No.

Date

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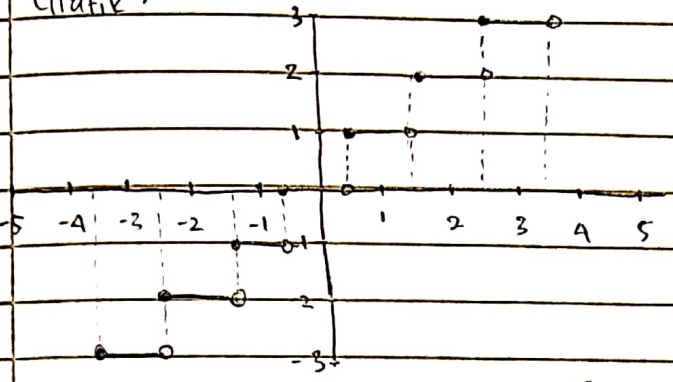
Matkul: MTK. Diskrit — UTS

1. $f(x) = \left\lceil \left| x - \frac{1}{2} \right| + \frac{1}{2} \right\rceil$

Grafik:



2. $g(x) = \lfloor x \rfloor$

a. $g^{-1}(\{0\}) = \{x \mid 0 \leq x < 1\}$

b. $g^{-1}(\{-1, 0, 1\}) = \{x \mid -1 \leq x < 2\}$

c. $g^{-1}(\{x \mid 0 < x < 1\}) = \{\emptyset\}$

4. $P(n) = 1.2.3 + 2.3.4 + \ldots + n(n-1)(n+2)$

$= n(n+1)(n+2)(n+3) \,/\, 4$

$P(1) = 1(1+1)(1+2)(1+3) \,/\, 4$

$= 6$

$P(k) = 1.2.3 + 2.3.4 + \ldots + k(k-1)(k+2)$

$= k(k+1)(k+2)(k+3) \,/\, 4$

$P(k+1) = 1.2.3 + 2.3.4 + \ldots + k(k+1)(k+2) + (k+1)(k+2)(k+3)$

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

$= \left(\frac{k+4}{4}\right)(k+1)(k+2)(k+3)$

$= \frac{(k+1)(k+2)(k+3)(k+4)}{4}$

$= \frac{(k+1)((k+1)+1)((k+1)+2)((k+1)+3)}{4}$

Dengan demikian, soal diatas berlaku untuk setiap n bilangan positif

No.

Date

3. $H = \{1, 2, 3, 4\}$

a. Reflektif, simetris, dan tidak transitif.

$R = \{(1,1), (2,2), (3,3), (4,4), (2,1), (1,2), (3,2), (2,3)\}$

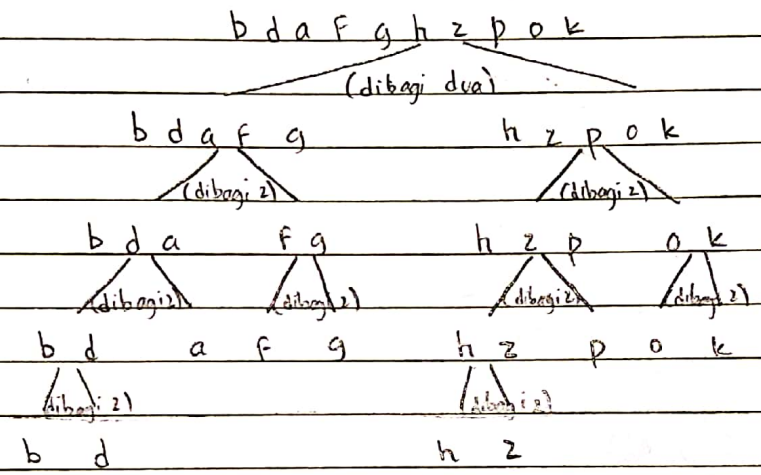
b. Tidak reflektif, simetris, dan Transitif.

