

PENCACAHAN

Nomor 1

18 jurusan matematika dan 325 jurusan ilmu computer.

a. $(18 \times 325) : 2 = 2.835$

b. $18 + 325 = 343$

Nomor 2

27 lantai dan 37 kantor

a. $27 \times 37 = 999$

Nomor 3

10 soal

a. $C(10,4) = 10! / 4! 6! = 1.260$

b. $C(13,3) = 13! / 3! 10! = 286$

Nomor 4

Kemeja 12 warna terdiri dari pria dan wanita

$12 \times 2 \times 3 = 72$

Nomor 5

Himpunan 6 kelas

1 pertemuan, 1x seminggu

2 pertemuan pada hari yang sama

Tidak ada kelas di akhir pekan

$C(6,2) = 6! / 2! 4! = 15$

Nomor 6

30 siswa, 2 nama sama

$$C(30,2) = 30! / 2! 28! = 435$$

Nomor 7

1 lusin kaus kaki coklat

1 lusin kaus kaki hitam

a. 2 kaus kaki warna sama $\rightarrow C(24,2) = 24! / 2! 22! = 276/128 = 5$

b. 2 kaus kaki warna hitam $\rightarrow C(12,2) = 12! / 12! 0! = 12 + 1 = 13$

Nomor 8

a. $P(6,3) = 6! / 3! = 120$

b. $P(8,1) = 8! / 7! = 8$

c. $P(8,8) = 8! / 0! = 40.320$

d. $P(6,5) = 6! / 1! = 720$

e. $P(8,5) = 8! / 3! = 40.320$

f. $P(10,9) = 10! / 1! = 806.400$

Nomor 9

a. $C(5,1) = 5! / 1! 4! = 5$

b. $C(8,4) = 8! / 4! 4! = 70$

c. $(8,10) = 8! / 0! 8! = 0$

d. $C(5,3) = 5! / 3! 2! = 10$

e. $C(8,8) = 8! / 8! 0! = 0$

f. $C(12,6) = 12! / 6! 6! = 924$

Nomor 10

Koin dilempar 8 kali

a. $2^8 = 256$

b. $C(8,3) = 8! / 3! 5! = 56$

c. $C(8,3) + C(8,4) + C(8,5) + C(8,6) + C(8,7) + C(8,8) = 219$

d. $C(8,4) = 8! / 4! 4! = 70$

PENCACAHAN

Nomor 1

Penjabaran dari $(x+y)^6 = x^6 + 6x^5y + 15x^4y^2 + 20x^3y^3 + 15x^2y^4 + 6xy^5 + y^6$

Nomor 2

Penjabaran dari $(x+y)^4 = x^4 + 4x^3y + 6x^2y^2 + 4xy^3 + y^4$

Nomor 3

Koefisien dari $x^{12}y^{13}$ pada penjabaran dari $(x+y)^{25}$

$$(25 \ 13) = 25! / 13! 12! = 5.200.300$$

Nomor 4

Koefisien dari x^5y^8 pada penjabaran dari $(x+y)^{13}$

$$(13 \ 8) = 13! / 8! 5! = 1.287$$

Nomor 5

Koefisien dari $x^{12}y^{13}$ pada penjabaran dari $(2x-3y)^{25} = -(25! / 13! 12!) 2^{12} 3^{13}$

Nomor 6

Koefisien dari x^8y^9 pada penjabaran dari $(3x + 2y)^{17} = (17! / 9! 8!) 3^8 2^9$

Nomor 7

5 elemen terpilih dari 3 elemen perulangan = $3^5 = 243$

Nomor 8

3 elemen berbeda dari 5 elemen perulangan = $C(3+5-1,5) = C(7,5) = 42$

Nomor 9

3 mangga, 2 papaya, 2 kiwi.

