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Latihan Fungsi Ⓐ

1. Dik $S = \{-1, 0, 2, 4, 7\}$, Tentukan S

a. $F(x) = 1$

   $f(S) = 1$
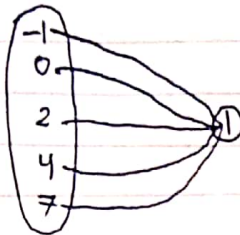 $f(-1) = 1$
   $f(0) = 1$
   $f(2) = 1$
   $f(4) = 1$
   $f(7) = 1$

   • everywhere defined ✓
   • Onto ✓
   • one to - one ✗

b. $f(x) = [x/5]$

   $f(S) = [5/5]$
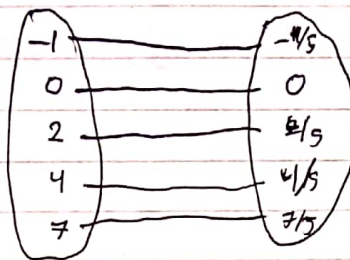 $f(-1) = -1/5$
   $f(0) = 0/5 = 0$
   $f(2) = 2/5$
   $f(4) = 4/5$
   $f(7) = 7/5$

   • everywhere ✓
   • onto ✓
   • one to one ✓

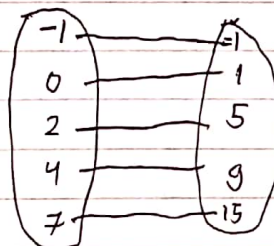c. $f(x) = 2x + 1$

   $f(-1) = 2(-1) + 1$ $f(4) = 2(4) + 1$
   $\quad = -1$ $\quad = 9$
   $f(0) = 2(0) + 1$ $f(7) = 2(7) + 1$
   $f(2) = 2(2) + 1$ $\quad = 15$
   $\quad = 5$

   • everywhere ✓
   • onto ✓
   • one to one ✓

d. $f(x) = [(x^2 + 1)/3]$ $f(4) = [(4^2 + 1)/3] = 17/3$
   $f(-1) = [(-1^2 + 1)/3]$ $f(7) = [(7^2 + 1)/3] = 50/3$
   $f(0) = [(0^2 + 1)/3]$
   $f(2) = [(2^2 + 1)/3]$
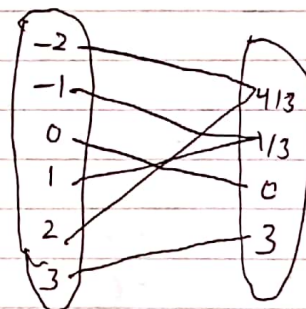
   everywheed
   defined ✓
   Onto ✓
   One-to-oner

2. Dik: $f(x) = [x^2/3]$, tentukan $f(S)$ jika:

a. $3 = \{-2, -1, 0, 1, 2, 3\}$ $f(1) = 1^2/3$
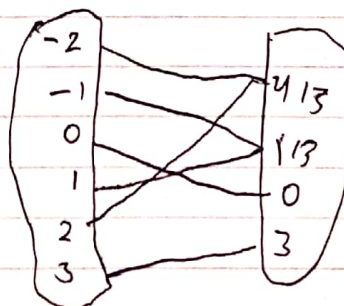 $f(-2) = -2^2/3 = 4/3$ $\quad = 1/3$
   $f(-1) = -1^2/3 = 0/3$ $f(2) = 2^2/3$
   $f(0) = 0^2/3 = 0$ $\quad = 4/3$
                                    $f(3) = 3^2/3$
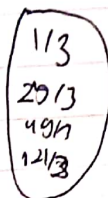 $\quad = 3$

   everywhere defined ✓
   onto ✓
   One to one ✗

b. $S = [0,1,2,3,4,5]$

$F(0) = 0^2/3 = 0$

$F(1) = 1^2/3 = 1/3$

$F(2) = 2^2/3 = 4/3$

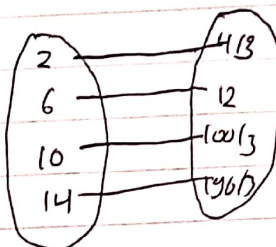$F(3) = 3^2/3 = 3$

$F(4) = 4^2/3 = 16/7$

$F(5) = 5^2/3 = 25/3$

```
  0          0
  1          1/3
  2          4/3
  3          3
  4          16/3
  5          25/3
```
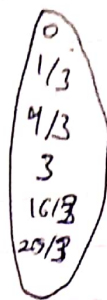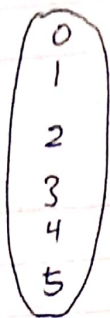
everywhere defined ✓
onto ✓
one-to-one ✓