$R = \{(1,2), (2,1), (2,2), (1,1)\}$

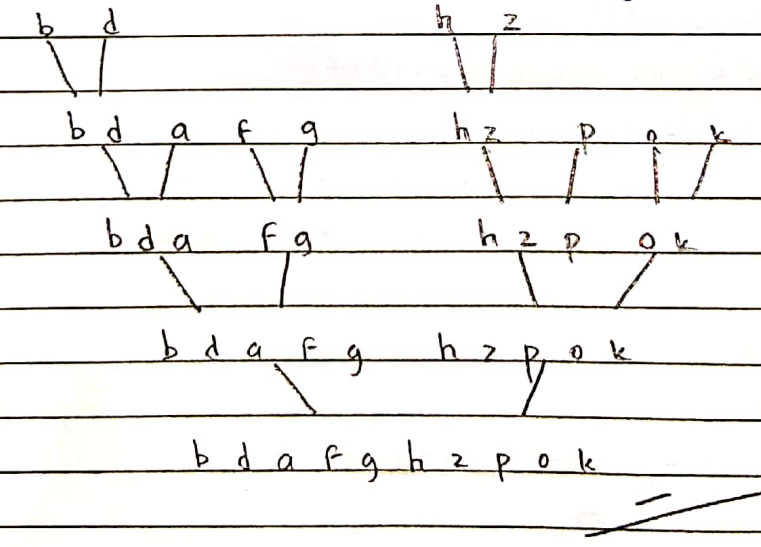
c. Reflektif, Antisimetris, Tidak transitif.

$R = \{(1,1), (2,2), (3,3), (4,4)\}$

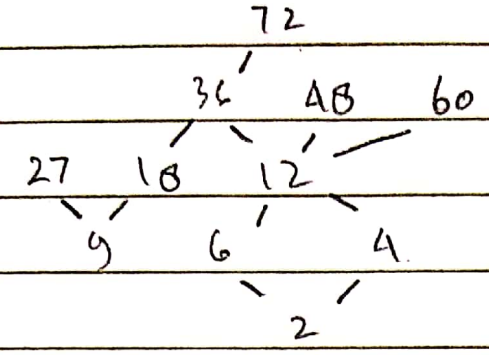
5. merge sort : b, d, a, f, g, h, z, p, o, k



(disusutkan tiap bagiannya)



6.) Poset ({2, 4, 6, 9, 12, 16, 18, 27, 36, 48, 60, 72})



a. max element : {27, 72, 48, 60}

b. min element : {2, 9}

c. greatest element : -

d. greatest element : -

e. upper bound of {3, 9} : {18, 36, 72}

f. least upper bound of {2, 9} : {18}

g. All lower bound of {60, 72} = {2, 4, 6, 12}

h. greatest lower bound of {60, 72} : {12}

No.

Date

7. $13x \equiv 4 \pmod{99}$

$15x \equiv 56 \pmod{101}$

$13^{-1} \equiv 61 \pmod{99}$

$61 \cdot 13x = 61 \cdot 4 \pmod{99}$

$793x \equiv 244 \pmod{99}$

$x \equiv 46 \pmod{99}$, $x = 46 + 99k_1$

$15x = 56 \pmod{101}$

$15(46 + 99k_1) \equiv 56 \pmod{101}$

$690 + 1485k_1 \equiv 56 \pmod{101}$

$84 + 71k_1 \equiv 56 \pmod{101}$

$71k_1 \equiv -28 \pmod{101}$

$71^{-1} \equiv 37 \pmod{101}$

$37 \cdot 71k_1 \equiv 37 \cdot 73 \pmod{101}$

$2627k_1 \equiv 2701 \pmod{101}$

$k_1 \equiv 75 \bmod (10)$

$k_1 = 75 + 101k_2$

$x = 46 + 99q$

$= 46 + 99(75 + 101k_2)$

$= 46 + 7425 + 9999k_2$

$x \equiv 7471 \pmod{9999}$