1 siswa makan 1 buah setiap hari yang berbeda-beda

$$C(7,3) C(4,2) C(2,2) = 70$$

Nomor 10

7 kartu untuk 5 pemain dari total kartu 52

$$C(52,7) C(45,7) C(38,7) C(31,7) C(24,7) = 45! / 7! 7! 7! 7! 7! 17!$$

Nomor 11

$$C(9+6-1,6) = C(14,6) = 3.003$$

Nomor 12

5 karyawan di 4 kantor yang sama

$$C(5,4) = 5! / (4! * 1!) = 5$$

Nomor 13

3000 buku ditempatkan di 3 gudang

$$C(3000, 3) = 3000! / (3! * 2997!) = 12000$$

RELASI

Nomor 1

$$A = \{1, 2, 3, 4\}$$

$$\text{relasi } R = \{ (a, b) \mid a \text{ membagi } b \}$$

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

Nomor 2

Relasi pada $\{1, 2, 3, 4\}$

$$R_1 = \{(1, 1), (1, 2), (2, 1), (2, 2), (3, 4), (4, 1), (4, 4)\},$$

$$R_2 = \{(1, 1), (1, 2), (2, 1)\},$$

$$R_3 = \{(1, 1), (1, 2), (1, 4), (2, 1), (2, 2), (3, 3), (4, 1), (4, 4)\},$$

$$R_4 = \{(2, 1), (3, 1), (3, 2), (4, 1), (4, 2), (4, 3)\},$$

$$R_5 = \{(1, 1), (1, 2), (1, 3), (1, 4), (2, 2), (2, 3), (2, 4), (3, 3), (3, 4), (4, 4)\},$$

$$R_6 = \{(3, 4)\}$$

Relasi manakah bersifat refleksif? R_3 dan R_5

Nomor 3

Relasi pada $\{1, 2, 3, 4\}$

$$R_1 = \{(1, 1), (1, 2), (2, 1), (2, 2), (3, 4), (4, 1), (4, 4)\},$$

$$R_2 = \{(1, 1), (1, 2), (2, 1)\},$$

$$R_3 = \{(1, 1), (1, 2), (1, 4), (2, 1), (2, 2), (3, 3), (4, 1), (4, 4)\},$$

$$R_4 = \{(2, 1), (3, 1), (3, 2), (4, 1), (4, 2), (4, 3)\},$$

$$R_5 = \{(1, 1), (1, 2), (1, 3), (1, 4), (2, 2), (2, 3), (2, 4), (3, 3), (3, 4), (4, 4)\}, R_6 = \{(3, 4)\}.$$

Relasi manakah bersifat simetris? R_2 dan R_3

Nomor 4

Relasi pada $\{1, 2, 3, 4\}$

$$R_1 = \{(1, 1), (1, 2), (2, 1), (2, 2), (3, 4), (4, 1), (4, 4)\},$$

$$R_2 = \{(1, 1), (1, 2), (2, 1)\},$$

$$R_3 = \{(1, 1), (1, 2), (1, 4), (2, 1), (2, 2), (3, 3), (4, 1), (4, 4)\},$$

$$R_4 = \{(2, 1), (3, 1), (3, 2), (4, 1), (4, 2), (4, 3)\},$$

$$R_5 = \{(1, 1), (1, 2), (1, 3), (1, 4), (2, 2), (2, 3), (2, 4), (3, 3), (3, 4), (4, 4)\},$$

$$R_6 = \{(3, 4)\}.$$

Relasi manakah bersifat transitif? R_4 dan R_5

Nomor 5

$$A = \{1, 2, 3\}$$

$$B = \{1, 2, 3, 4\}$$

$$R_1 = \{(1, 1), (2, 2), (3, 3)\}$$

$$R_2 = \{(1, 1), (1, 2), (1, 3), (1, 4)\}$$

$$R_1 \cup R_2 = \{(1, 1), (1, 2), (1, 3), (1, 4), (2, 2), (3, 3)\},$$

$$R_1 \cap R_2 = \{(1, 1)\},$$

$$R_1 - R_2 = \{(2, 2), (3, 3)\},$$

$$R_2 - R_1 = \{(1, 2), (1, 3), (1, 4)\}$$

Nomor 6

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

$$S = \{(1, 0), (2, 0), (3, 1), (3, 2), (4, 1)\}$$

$$S \circ R = \{(1, 0), (1, 1), (2, 1), (2, 2), (3, 0), (3, 1)\}.$$

Nomor 7

$$A = \{0,1,2,3,4\}$$

$$B = \{0,1,2,3\}$$

a). $a = b$

$$(0,0), (1,1), (2,2), (3,3)$$

b). $a + b = 4$

$$(1,3), (2,2), (3,1), (4,0)$$

c). $a > b$

$$(1,0), (2,0), (2,1), (3,0), (3,1), (3,2), (4,0), (4,1), (4,2), (4,3)$$

d). $a \mid b$

$$(1,1), (1,2), (1,3), (2,2), (3,3)$$

e). $\gcd(a,b) = 1$

$$(1,0), (1,2), (1,3), (2,1), (2,3), (3,1), (3,2), (4,1), (4,3)$$

f). $\text{lcm}(a,b) = 2$

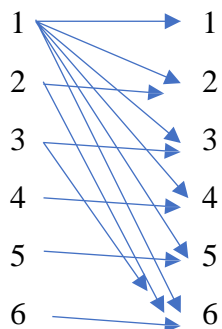
$$(1,2), (2,1)$$

Nomor 8

a). $R = \{(a,b) \mid a \text{ divides } b\}$ pada himpunan $\{1,2,3,4,5,6\}$

$$(1,1), (1,2), (1,3), (1,4), (1,5), (1,6), (2,2), (2,4), (2,6), (3,3), (3,6), (4,4), (5,5), (6,6)$$

b). grafik



c). tabular

R	1	2	3	4	5	6
1	<u>x</u>	x	x	x	x	x
2		<u>x</u>		x		
3			<u>x</u>			x
4				<u>x</u>		
5					<u>x</u>	
6						<u>x</u>

