

CSA 0669

Assignment

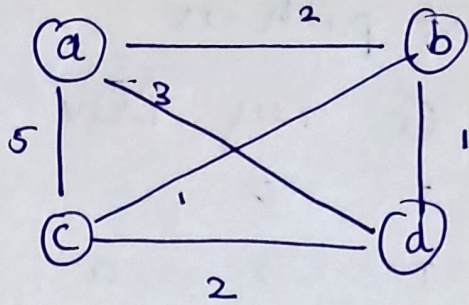
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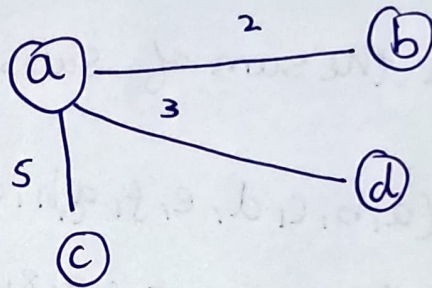
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1) Prim's Algorithm.

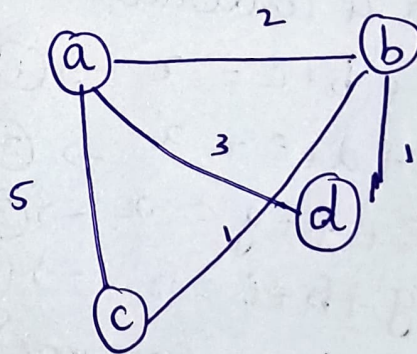
Node	Q	Key	Prev
a	-	∞	-
b	-	∞	-
c	-	∞	-
d	-	∞	-



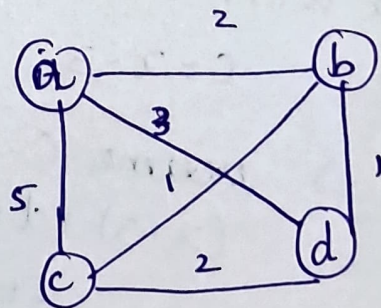
Node	Q	Key	Prev
a	T	0	-
b	-	2	a
c	-	5	a
d	-	3	a



Node	Q	Key	Prev
a	T	0	-
b	T	2	a
c	-	1	b
d	-	1	b

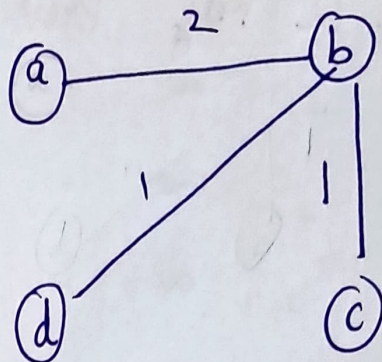


Node	Q	Key	Prev
a	T	0	-
b	T	2	a
c	T	1	b
d	T	1	b



The shortest path is

Node	Q	Key	Prev
a	T	0	-
b	T	2	a
c	T	1	b
d	T	1	b



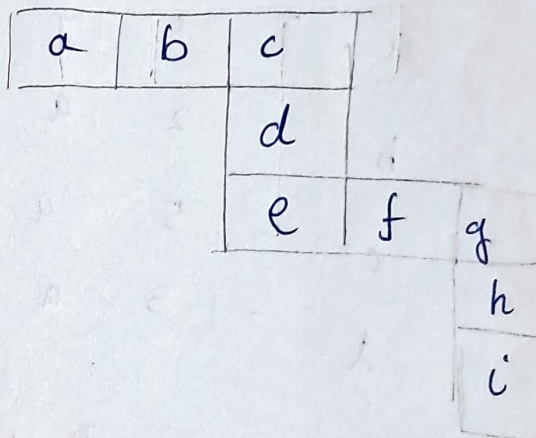
2) Compute the sum of subsets for the following graph

$$S\{\} = \{a, b, c, d, e, f, g, h, i\}$$

$$V\{i\} = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$$

Constraints,

$$a+b+c = c+d+e = e+f+g = g+h+i$$



We are given 4 constraints:

$$a + b + c = x \rightarrow (1)$$

$$c + d + e = x \rightarrow (2)$$

$$e + f + g = x \rightarrow (3)$$

$$g + h + i = x \rightarrow (4)$$

$$(1) \Rightarrow a=1, b=2 \text{ (assume)}$$

$$c = x - 3$$

$$(2) \Rightarrow \text{assume } c = x - 3 \text{ in } (2)$$

$$(x - 3) + d + e = x$$

$$d + e = 3$$

Given the values from 1 to 9, sum of all possible value is 45. Since there are 4 subsets

$$4x = 45$$

$$x = 45/4$$

$$x = 11.25$$

The sum of all subsets is 11.25

Let us assume $x = 15$:

