_{p^*} = 0 \Rightarrow N(1-p^*)^{N-1} = Np^*(N-1)(1-p^*)^{N-2}$$

$$\Rightarrow 1-p^* = p^*(N-1) \qquad 1-p = pN - p$$

$$\Rightarrow p^* = \frac{1}{N}$$

$$f(p^*) = N \cdot p^* (1-p^*)^{N-1} = \left(1 - \frac{1}{N}\right)^{N-1} \rightarrow \frac{1}{e} \text{ when } N \rightarrow \infty$$