

Problem 1

		M		
	C_0C_1	0	1	2
$\alpha_0\alpha_1$	00	00	10	20
	01	00	11	22
	02	00	12	21
	10	01	11	21
	11	01	12	20
	12	01	10	22
	20	02	12	22
	21	02	10	21
	22	02	11	20

a) $P_I = \frac{1}{3}$

b) $P_S = \frac{1}{3}$

Problem 2

$$n = 7081 = p \cdot q = 73 \cdot 97, \phi(n) = 72 \cdot 96 = 6912, e = 5113, d = 73 \Rightarrow M = C^d \bmod n = 957^{73} = 957^{2^6 + 2^3 + 1} = 3293.$$

Problem 3

$$S(z) = \frac{P(z)}{C(z)} = \frac{1+4z^{-2}+3z^{-3}+2z^{-4}+4z^{-5}}{1-z^{-7}} \text{ because the length of the sequence } s \text{ is } 7.$$

$$C(z) = 1 - z^{-7} \text{ since } \gcd(C(z), P(z)) = 1.$$

Problem 4

$C(z) = z^{-7} + 2z^{-6} + z^{-1} + 2 = (z^{-1} + 2)(z^{-2} + 1)^3$ and thus $S_1 = 3(1)$, $S_2 = 1(1) \oplus 2(4) \oplus 60(12)$ and $S_{\text{TOT}} = 3(1) \oplus 6(4) \oplus 180(12)$.

Problem 5

- Wrong, $N_0 = 2$.
- Wrong, $I(\underline{M}; \underline{C}) \neq 0$.
- Correct.
- Correct.
- Correct.