

1A. $X_1, X_2, \dots, X_{50} \sim \text{Bernoulli} (p = \frac{1}{2})$

Then $Y = X_1 + X_2 + \dots + X_{50} \sim \text{Binomial} (n=50, p=\frac{1}{2})$

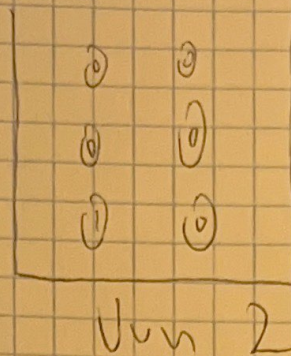
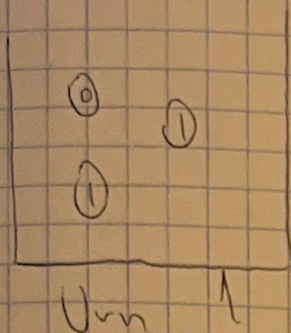
The p.m.f of Y is $P(Y=y) = \binom{50}{y} p^y (1-p)^{50-y}$

Then, the probability that 25 approx vote for the CEO yes is:

$$P(Y=25) = \binom{50}{25} \left(\frac{1}{2}\right)^{25} \left(\frac{1}{2}\right)^{50-25}$$

$$= \binom{50}{25} \left(\frac{1}{2}\right)^{50} \approx 0.1123$$

Ex 2



| H | T |
|----|----|
| 00 | 00 |

(Heads)

$$0.5 \times \frac{1}{3} \times \frac{1}{3} \times \frac{2}{3} \times \frac{1}{6} =$$

(Tails)

+

$$= 0.03086$$

$$0.5 \times \frac{5}{6} \times \frac{1}{3} \times \frac{2}{3} \times \frac{1}{6} =$$

$$P(0011) = 0.03086$$

Q 1 B

$$P(X=25)=?$$

$$Z = \frac{y - \mu_y}{\sigma_y} \Rightarrow Z_1 = \frac{25.5 - 25}{\sqrt{npq}} = \frac{0.5}{\sqrt{0.5 \cdot 50}}$$

$$\Rightarrow 0.1414 \Rightarrow P(X < 25.5) = 0.55632$$

$$Z_2 = \frac{24.5 - 25}{\sqrt{npq}} = \frac{-0.5}{\sqrt{50 \cdot 0.5 \cdot 0.5}} = -0.1414 \Rightarrow P(X < 24.5) = 0.44368$$

$$P(X=25) = P(X < 25.5) - P(X < 24.5) = 0.55632 - 0.44368$$

$$P(X=25) = 0.11264$$