

22

#include <stdio.h>

int main()

{ int a[4][5] = { { 1, 2, 3, 4, 5 },
 { 6, 7, 8, 9, 10 },
 { 11, 12, 13, 14, 15 },
 { 16, 17, 18, 19, 20 } };

printf("%d\n", *(*(a + **a + 2) + 3));

return (0);

}

output —

19

23

$h_1(K) = K \bmod 23$, Key value $K = 90$

$h_2(K) = 1 + (K \bmod 19)$, Table size = 23

13

Address returned by prob 1 - Start prob of

$$h_1(K) = 90 \% 23 = 21$$

$$h_2(K) = 1 + K \% 19 = 1 + 90 \% 19 = 15$$

Prob 1 -

$$(21 + 15) \% 23 = 13 \text{ Ans}$$

24

Grammar -

$S \rightarrow aSB \mid d$

$B \rightarrow b$

No. of reduction step, accept ~~daadbbb~~ aadbbb

Sol

$S \rightarrow aSB$

$\rightarrow aasBB$

$\{ S \rightarrow aSB \}$

$\rightarrow aqaSBBB$

$\{ S \rightarrow aSB \}$

$\rightarrow aqadBBB$

$\{ S \rightarrow d \}$

$\rightarrow aqaadbBB$

$\{ B \rightarrow b \}$

$\rightarrow aqaadbba$

$\{ B \rightarrow b \}$

$\rightarrow aqaadbba$

$\{ B \rightarrow b \}$

Total 7 steps

25

26

$\langle M \rangle \Rightarrow$ encoding of Turing machine M .

- A
- $L_1 = \{ \langle M \rangle \mid L(M) = \emptyset \}$
 - $L_2 = \{ \langle M, w, q \rangle \mid M \text{ on input } w \text{ reaches state } q \text{ in exactly } 1000 \text{ steps} \}$
 - $L_3 = \{ \langle M \rangle \mid L(M) \text{ is not recursive} \}$
 - $L_4 = \{ \langle M \rangle \mid L(M) \text{ contains at least 21 members} \}$

Undecidable $\Rightarrow L_1, L_3 \nrightarrow L_4$

27 ~~→~~ True -

~~C~~

~~I~~

~~II~~

~~III~~

~~IV~~

$$\text{rank}(AB) = \text{rank}(A) \cdot \text{rank}(B)$$

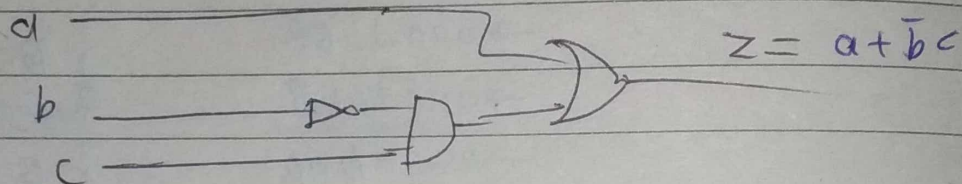
$$\det(AB) = \det(A) \cdot \det(B)$$

$$\text{rank}(A+B) = \text{rank}(A) + \text{rank}(B)$$

$$\det(A+B) = \det(A) + \det(B)$$

II & III True

28 ~~→~~



~~B~~

	$\bar{a}c$	$\bar{a}\bar{c}$	$\bar{b}c$	$\bar{b}\bar{c}$
\bar{a}	0	1	3	2
a	1	5	1	1

$$Z = \sum (1, 4, 5, 6, 7)$$

29 ~~→~~

$$R_1 = 0x42200000$$

$$R_2 = 0x61200000$$

$$R_3 = \frac{R_1}{R_2}$$

S

BE

M

$$R_1 = \boxed{0} \boxed{10000100} \boxed{010000 \dots}$$

$$R_2 = \boxed{1} \boxed{10000010} \boxed{01000 \dots}$$

$$10060100$$

$$10000010$$

$$\text{AE: } 00000010$$

$$= \text{Bias: } 01111111$$

$$\text{BE } 10000001$$

$$R_1 \quad 1.010 \dots$$

$$R_2 \quad 1.010 \dots \quad (\text{Divide})$$

$$R_3 \quad \boxed{1} \boxed{10000001} \boxed{0000 \dots}$$

(31) $G = (V, E)$, \rightarrow weighted & undirected / $T \rightarrow \text{MST}$
 $(u, v) \in V \times V$ is added to G

P

worst case time complexity —

$$O(|V|)$$

Ans

(32)

$$L_1 = \{wxyz \mid w, x, y \in (0,1)^+\}$$

$$L_2 = \{xy \mid x, y \in (a+b)^*, |x| = |y|, x \neq y\}$$

A

True -

L_1 is Regular $\Rightarrow L_2$ is context-free.

(33)

(34)

CODE P

wait(a); count = count + 1;

if (count == 1) single(b);

single(a); wait(b); single(b);

CODE Q

code achieve

It ensures that no process executes CODE Q before every process has finished CODE P

36 \Rightarrow $R \rightarrow 3NF$, not in BCNF

A

True \Rightarrow

R has a non-trivial functional dependency $X \rightarrow A$, where X is not a superkey and A is a prime attribute.

37 \Rightarrow

T_1	RA			RC		WD		WB	commit	
T_2		RB	WB		RD		WC			commit

A

Cond' equivalent.

T_1				RA	RC	WD	WB		commit	
T_2	RB	WB	RD				WC			commit

38 \Rightarrow

39 \Rightarrow

Not valid Formula not logical valid

C

$$\forall x (p(x) \rightarrow q) \equiv \forall x p(x) \rightarrow q$$

\rightarrow Invalid