Recitation 20

1

$Pr\{\#\text{heads} \geq \beta n\} = Pr\{\#\text{tails} \leq (1-\beta)n\}$

$$= \frac{1-(1-\beta)}{1-(1-\beta)/p} \cdot \frac{2^{nH(\beta)}}{\sqrt{2\pi(1-\beta)\beta n}} \cdot p^{(1-\beta)n} (1-p)^{\beta n}$$

2

(a) $Pr\{qn \leq (P-0.04)n\}$

$$\leq \frac{1-(P-0.04)}{1-(P-0.04)/P} \cdot \frac{2^{nH(P-0.04)} \cdot P^{(P-0.04)n}}{\sqrt{2\pi(P-0.04)(1-(P-0.04))n}} \cdot (1-P)^{(1-(P-0.04))n}$$

(b) $Pr\{qn > (P+0.04)n\} = Pr\{qn \leq (1-(P+0.04))n\}$

$$\leq \frac{P+0.04}{1-\frac{1-(P+0.04)}{1-P}} \cdot \frac{2^{nH(P+0.04)}}{\sqrt{2\pi(P+0.04)(1-(P+0.04))n}} \cdot P^{(P+0.04)n} (1-P)^{(1-(P+0.04))n}$$

(c) sum is .054 → confidence is 0.946.

No.

3

$$Pr\{\cancel{\#}\text{ Lost } \leq 0.99(\cancel{2}10{,}000)\}$$

$$= \left(\frac{1-.98}{1-.98/.99}\right) \frac{2^{10{,}000\, H(.98)}}{\sqrt{2\pi \cdot .98(1-.98)10{,}000}} \cdot 0.01^{.98 \times 10{,}000}$$

$$\times .99^{.02 \cdot 10{,}000}$$