c. $S = [1,3,7,11]$

$F(1) = 1^2/3 = 1/a$

$F(5) = 5^2/3 = 25/3$

$F(7) = 7^2/3 = 49/3$

$F(11) = 11^2/3 = 121/3$

```
  1          1/3
  5          25/3
  7          49/7
  11         121/3
```

everywhere defined ✓
Onto ✓
One-to-one ✓

d. $S = [2,6,10,14]$

$F(2) = 2^2/3 = 4/3$

$F(6) = 6^2/3 = 12$

$F(10) = 10^2/3 = 100/3$

$F(14) = 14^2/3 = 196/3$

```
  2          4/3
  6          12
  10         100/3
  14         196/3
```

everywhere defined
onto ✓
one-to-one ✓

③ Permutasi

1) urutan $[1,2,3,4,5,6]$

a. aturan $2,3,4,5,6,1$

$P = \begin{bmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 2 & 3 & 4 & 5 & 6 & 1 \end{bmatrix}$

$P' = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 6 & 1 & 2 & 3 & 4 & 5 \end{pmatrix}$

d. $P = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 1 & 5 & 6 & 4 & 2 & 3 \end{pmatrix}$
$P' = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 1 & 5 & 6 & 4 & 2 & 3 \end{pmatrix}$

$P = (2,5) \circ (3,6) \Rightarrow$ genap

$P = ((1,6) \circ (1,5) \circ (1,4) \circ (1,3) \circ (1,2) = $ ganjil

e. $P = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 5 & 4 & 3 & 2 & 1 & 6 \end{pmatrix}$
$P' = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 5 & 4 & 3 & 2 & 1 & 6 \end{pmatrix}$

$P = (1,5) \circ (2,4) \Rightarrow$ genap

b. $P = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 2 & 3 & 1 & 4 & 5 & 6 \end{pmatrix}$
$P' = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 3 & 1 & 2 & 4 & 5 & 6 \end{pmatrix}$

$P = (1,2,3)$

$= (1,3) \circ (1,2)$

$= $ Genap

c. $P = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 1 & 6 & 5 & 4 & 3 & 2 \end{pmatrix}$
$P' = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 1 & 6 & 5 & 4 & 3 & 2 \end{pmatrix}$

$P = (2,6) \circ (3,5)$

$= $ Genap

2. unsur $[1,2,3,4,5,6,7,8]$

a. $P = \begin{bmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ 3 & 1 & 5 & 2 & 8 & 7 & 6 & 4 \end{bmatrix}$

$P_1 = \begin{bmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ 2 & 4 & 1 & 8 & 3 & 7 & 6 & 5 \end{bmatrix}$

$P = (1,3,5,8,4,2) \, o \, (6,7)$
$= (1,2) \, o \, (1,4) \, o \, (1,8) \, o \, (1,5) \, o \, (1,2) \, o \, (6,7)$
$= \text{Genap}$

b. $P = \begin{bmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ 2 & 3 & 5 & 8 & 7 & 4 & 1 & 6 \end{bmatrix}$

$P_1 = \begin{bmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ 7 & 1 & 2 & 6 & 3 & 8 & 9 & 4 \end{bmatrix}$

$P = (1,2,3,5,7) \, o \, (4,8,6)$
$= (1,7) \, o \, (1,5) \, o \, (1,3) \, o \, (1,2) \, o \, (4,6) \, o \, (4,8)$
$= \text{Genap}$

c. $P = \begin{bmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ 1 & 6 & 2 & 3 & 5 & 4 & 7 & 8 \end{bmatrix}$ $P^{-1} = \begin{bmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ 1 & 3 & 4 & 6 & 5 & 2 & 7 & 8 \end{bmatrix}$

