# IKS

Pgn – 19

TALLY Method
- Counting Stones or Token
- Finger Counting (Body Part Based System)

- Drawback of tally method.

Pg no 20

Tally is not method of counting

→ used

Number uses of Symbols

Pg no – 21

Pg no 28

Babylonian Number System.

## AI

Search tree;

Being in state smallest and action small a1 need to a new state

$s' = a_1(s)$

A diff action $a_2$ may lead to $S''$ such that

$S'' = a_2(S)$

Recursive application of all possible action to all states begining with a starting state yields a search tree

Ex:-

8-puzzle problems

The problem is to search from starting state to goal state by moving a single tile in each state. you're allowed to slide only blank tile at the time.

| | | |
|---|---|---|
| 1 | | 2 |
| 4 | 5 | 3 |
| 7 | 8 | 6 |

Starting State

| | | |
|---|---|---|
| 1 | 2 | 3 |
| 4 | 5 | 6 |
| 7 | 8 | |

goal State.

| | | |
|---|---|---|
| 1 | - | 2 |
| 4 | 5 | 3 |
| 7 | 8 | 6 |

3 set of action

| | | |
|---|---|---|
| 1 | 5 | 2 |
| 4 | — | 3 |
| 7 | 8 | 6 |

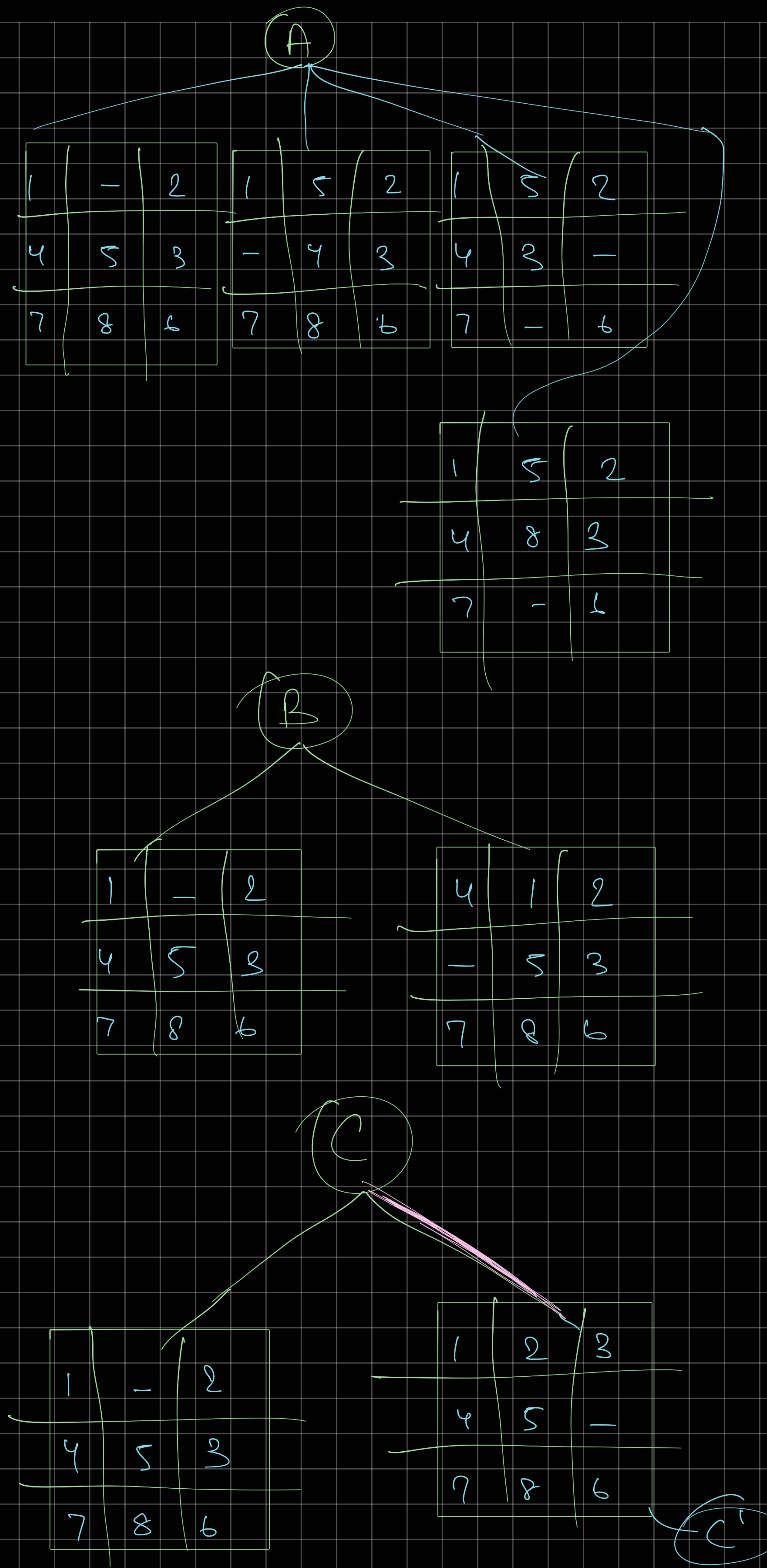
A

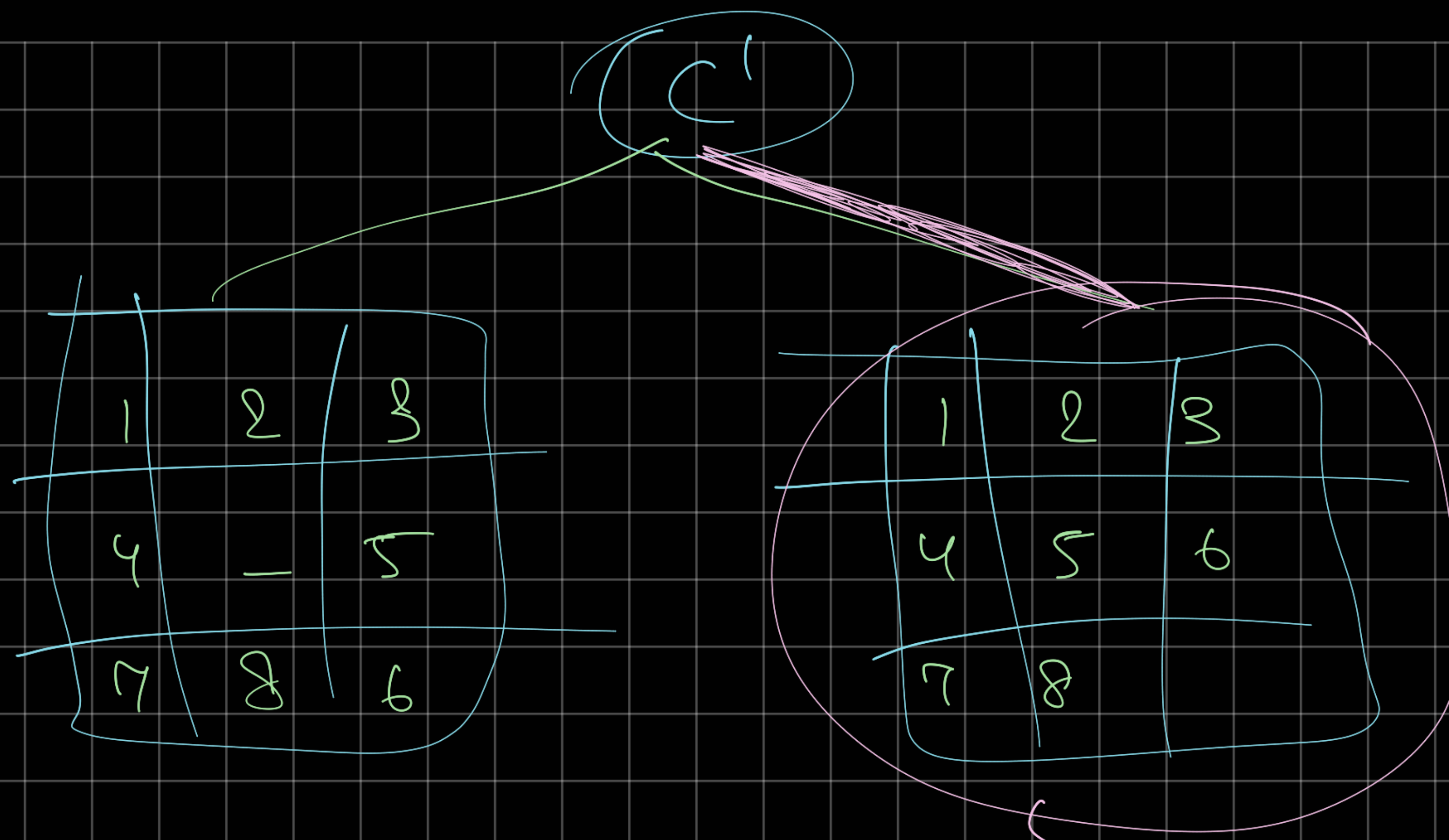
| | | |
|---|---|---|
| — | 1 | 2 |
| 4 | 5 | 3 |
| 7 | 8 | 6 |

