

HW 15

OKTUPUSC

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Problem #2

$$i) \quad x(n) = \frac{x(n-1) + 2x(n-2) + 3x(n-3) + 11x(n-4)}{x(n-1) + x(n-3)}$$

$$x(0) = 1, \quad x(1) = 5, \quad x(2) = 5, \quad x(3) = 2$$

$$x_1(n) = x(n), \quad x_2(n) = x_1(n-1), \quad x_3(n) = x_2(n-1)$$

$$x_4(n) = x_3(n-1)$$

$$\text{So, } x_1(n) = x(n) = \frac{x_1(n-1) + 2x_2(n-1) + 3x_3(n-1) + 11x_4(n-1)}{x_1(n-1) + x_3(n-1)}$$

4)

		Fathers		
		AA	Aa	aa
		u	v	w
Mother	AA	$u^2$	$uv$	$uw$
	Aa	$vu$	$v^2$	$vw$
	aa	$wu$	$wv$	$w^2$

Type of parents	Freq	AA	Aa	aa
AA x AA	$u^2$	$u^2$	0	0
AA x Aa	$2uv$	$uv$	$uv$	0
AA x aa	$2uw$	0	$uw$	$uw$
Aa x Aa	$v^2$	$v^2/4$	$v^2/4$	$v^2/4$
Aa x aa	$2wv$	0	$wv$	$wv$
aa x aa	$w^2$	0	0	$w^2$

$$AA = u^2 + uv + v^2/4$$

$$Aa = uv + uw + v^2/4 + wv$$

$$aa = uw + v^2/4 + vw + w^2$$

$$\text{So, } U_{n+1} = u_n^2 + u_n v_n + v_n^2/4$$

$$V_{n+1} = u_n v_n + 2u_n w_n + 1/2 v_n^2 + v_n w_n$$

$$W_{n+1} = 1/4 v_n^2 + v_n w_n + w_n^2$$