

HW3:

$$3) \quad a(n) = 3a(n-1) - 2a(n-2) \quad a(0)=2, \quad a(1)=3$$

$$R^n - 3R^{n-1} + 2R^{n-2} = 0$$

$$(R-2)(R-1) = 0$$

$$R = 1, 2$$

$$a_n = C_1 1^n + C_2 2^n$$

$$a_0 = 2 = C_1 + C_2$$

$$a_1 = 3 = C_1 + 2C_2$$

$$C_2 = 1 \quad C_1 = 1$$

$$\boxed{a_n = 1 + 2^n}$$

$$4) \quad a(n) = 2a(n-1) + 2a(n-2) - 2a(n-3) \quad a(0)=3, \quad a(1)=2, \quad a(2)=6$$

$$R^n - 2R^{n-1} + 2R^{n-2} - 2R^{n-3} = 0$$

$$R^n \left(1 - \frac{2}{R} + \frac{2}{R^2} - \frac{2}{R^3} \right) = 0$$

$$5) \quad a(n) = a(n-4) \quad a(0)=1, \quad a(1)=0, \quad a(2)=0, \quad a(3)=0$$

$$a(n) - a(n-4) = 0$$

$$r^n (1 - r^{-4}) = 0$$

$$r^4 - 1 = 0$$

$$(r^2+1)(r^2-1) = 0$$

$$r = 1, -1, \pm i$$

$$\boxed{a_n = \frac{i^n}{4} + \frac{-i^n}{4} + \frac{1^n}{4} + \frac{-1^n}{4}}$$