Nomor 9

a). $\{(a,b,c) \mid a,b,c \rightarrow 0 < a < b < c < 5\}$

(1,2,3) , (1,2,4) , (1,3,4) , (2,3,4)

b). $\{(a,b,c,d) \mid a,b,c,d \rightarrow abcd = 6\}$

(1,1,1,6) , (1,1,2,3) , (1,1,3,2) , (1,2,1,3) , (1,2,3,1) , (1,3,1,2) , (1,3,2,1) , (2,1,1,3) , (2,1,3,1) ,
(2,3,1,1) , (3,1,1,2) , (3,1,2,1) , (3,21,1)

Nomor 10

a). $\{(1,1) , (1,2) , (1,3)\}$

$\rightarrow [1 \ 1 \ 1]$

b). $\{(1,2) , (2,1) , (2,2) , (3,3)\}$

$\rightarrow [0 \ 1 \ 0]$

$[1 \ 1 \ 0]$

c). $\{(1,1) , (1,2) , (1,3) , (2,2) , (2,3) , (3,3)\}$

$\rightarrow [1 \ 1 \ 1]$

$[0 \ 1 \ 1]$

$[0 \ 0 \ 1]$

d). $\{(1,3) , (3,1)\}$

$$\rightarrow [0 \ 0 \ 1]$$

$$[0 \ 0 \ 0]$$

$$[1 \ 0 \ 0]$$

Nomor 11

a). $[1 \ 0 \ 1]$

$$[0 \ 1 \ 0]$$

$$[1 \ 0 \ 1]$$

$$\rightarrow (1,1), (1,3), (2,2), (3,1), (3,3)$$

b). $[0 \ 1 \ 0]$

$$[0 \ 1 \ 0]$$

$$[0 \ 1 \ 0]$$

$$\rightarrow (1,2), (2,2), (3,2)$$

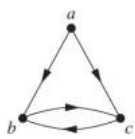
c). $[1 \ 1 \ 1]$

$$[1 \ 0 \ 1]$$

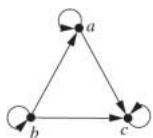
$$[1 \ 1 \ 1]$$

$$\rightarrow (1,2), (1,2), (1,3), (2,1), (2,3), (3,1), (3,2), (3,3)$$

Nomor 12



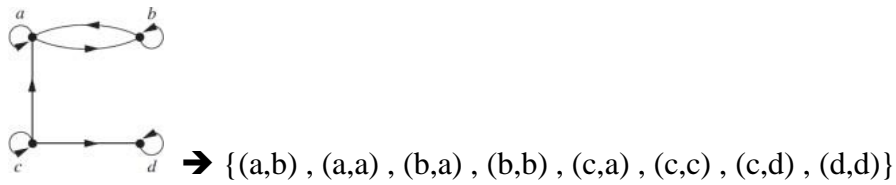
$$\{(a,b), (a,c), (b,c), (c,b)\}$$



$$\{(a,c), (b,c), (a,a), (c,c), (b,b), (b,a)\}$$

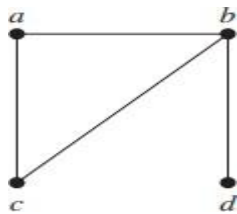