B

| | | |
|---|---|---|
| 1 | 2 | — |
| 4 | 5 | 3 |
| 7 | 8 | 6 |

C


A
1 _ 2 / 4 5 3 / 7 8 6
1 5 2 / _ 4 3 / 7 8 6
1 5 2 / 4 3 _ / 7 _ 6
1 5 2 / 4 8 3 / 7 _ 6
B
1 _ 2 / 4 5 3 / 7 8 6
4 1 2 / _ 5 3 / 7 8 6
C
1 _ 2 / 4 5 3 / 7 8 6
1 2 3 / 4 5 _ / 7 8 6
C'




goal state

So the shortest distance is denoted by

Types of State Space Search;

① Blind search or Uninformed search;

Here we have no domain specific information.

② Inform/Heuristic search;

Here we have domain specific information or we have function to guide search procedure.

# MFAI

$H_1 \wedge H_2 \wedge \cdots \wedge H_m \Rightarrow C$

$H_1, H_2, \cdots H_m \neg C \left\{ \vdash R \wedge \neg R \right.$

$H_1 \wedge H_2 \wedge H_3 \cdots \wedge H_m \wedge \neg C \Rightarrow R \wedge \neg R$

$H_1 \wedge H_2 \wedge H_3 \cdots \wedge H_m \Rightarrow \neg C \rightarrow (R \wedge \neg R)$

$\Rightarrow \neg(\neg C)$

$P \rightarrow (Q \wedge \neg Q) \Rightarrow \neg P$

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Premises

$\neg P \wedge \neg Q$

Conclusion

$\neg(P \wedge Q)$

$= \neg\neg(P \vee Q)$

$= P \wedge Q$

$= P$

$\neg P \wedge \neg Q$

$\neg P$

$P \wedge \neg P$

It is a contradiction.

Mechanism of the Proof &

Automatic theorem proving

Ex: COq

Since mathematical system is not sound and clean.

Not Included in Syllabus

But you can write it

# Predicate calculus:

Predicates :-

P : John is bachelor
Q : Smith is bachelor } Predicates

Introduce two variables.

All human beings are mortal
: J is human being } Predicates
: Therefore J is mortal.

→ All & Some are not included in Propositional.

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J is bachelor.

S is bachelor.

Statement function:

$B(x)$ : $x$ is a bachelor

$x$ Acting as a variable

$B(J) \rightarrow$ J is bachelor

$B(S) \rightarrow$ S is bachelor.

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John is bachelor and this painting is red

$B(x)$ : $x$ is bachelor

$R(x)$ : $x$ is Red

$\Rightarrow B(J) \wedge R(P)$ [J = John & P = Painting] or; $B(J) \vee R(P)$

or; $\neg R(P)$

or; $B(J) \rightarrow R(P)$

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2 var predicates

Jack is taller than Jill.

$T(x, y)$: x is taller than y

Susan sits b/w Ralph & Bill.

$S(x, y, z)$: x sits in b/w y & z

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$B(x) \wedge R(x)$

Compound statement function

$B(J) \wedge R(P)$

object statement function.

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All men are mortal

Every apple is red

$M(x)$: x is mortal

$R(x)$: x is red

$\forall$ means for all

For all $x$ if $x$ is men then $x$ is mortal.

$\forall x \quad M_e(x) \xrightarrow{\ } M_o(x)$

$\forall x \quad A(x) \xrightarrow{\ } R(x)$

$M_e(x)$ : $x$ is men $M_a(x)$ : $x$ is mortal

$A(x)$ : $x$ is apple $R_e(x)$ : $x$ is red

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$\exists$ exist

Some apple is red

$\exists x \quad A(x) \wedge R(x)$