$P = (2,6,4,3)$
$= (2,3) \, o \, (2,4) \, o \, (2,6)$
$= \text{Ganjil}$

3. Permutasi dan Kombinasi

1. Swasta adalah Variabel di dalam 'Bahasa Pemograman harus berupa sebuah huruf atau sebuah huruf diikuti dengan sebuah angka. Berapa banya Nama perubah yang dapat dibuat,

$n_1 = 26 \qquad n_2 = 10$

$r_1 = 1 \qquad r_2 = 1$

Huruf kapital dan huruf kecil dibedakan (P)

$P(26,1) = \dfrac{26!}{(26-1)!} = \dfrac{26 \times 25!}{25!} = 26 \text{ cara}$

$P(10,1) = \dfrac{10!}{(10-1)!} = \dfrac{10 \times 9!}{9!} = 10 \text{ cara}$

$P(26,1) \times P(10,1) = 260 \text{ cara}$

Huruf capital dan kecil tidak dibedakan

$C = \dfrac{n!}{r!(n-r)!}$

$C(26,1) = \dfrac{26!}{1!(26^2-1)!}$

$= \dfrac{26 \times 25!}{25!} = 26 \text{ cara}$

$C(10,1) = \dfrac{10!}{1!(10-9)!}$

$= \dfrac{10 \times 9!}{9!} = 10 \text{ cara}$

$C(26,1) \times C(10,1) = 26 \times 10$
$= 260 \text{ cara}$

2) Pengulangan diperbolehkan,
$r = 4 \quad n = \{0,2,3,5,7,0\} = 6$
$n^r = 6^4$

$= 1296 \text{ cara}$

3) Di dalam kelas terdapat 100 mahasiswa, 40 orang laki-laki, 60 orang perempuan. a. berapa banyak jika panitia itu harus dapat dikenal Sebuah panitia 10 orang

$n = 100 \quad r = 10$

$P(100,10) = \dfrac{100!}{(100-10)!}$

$= \dfrac{100 \times 99 \times 98 \times 97 \times 96 \times 95 \times 94 \times 93 \times 92 \times 91 \times}{90!}$

$= 62\,815\,650\,E19 \text{ cara}$

b. $n = 100$

$r = 50$

$P(y, n) = \dfrac{y!}{(y-r)!}$

$\longrightarrow X(100,50) \dfrac{100!}{C(100-50)!} = \dfrac{100!}{50!} = 3.0685187E493 \text{ caro}$

c. $A_1 = 40 \cdot r_1 = 6 \quad n_2 = 60 \quad r_2 = 4$

$P(40,6) = \dfrac{40!}{(40-6)!} = \dfrac{40!}{34!} = 2.763633600 \text{ cora} \quad P(60,4) = \dfrac{60!}{(60-4)!} = \dfrac{60!}{56!} = 11.703.240$
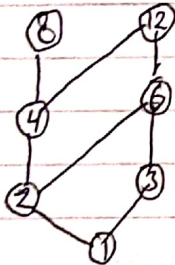
$P(40,6) \times P(60,4) = 32343467616 \text{ com}$

B. Latihan Poset   ① Diagram hasse

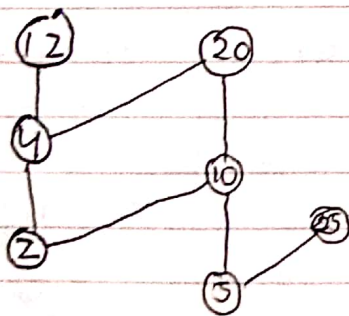a. $(\{1,2,3,4,6,8,12\}, 1)$

$R = (\{(1,1),(1,2),(1,3),(1,4),(1,8),(1,12),(2,2),(2,4),(2,6),(2,8),(2,12),(3,3),(3,6),(3,12),$
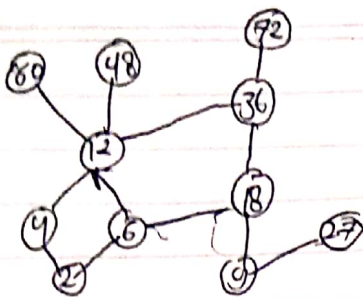$(4,4),(4,8),(4,12),(6,6),(6,12),(8,8),(12,12)\}$