$$\{(a,c), (d,b), (b,a), (c,d)\}$$



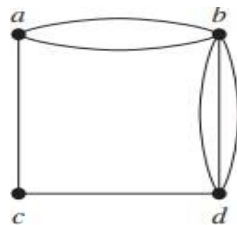
GRAF

Nomor 1



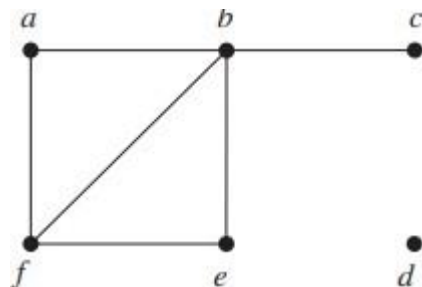
- Sisi tidak berarah
- Mempunyai 4 sisi

Nomor 2



- Sisi tidak berarah
- Mempunyai graf ganda
- Mempunyai 7 sisi

Nomor 3

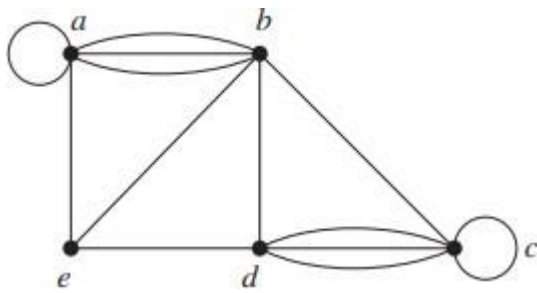


Jumlah sisi = 6

Jumlah derajat keseluruhan = 12

Jumlah simpul = 6

Nomor 4

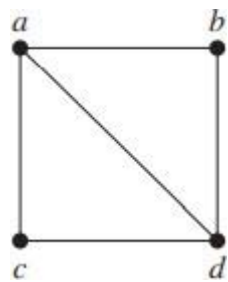


Jumlah sisi = 13

Jumlah derajat keseluruhan = 22

Jumlah simpul 5

Nomor 5



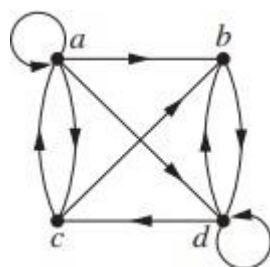
$N(a) = \{ b, c, d \}$

$N(b) = \{ a, d \}$

$N(c) = \{ a, d \}$

$N(d) = \{ c, a, b \}$

Nomor 6



$N(a) = \{ b, d, c, a \}$

$N(b) = \{ d \}$

$N(c) = \{ a, b \}$

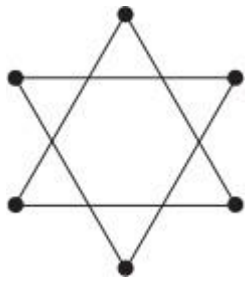
$N(d) = \{ b, d, c \}$

Nomor 7



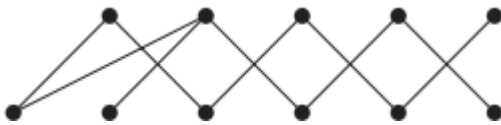
→ Graf tidak terhubung

Nomor 8



→ Graf tidak terhubung

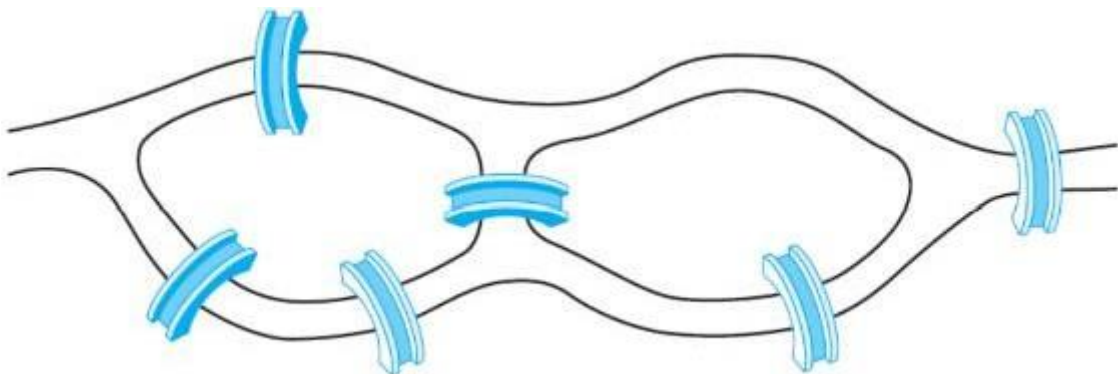
Nomor 9



→ Graf terhubung

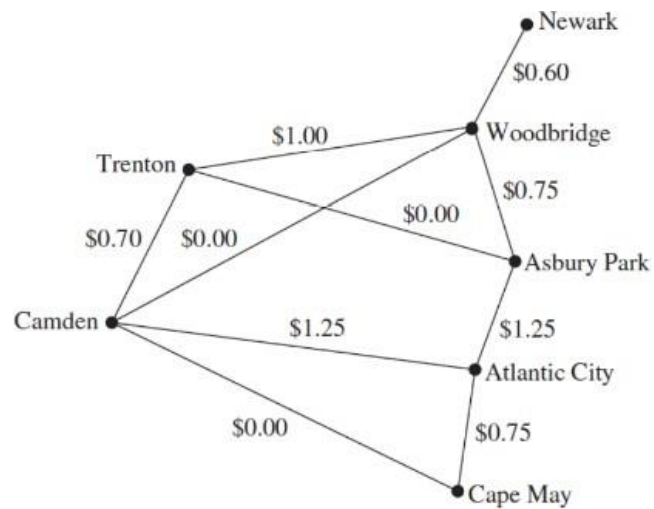
GRAF

Nomor 1



Dari gambar diatas, mungkin untuk melintasi semua jembatan tepat 1 kali dan kembali ke titik awal. Jika kita mengambil satu wilayah dan kembali ke wilayah tersebut, maka kita dapat melintasi dengan hanya satu jembatan.