$$* a + b + c = 15$$

$$* c + d + e = 15$$

$$* e + f + g = 15$$

$$* g + h + i = 15$$

$$* \text{Choose } a=1, b=5, c=9$$

$$1 + 5 + 9 = 15$$

$$* c=9, \text{ thus, } d=3 \text{ and } e=3,$$

$$\text{so, } d=4, e=2$$

$$9 + 4 + 2 = 15$$

$$* e=2, \text{ choose } f=6 \text{ and } g=7$$

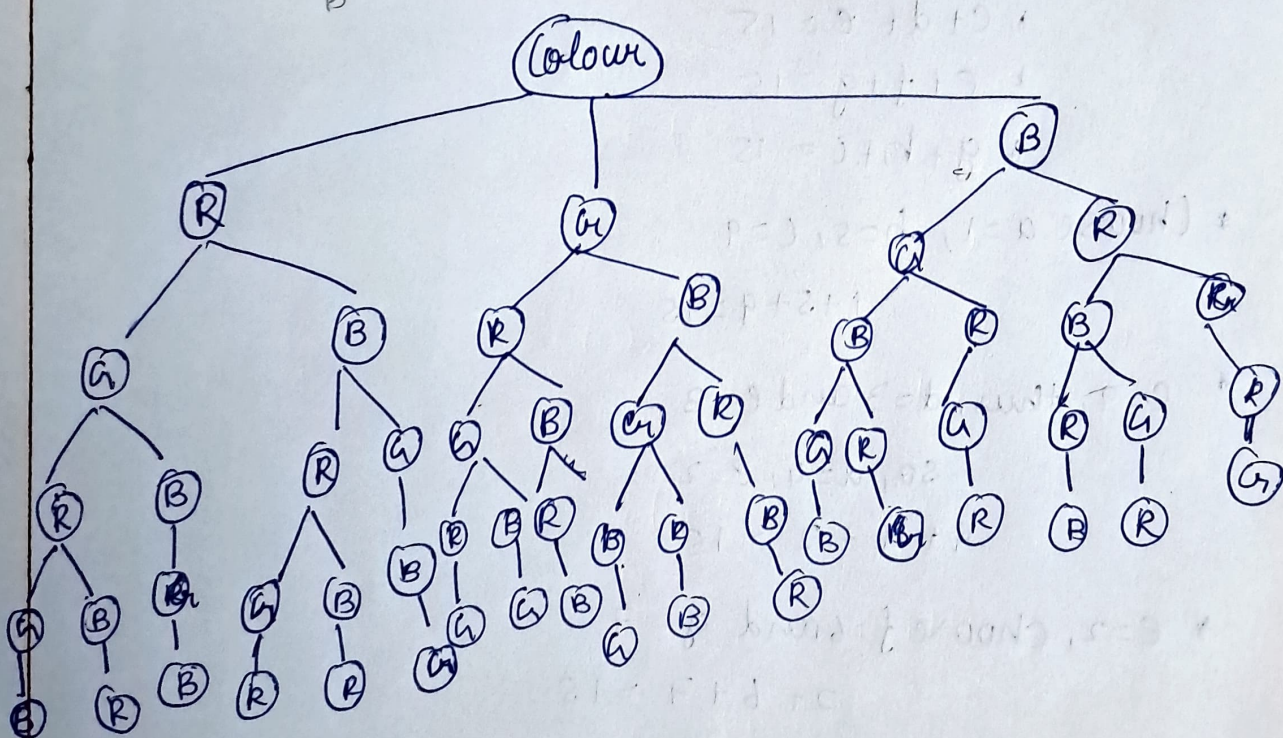
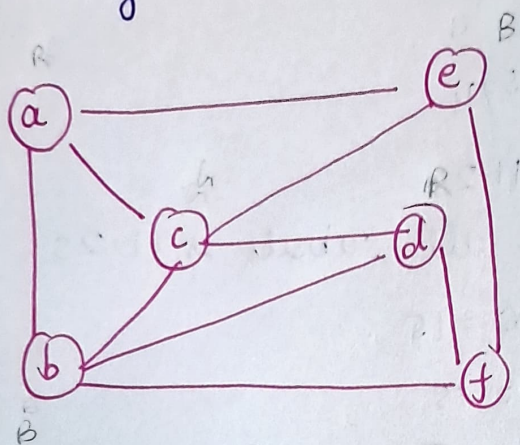
$$2 + 6 + 7 = 15$$

$$* g=7, \text{ choose } h=8 \text{ and } i=1$$

$$7 + 6(\text{remain}) + 2$$

$$\boxed{a=1, b=5, c=9, d=4, e=2, f=6, g=7, h=8, i=1}$$

3) calculate the chromatic no for the following graph coloring



1) Consider a set $S = (5, 10, 12, 13, 15, 18)$ and $d = 30$.
Solve it for obtaining a sum of subset

* Start with an empty subset - $\{\}$

* Add the first element (5):

→ Current subset: $\{5\}$

→ Sum = 5

* Add the second element (10):

→ Current subset: $\{5, 10\}$

→ Sum = 15

* Add the 3rd element (12):

→ Current subset: $\{5, 10, 12\}$

→ Sum = 27 (less than 30)

* Add the 4th element (13):

→ Current subset: $\{5, 10, 12, 13\}$

→ Sum = 40 (backtrack by removing 13)

* Add the 5th element (15):

→ Current subset: $\{5, 10, 12, 15\}$

→ Sum = 42 (backtrack by removing 15)

* Add 6th element (18):

→ Current subset: $\{5, 10, 12, 18\}$

→ Sum 45 (backtrack by removing 18)

→ Current subset: $\{5, 10, 15\}$

→ Sum = 30 (subset found)