1. Find the sequence generation rule of $0, 1, 1, 2, 3, 5, 8, 13, \cdots$.

This is a Fibonacci Sequence : $\begin{cases} F_0 = 0 \\ F_1 = 1 \\ F_n = F_{n-1} + F_{n-2} \quad (n \geq 2) \end{cases}$

2. Use Berlekamp - Massey Algorithm to find out the sequence rule of $0, 1, 1, 2, 3, 5, 8, 13, 21, 34$.

$S(X) = X^8 + X^7 + 2X^6 + 3X^5 + 5X^4 + 8X^3 + 13X^2 + 21X + 34$

$r(X) = X^9$

$1 + 1 + 2 + 3 + 5 + 8 + 13 + 21 + 34$ | $1 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0$ (1 − 1)

$1 + 1 + 2 + 3 + 5 + 8 + 13 + 21 + 34 + 0$

$-1 - 2 - 3 - 5 - 8 - 13 - 21 - 34 + 0$

$-1 - 1 - 2 - 3 - 5 - 8 - 13 - 21 - 34$

$-1 - 1 - 2 - 3 - 5 - 8 - 13 + 34$

$-1 - 1 - 2 - 3 - 5 - 8 - 13 + 34$ | $1 + 1 + 2 + 3 + 5 + 8 + 13 + 21 + 34$ (−1)

$1 + 1 + 2 + 3 + 5 + 8 + 13 - 34$

$55 + 34$

$Q(X)$	$A(X)$	$B(X)$	GCD
	1	0	X^9
	0	1	$X^8 + X^7 + 2X^6 + 3X^5 + 5X^4 + 8X^3 + 13X^2 + 21X + 34$
$X - 1$	$1 - 0 \cdot (X-1) = 1$	$0 - 1 \cdot (X-1) = 1 - X$	$-X^7 - X^6 - 2X^5 - 3X^4 - 5X^3 - 8X^2 - 13X + 34$
$-X$	$0 - 1 \cdot (-X) = X$	$1 - (1-X)(-X) = 1 + X - X^2$	$55X + 34$ ⇒ stop

$2 > 1$

$X \cdot r(X) + (1 + X - X^2) S(X) = 55X + 34$

$\deg(1 + X - X^2) > \deg(55X + 34)$

Sequence rule for $0, 1, 1, 2, 3, 5, 8, 13, 21, 34$ using Berlekamp - Massey algorithm is $(1 + X - X^2)$