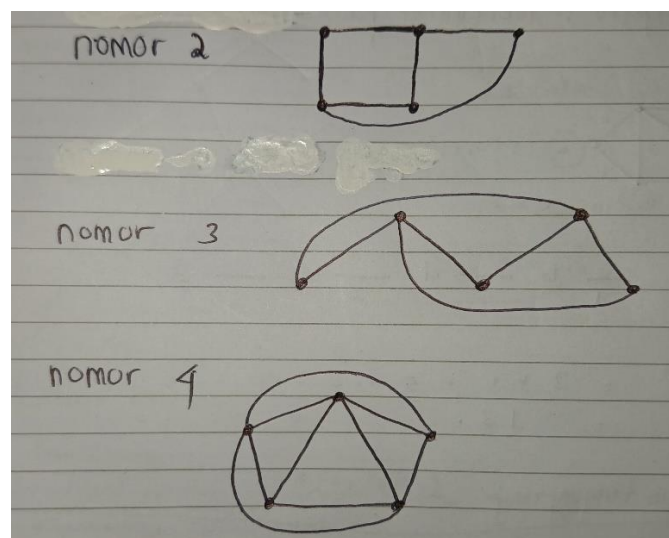
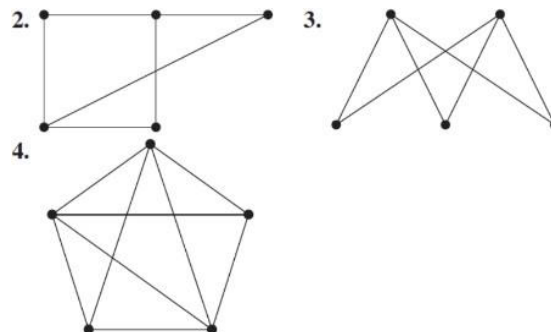
Nomor 2



Dari gambar tersebut, terdapat beberapa pilihan rute termurah untuk mencapai titik kota Newark dari Camden. Yaitu :

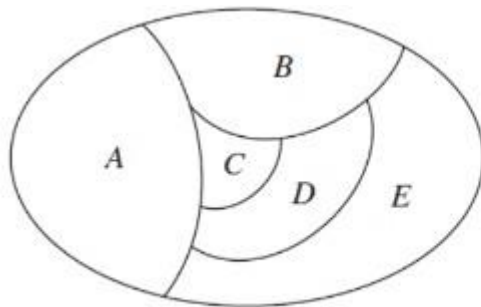
- Camden – Woodbridge – Newark
- Camden – Trenton – Woodbridge – Newark

Nomor 3

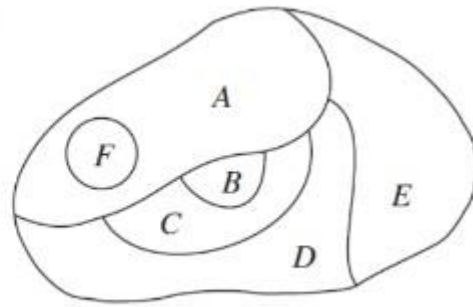


Nomor 4

1.



3.

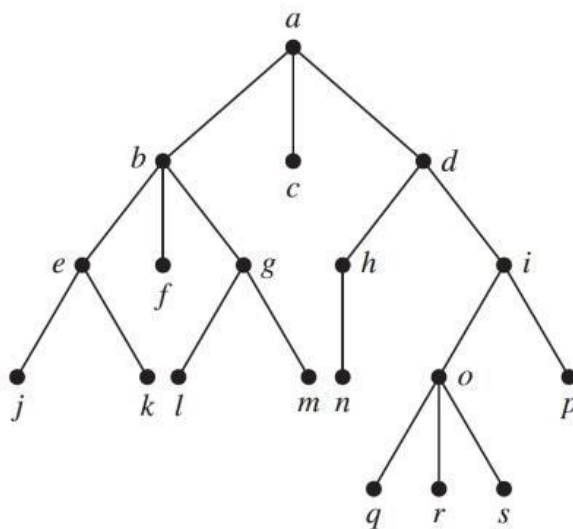


1). $A = 1, B = 2, C = 3, D = 4, E = 3 \rightarrow$ total ada 4 warna

2). $A = 1, B = 3, C = 2, D = 3, E = 2, F = 2 \rightarrow$ total ada 3 warna

POHON

Nomor 1



- Which vertex is the root?
- Which vertices are internal?
- Which vertices are leaves?
- Which vertices are children of j ?
- Which vertex is the parent of h ?
- Which vertices are siblings of o ?
- Which vertices are ancestors of m ?
- Which vertices are descendants of b ?

a). a adalah akar dari pohon

b). a,b,d,e,g,h,i,o adalah simpul internal/yang memiliki keterhubungan dengan simpul lain

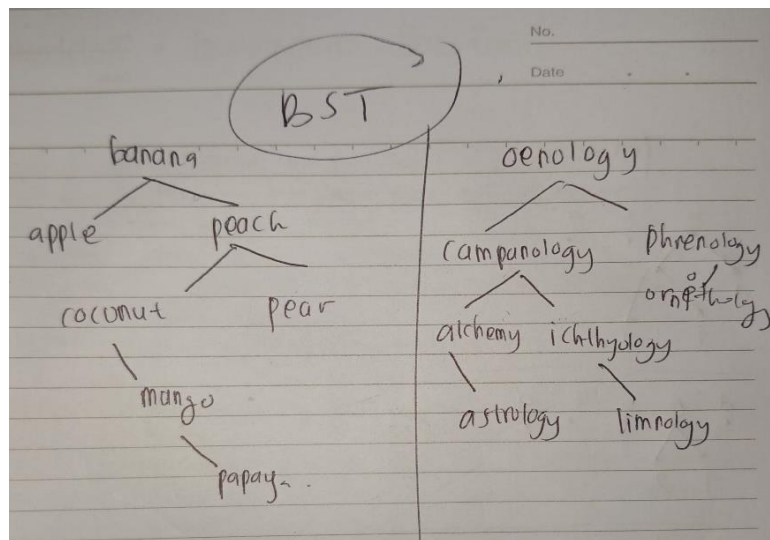
c). j,k,l,m,n,p,q,r,s,f,c adalah simpul daun

