3. ERROR CONTROL AND CRC

3.1 [1 2 3 4]
3.2 [1 2 3 4 5 6 7 8 9 10]

~~3.1. Error Control~~

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3.1.1.

An upper-layer packet ~~is~~ is split in 10 frames, each of ~~which~~ which has an 80% of arriving undamaged. If no error control is done, how many times must ~~each~~ each packet be sent on average to get the entire thing through?

Packet ~~P~~ split into frames $F_1, F_2, \dots, F_{10}$.

$P(F_i \text{ ok}) = P_s = 0.8$

$P(p \text{ ok}) = P\left(\bigcap_{i=1}^{10} F_i \text{ ok}\right) = \prod_{i=1}^{10} P(F_i \text{ ok}) = P_s^{10}$

~~$N_{eff} \quad avg(N_{eff}) = 1 \cdot (1-P_s)^{10} + 2 \cdot (1-P_s)^{10} P_s^{10} + 3 \cdot (1-P_s)^{10}$~~

$$avg(N_{eff}) = 1 \cdot P_s^{10} + 2\underbrace{(1-P_s^{10})}_{P(\bigcup_{i=1}^{10} F_i \text{ not ok})} P_s^{10} + 3(1-P_s^{10})^2 P_s^{10} + \dots = \sum_{n=1}^{\infty} n(1-P_s^{10})^{n-1} \cdot P_s^{10} = P_s^{10} \frac{1}{(1-(1-P_s^{10}))^2} =$$

$$= P_s^{10} \frac{1}{(P_s^{10})^2} = \frac{1}{P_s^{10}} = \frac{1}{0.8^{10}} = 9.313$$