

## 1.2 Mathematical terminologies

- Linear recursion order  $t$ 
  - $a_n = m_1 a_{n-1} + m_2 a_{n-2} + \dots + m_t a_{n-t} + c, m_t \neq 0. \begin{cases} c = 0 & \text{Homogeneous} \\ c \neq 0 & \text{Non-Homogeneous} \end{cases}$
- Generating function for  $a_0, a_1, a_2, a_3, \dots, a_n, \dots$ 
  - $G(x) = a_0 + a_1 x + a_2 x^2 + a_3 x^3 + \dots + a_n x^n + \dots$
- Characteristic equation
  - $x^t = m_1 x^{t-1} + m_2 x^{t-2} + \dots + m^t x^{t-t}$
  - $\Leftrightarrow x^t - m_1 x^{t-1} - m_2 x^{t-2} - \dots - m^t = 0$
  - Distinct non-zero roots:  $\lambda_1, \lambda_2, \lambda_3, \dots, \lambda_s$ , with multiplicity  $p_1, p_2, p_3, \dots, p_s$

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