d). tidak ada

- e). d adalah induk dari h
- f). p adalah saudara kandung dari o
- g). a,b,g adalah leluhur dari m
- h). e,f,g,j,k,l,m adalah keturunan dari b

Nomor 2

1. Build a binary search tree for the words *banana*, *peach*, *apple*, *pear*, *coconut*, *mango*, and *papaya* using alphabetical order.
2. Build a binary search tree for the words *oenology*, *phrenology*, *campanology*, *ornithology*, *ichthyology*, *limnology*, *alchemy*, and *astrology* using alphabetical order.

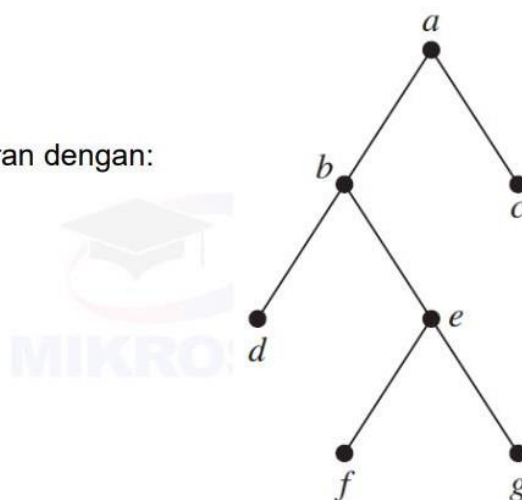


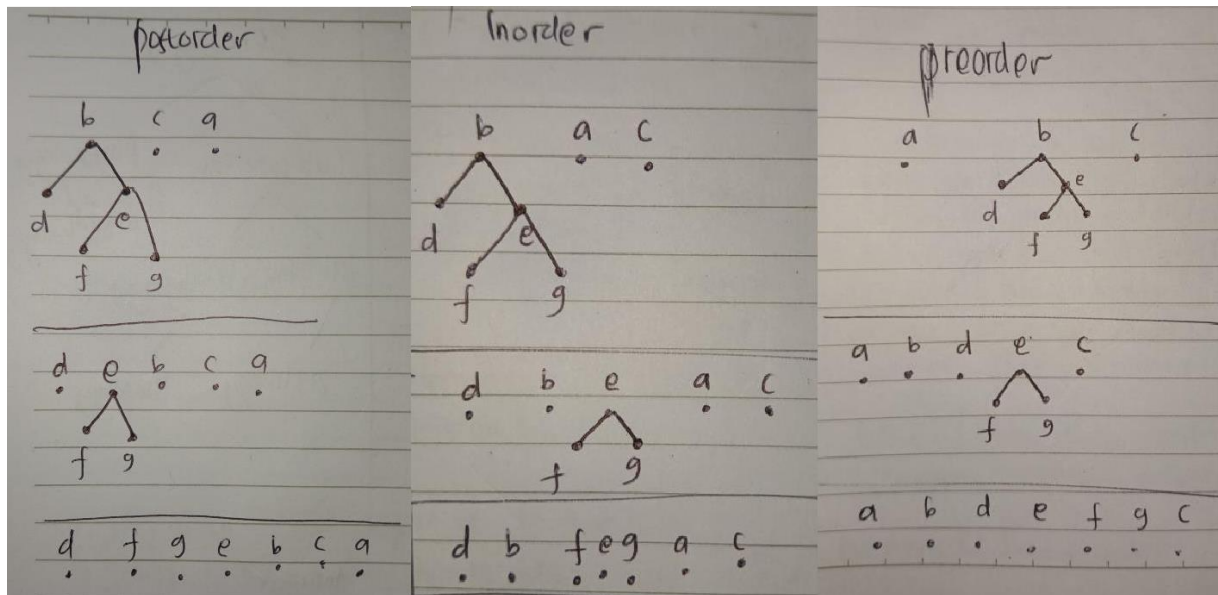
Nomor 3

Exercise

Lakukan penelusuran dengan:

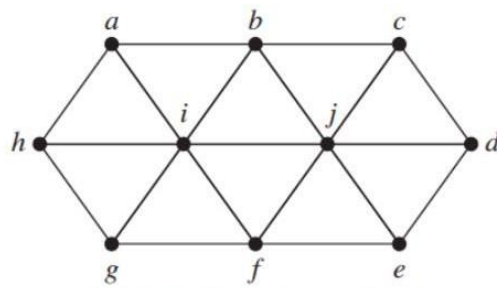
- A. Preorder
- B. Inorder
- C. Postorder





