Plotkin bound

$$M = A_q(n,d) \le \frac{dq}{dq - n(q-1)} \quad \text{if} \quad dq > n(q-1).$$
$$\left(d > n\left(1-\frac{1}{q}\right).\right)$$

$$\sum_{c \ne c' \in C} d(c, c') \ge M(M-1)d$$

$$\le n \cdot \sum_{i=1}^{q} m_i (M - m_i) \quad , \text{ where } \sum m_i = M.$$

$$\le n \cdot \cancel{q}\, \frac{M}{\cancel{q}} \cdot \left(M - \frac{M}{q}\right) = n \cdot M^2 \cdot \left(1 - \frac{1}{q}\right)$$

$$n \cdot M^{\cancel{2}}\left(1 - \frac{1}{q}\right) \ge \cancel{M}(M-1)d \qquad \text{using } dq > n(q-1) \quad / \cdot q$$

$$n \cdot (q-1)(M) \ge (M-1)dq$$

$$dq \ge M(\underbrace{dq - n(q-1)}_{>0}). \Rightarrow M \le \frac{dq}{\dots} \checkmark$$

GRIESMER (binary)

$$n \ge \sum_{i=0}^{k-1} \left\lceil \frac{d}{2^i} \right\rceil.$$