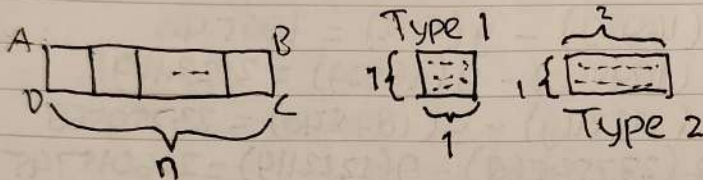


M-9

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1. Perhatikan Gambar dibawah ini. Ada sebuah persegi panjang ABCD berukuran $1 \times n$ yang akan ditutup oleh ubin yang berukuran 1×1 (ubin tipe 1) dan 1×2 (ubin tipe 2). Ada berapa cara untuk menutup persegi panjang ABCD dengan ubin yang tersedia (Nyatakan masalah ini dalam bentuk relasi rekurensi). Berapa banyak cara menutup persegi panjang ABCD jika persegi panjang ABCD berukuran 1×20 ?



1) $f(n-1)$
2) $f(n-2)$

$f(1) = 1$ $f(20) = ?$
 $f(2) = 2$

$$f(n) = f(n-1) + f(n-2)$$

$$f(3) = f(2) + f(1) = 2 + 1 = 3$$

$$f(4) = f(3) + f(2) = 3 + 2 = 5$$

$$f(5) = f(4) + f(3) = 5 + 3 = 8$$

$$f(6) = f(5) + f(4) = 8 + 5 = 13$$

$$f(7) = f(6) + f(5) = 13 + 8 = 21$$

$$f(8) = f(7) + f(6) = 21 + 13 = 34$$

$$f(9) = f(8) + f(7) = 34 + 21 = 55$$

$$f(10) = f(9) + f(8) = 55 + 34 = 89$$

$$f(11) = f(10) + f(9) = 89 + 55 = 144$$

$$f(12) = f(11) + f(10) = 144 + 89 = 233$$

$$f(13) = f(12) + f(11) = 233 + 144 = 377$$

$$f(14) = f(13) + f(12) = 377 + 233 = 610$$

$$f(15) = f(14) + f(13) = 610 + 377 = 987$$

$$f(16) = f(15) + f(14) = 987 + 610 = 1597$$

$$f(17) = f(16) + f(15) = 1597 + 987 = 2584$$

$$f(18) = f(17) + f(16) = 2584 + 1597 = 4181$$

$$f(19) = f(18) + f(17) = 4181 + 2584 = 6765$$

$$f(20) = f(19) + f(18) = 6765 + 4181 = 10946$$

$$= 10946$$

2) Diberikan relasi rekurensi $b_n - 12b_{n-1} + 9b_{n-2} = 0$. jika $b_0 = 0$ dan $b_1 = 1$. Tentukan b_5 dan b_9 ?

$$b_n = 12b_{n-1} - 9b_{n-2}$$

$$b_0 = 0 ; b_1 = 1$$

$$b_2 = 12b_1 - 9b_0 = 12(1) - 9(0) = 12$$

$$b_3 = 12b_2 - 9b_1 = 12(12) - 9(1) = 135$$

$$b_4 = 12b_3 - 9b_2 = 12(135) - 9(12) = 1512$$

$$b_5 = 12b_4 - 9b_3 = 12(1512) - 9(135) = \underline{16929}$$

$$b_6 = 12b_5 - 9b_4 = 12(16929) - 9(1512) = 189540$$

$$b_7 = 12b_6 - 9b_5 = 12(189540) - 9(16929) = 2122119$$

$$b_8 = 12b_7 - 9b_6 = 12(2122119) - 9(189540) = 23759568$$

$$b_9 = 12b_8 - 9b_7 = 12(23759568) - 9(2122119) = \underline{266015745}$$

$$b_5 = 16929$$

$$b_9 = 266015745$$

3) Tentukan jenis dari relasi rekurensi berikut

a. $b_n - b_{n-1} + 9b_{n-2} + 5 = 0$

b. $a_n - a_{n-1} \cdot 9a_{n-2} = n$

c. $b_n = n b_{n-5}$

a) $b_n = b_{n-1} - 9b_{n-2} + 5$
relasi rekurensi nonhomogen linear

b) $a_n = a_{n-1} \cdot 9a_{n-2} + n$
relasi rekurensi nonhomogen linear

c) $b_n = n b_{n-5}$
relasi rekurensi berderajat 5

4) Hitunglah solusi umum (homogen) dari setiap relasi rekursif di bawah ini

a. $2b_n - b_{n-1} - 6b_{n-2} = 0$

$$2r^2 - r - 6$$

$$(2r+3)(r-2)$$

$$r = \frac{-3}{2}$$

$$r = 2$$

SOLUSI UMUM

$$b_n = C_1 \left(\frac{-3}{2}\right)^n + C_2 2^n$$

$$b) 4b_n - 8b_{n-1} + 3b_{n-2} = 0$$

$$4r^2 - 8r + 3 = 0$$

$$(2r - 3)(2r - 1)$$

$$r = \frac{3}{2}$$

$$r = \frac{1}{2}$$

Solusi umum

$$b_n = C_1 \left(\frac{3}{2}\right)^n + C_2 \left(\frac{1}{2}\right)^n$$

$$c) b_n - 12b_{n-1} + 9b_{n-2} = 0$$

$$r^2 - 12r + 9 = 0$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x_{1,2} = \frac{12 \pm \sqrt{-12^2 - 4 \cdot 1 \cdot 9}}{2 \cdot 1}$$

Solusi umum

$$b_n = C_1 (6 + 3\sqrt{3})^n + C_2 (6 - 3\sqrt{3})^n$$

$$= \frac{12 \pm \sqrt{144 - 36}}{2}$$

$$= \frac{12 \pm \sqrt{108}}{2}$$

$$= \frac{12 \pm 6\sqrt{3}}{2}$$

$$= 6 \pm 3\sqrt{3}$$

$$d) b_n - 8b_{n-1} + 16b_{n-2} = 0$$

$$r^2 - 8r + 16$$

$$(r - 4)(r - 4)$$

$$(r - 4)^2$$

$$r_1 = r_2 = 4$$

$$b_n = C_1(4)^n + C_2 n 4^n \rightarrow \text{solusi umum}$$