POHON

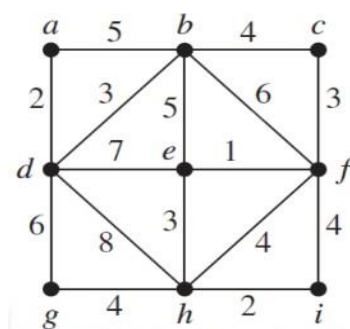
Nomor 1

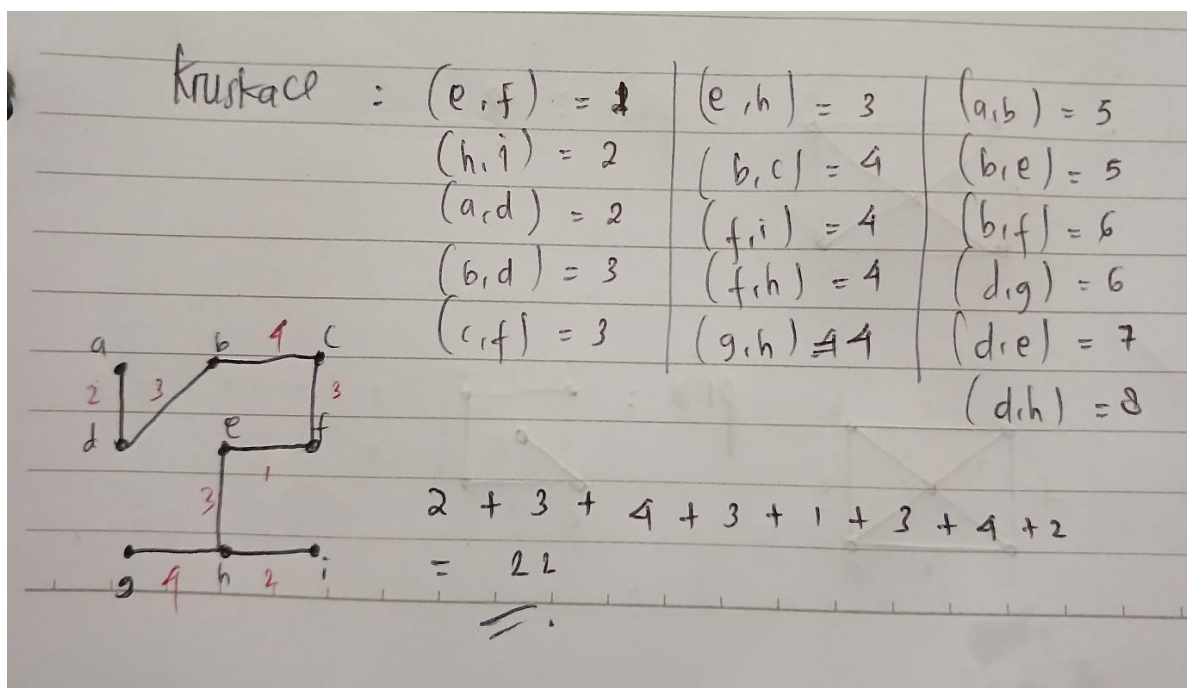
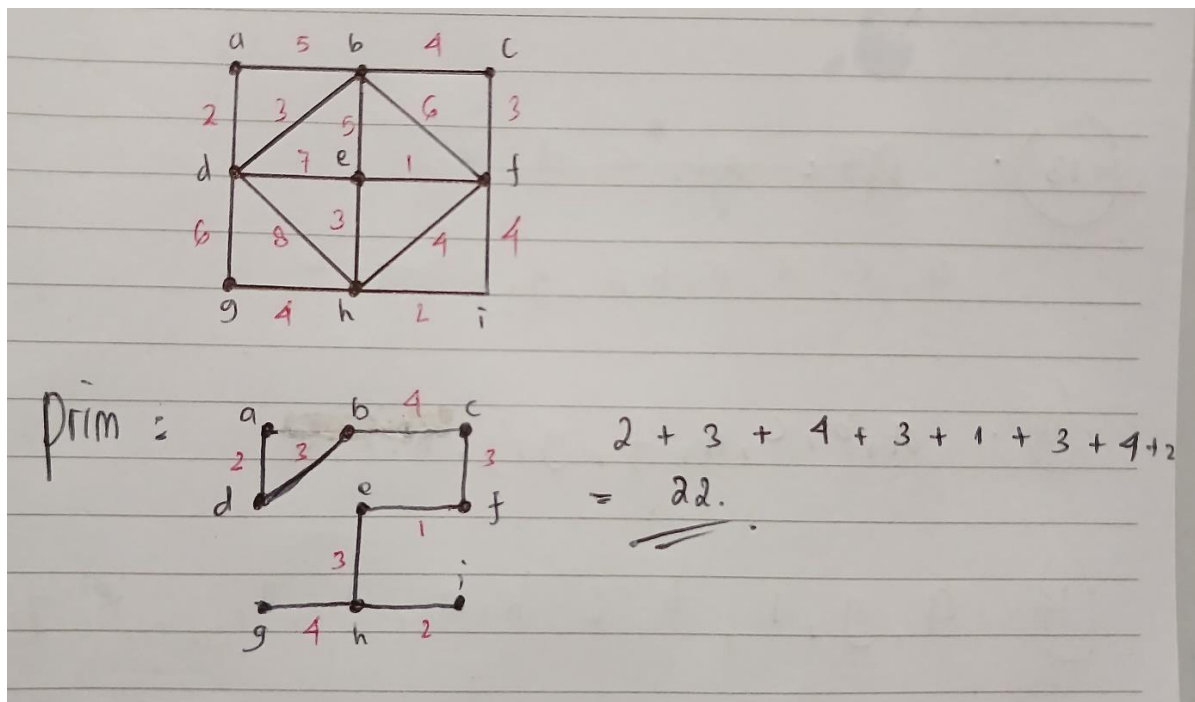


