$b_n = 5b_{n-1} + 3, \quad b_1 = 3$

$b_{n-1} = 5b_{n-2} + 3$

$b_n = 5(5b_{n-2} + 3) + 3$

$b_n = 5^2 b_{n-2} + 5\cdot 3 + 3$

$b_{n-2} = 5b_{n-3} + 3$

$b_n = 5^2(5b_{n-3} + 3) + 5\cdot 3 + 3$

$b_n = 5^3 b_{n-3} + 5^2\cdot 3 + 5\cdot 3 + 3$

$b_{n-3} = 5b_{n-4} + 3$

$b_n = 5^3(5b_{n-4} + 3) + 5^2\cdot 3 + 5\cdot 3 + 3$

$b_n = 5^4 b_{n-4} + 5^3\cdot 3 + 5^2\cdot 3 + 5\cdot 3 + 3$

$b_n = 5^k b_{n-k} + 5^{k-1}\cdot 3 + \cdots + 5\cdot 3 + 3.$

Put $k = n-1$

$b_n = 5^{n-1} b_{n-(n-1)} + 5^{n-2}\cdot 3 + \cdots + 5\cdot 3 + 3$

$b_n = 5^{n-1} b_1 + 5^{n-2}\cdot 3 + \cdots + 5\cdot 3 + 3$

$b_n = 5^{n-1}\cdot 3 + 5^{n-2}\cdot 3 + \cdots + 5^1\cdot 3 + 3$

$n-3+n-2+n-1+n$

$C_n = C_{n-1} + n \quad , C_1 = 1$

$C_{n-1} = C_{n-2} + n-1$

$C_n = C_{n-2} + n-1 + n$

$C_{n-2} = C_{n-3} + n-2$

$C_n = C_{n-3} + n-2 + n-1 + n$

$C_{n-3} = C_{n-4} + n-3$

$C_n = C_{n-4} + n-3 + n-2 + n-1 + n$

$C_n = C_{n-K} + (n-K+1) + (n-K+2) + \dots + (n-1) + n$

Put $\Rightarrow K = n-1$

$C_n = C_1 + 2 + 3 + 4 + \dots + K + K+1$

$\because C_1 = 1$

$C_n = 1+2+3+4+ \dots + K + K+1$

$d_n = n \cdot d_{n-1} \quad , d_1 = 6$

$d_{n-1} = (n-1)\, d_{n-2}$

$d_n = (n)(n-1)\, d_{n-2}$

$d_{n-2} = (n-2)\, d_{n-3}$

$d_n = (n)(n-1)(n-2)\, d_{n-3}$

$d_{n-3} = (n-3)\, d_{n-4}$

$$d_n = (n)(n-1)(n-2)(n-3)\,d_{n-4}$$

$$d_n = (n)(n-1)(n-2)(\ldots\ldots\ldots(n-k+1)\,d_{n-k}$$

$a_n = 4a_{n-1} + 5a_{n-2}$ , $a_1 = 2$, $a_2 = 6$

$a_{n-1} = 4a_{n-2} + 5a_{n-3}$

$a_n = 4(4a_{n-2} + 5a_{n-3}) + 5a_{n-2}$

$a_n = 4^2 a_{n-2} + 4^1 \cdot 5a_{n-3} + 4^0 \cdot 5a_{n-2}$

$a_{n-2} = 4a_{n-3} + 5a_{n-4}$

$a_n = 4^2(4a_{n-3} + 5a_{n-4}) + 4^1 \cdot 5a_{n-3} + 4^0 \cdot 5a_{n-2}$

$a_n = 4^3 a_{n-3} + 4^2 \cdot 5a_{n-4} + 4^1 \cdot 5a_{n-3} + 4^0 \cdot 5a_{n-2}$

$a_n = 4^k a_{n-k} + 4^{k-1} \cdot 5a_{n-k-1} + 4^{k-2} \cdot 5a_{n-k}$
$+ 4^{k-3} \cdot 5a_{n-k+1} + \cdots + 4^0 \cdot 5a_{n-2}$

Put :- $k = n-1$

$a_n = 4^{n-1}a_1 + 4^{n-2} \cdot 5a_0 + 4^{n-3} \cdot 5a_1 + 4^{n-4} \cdot 5a_2$
$+ \cdots + 4^{n-n} \cdot 5a_{n-2}$

~~$a_1 = 2$~~

$f_n = f_{n-1} + f_{n-2}$ , $f_0 = 0$ , $f_1 = 1$

$n=2$, $f_2 = f_1 + f_0 = 0+1 = 1$

$n=3$, $f_3 = f_2 + f_1 = 1+1 = 2$

$n=4$, $f_4 = f_3 + f_2 = 2+1 = 3$

$n=5$, $f_5 = f_4 + f_3 = 3+2 = 5$

$n=6$, $f_6 = f_5 + f_4 = 5+3 = 8$

Sequence: $0, 1, 1, 2, 3, 5, 8, 13, \ldots$

$b_n = -6b_{n-1} - 9b_{n-2}$ , for $b_1 = 2.5$ , $b_2 = 4.7$

$b_{n-1} = -6b_{n-2} - 9b_{n-3}$

$b_n = -6(-6b_{n-2} - 9b_{n-3}) - 9b_{n-2}$

$b_n = 6^2 b_{n-2} + 6^1 9 b_{n-3} - 9b_{n-2}$

$b_{n-2} = -6b_{n-3} - 9b_{n-4}$

$b_n = 6^2(-6b_{n-3} - 9b_{n-4}) + 6^1 \cdot 9b_{n-3} - 6^0 \cdot 9b_{n-2}$

$b_n = -6^3 b_{n-3} - 6^2 \cdot 9b_{n-4} + 6^1 \cdot 9b_{n-3} - 6^0 \cdot 9b_{n-2}$

$b_n = -6^k b_{n-k} - 6^{k-1} \cdot 9b_{n-k-1} + 6^{k-2} \cdot 9b_{n-k} - 6^{k-3} \cdot 9b_{n-k+1}$
$+ \ldots - 6^0 \cdot 9b_{n-2}$

Put, $K = n-1$

$$b_n = 6^{n-1} b_1 - 6^{n-2} \cdot 9 b_0 + 6^{n-3} \cdot 9 b_1 - 6^{n-4} \cdot 9 b_2$$

$$+ \cdots - 6^0 \cdot 9 b_{n-2}$$