b. $(\{2,4,5,10,12,20,25\}, 1)$

$R = \{(2,2),(2,4),(2,10),(2,12),(2,20),(4,4),(4,12),(4,20),(5,5),$
$(5,10),(5,20),(5,25),(10,10),(10,20),(12,12),(20,20),(25,25)$
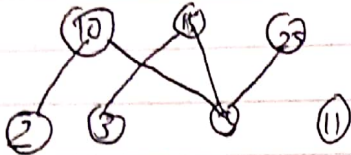$\}$

c. $(\{2,4,6,9,12,18,27,36,48,60,72\}, 1)$

$R = \{(2,2),(2,4),(2,6),(2,12),(2,18),(2,36),(2,48),(2,48),(2,60),(2,72),(4,4),(4,12),$
$(4,36),(4,48),(4,60),(4,72),(6,6),(6,12),(6,18),(6,30),(6,48),(6,60),(6,72)$
$(9,9),(9,18),(9,27),(9,36),(9,72),(12,12),(12,36),(12,48),(12,66),(12,72),(18,18)$
$(18,36),(18,72),(27,27),(36,36),(36,72),(48,48),(60,60),(72,72)\}$

Diagram with circles: 80, 48, 72, 36, 12, 4, 6, 8, 27, 22, 60, ...

d. $(\{2,3,5,10,11,13,23\})$

$R = \{(2,2),(2,10),(3,3),(3,15),(5,5),(5,10),(3,15),(5,15),(10,10),(11,11),(13,13),(23,23)\}$

Diagram with circles: 10, 15, 23, 2, 5, 11

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② Dari diagram hasse di samping, tentukan:

a. Elemen maksimum = d, m

b. Elemen minimum = a, b, c

c. Elemen terbesar. Tidak ada, karena elemen maksimum $\neq 1$

d. Elemen terkecil tidak ada karena elemen minimum $\neq 1$

e. UB, LUB, LB, GLB pada $\{a, b, c\}$
   - UB $= d, e, f, g, h, i, j, k, l, m$
   - LB $=$ Tidak ada
   - LUB $=$ Tidak terdefinisi, karena d, e, f pada tingkat yang sama, dan LUB harus ada!
   - GLB $=$ Tidak ada karena tidak ada LB

f. UB, LUB, LB, GLB pada $\{f, g, h\}$
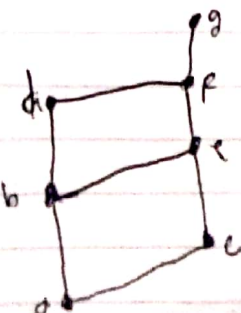   - UB $= j, k, l, m$
   - LB $= a, b, c, d, e$
   - LUB $=$ Tidak terdefinisi, karena j, k berada pada tingkat yang sama
   - GLB $=$ Tidak terdefinisi karena a, b, c berada pada tingkat yang sama.

E. LATTICES

Tentukan apakah diagram hasse merupakan lattices?
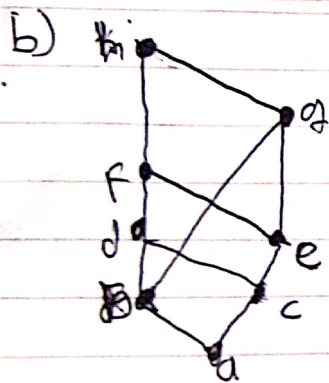
a)

UB, LUB, LB, GLB pada $\{d, e, f\}$
- UB $= g$
- LB $= a, b, c$
- LUB $= g$
- GLB $= 0$
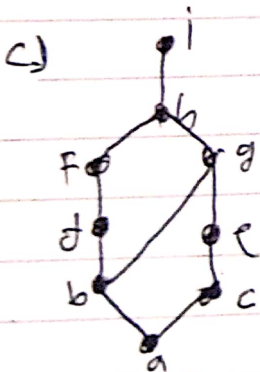
Sehingga diagram hasse ini merupakan lattices, karena ada LUB dan GLB

b)

UB, LUB, LB, GLB pada $\{d, g, f\}$

* UB = g, h
* LB = a, b, c
* LUB = g
* GLB = a

Diogram Hasse disamping merupakan Lattices

c)

UB, LUB, LB, GLB pada $\{d, h, f\}$

* UB = g, h, i
* LB = a, b, c
* LUB = g
* GLB = a

Diogram Hasse di samping merupakan Lattices