BFS : h, a, g, i, b, f, j, c, e, d

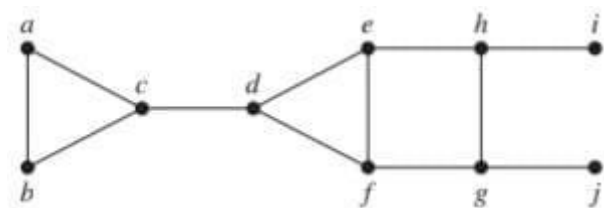
DFS : h, a, i, b, j, c, d, e, f, g

Nomor 2



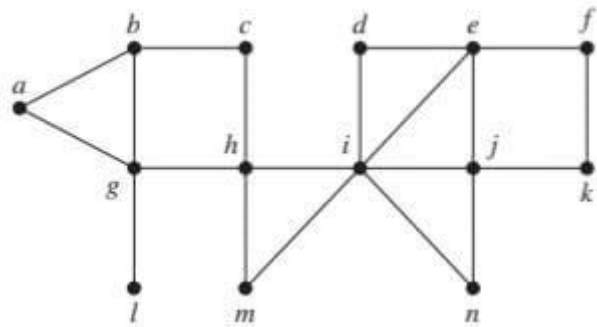


Nomor 3



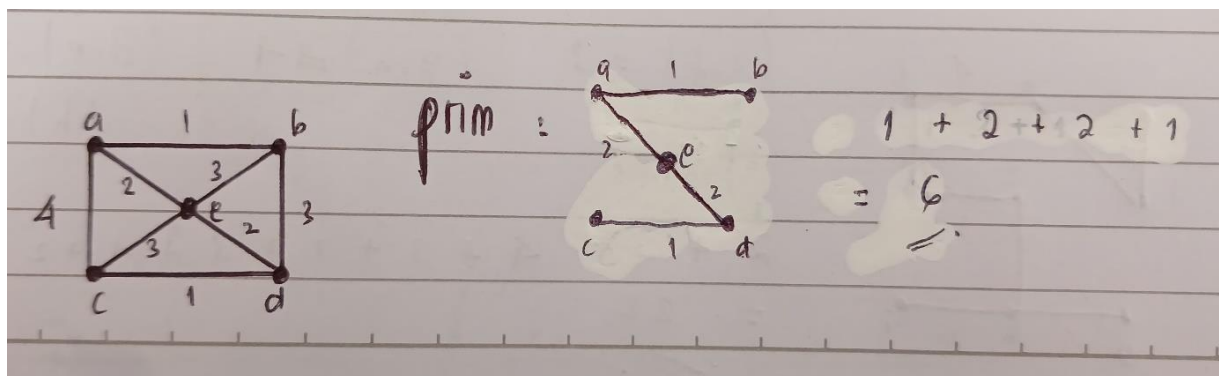
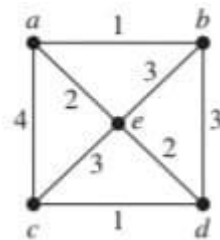
DFS : a, b, c, d, f, g, j, h, i, e

Nomor 4

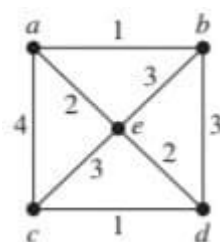


DFS : a, g, l, b, c, h, m, i, n, j, k, f, e, d

Nomor 5



Nomor 6



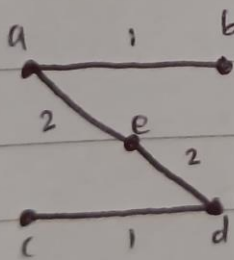
Kruskal : $(a,b) = 1$ $(c,e) = 3$

$(c,d) = 1$ $(b,d) = 3$

$(a,e) = 2$ $(a,c) = 4$

$(e,d) = 2$

$(b,e) = 3$



$$1 + 2 + 2 + 1 = 6$$