6406532878253. ✔ {[1, 2, 3, 5, 3, 5, 3, 6, 2, 4, 6, 2, 4, 6, 2, 3, 5, 3, 6, 7], [1, 2, 3, 5, 3, 6, 7], [1, 2, 4, 6, 2, 3, 6, 2, 3, 6, 2, 3, 6, 7], [1, 2, 4, 6, 7], [1, 2, 3, 6, 7]}

AI

Section Id :	64065361109
Section Number :	3
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	7
Number of Questions to be attempted :	7
Section Marks :	25
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Section Maximum Duration :	0
Section Minimum Duration :	0
Section Time In :	Minutes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653127880
Question Shuffling Allowed :	No

Question Number : 43 Question Id : 640653856496 Question Type : MCQ

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DEGREE LEVEL : AI: SEARCH METHODS FOR PROBLEM SOLVING (COMPUTER BASED EXAM)"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?
CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

(IF IT IS NOT THE CORRECT SUBJECT, PLS CHECK THE SECTION AT THE TOP FOR THE SUBJECTS REGISTERED BY YOU)

Options :

6406532878258. ✔ YES

6406532878259. ✖ NO

Question Number : 44 Question Id : 640653856497 Question Type : MCQ

Correct Marks : 0

Question Label : Multiple Choice Question

Options :

6406532878260. ✔ Printed graph sheets were provided to me.

6406532878261. ✖ Printed graph sheets were not provided to me

6406532878262. ✖ I did not use graph sheets.

Sub-Section Number :	2
Sub-Section Id :	640653127881
Question Shuffling Allowed :	No

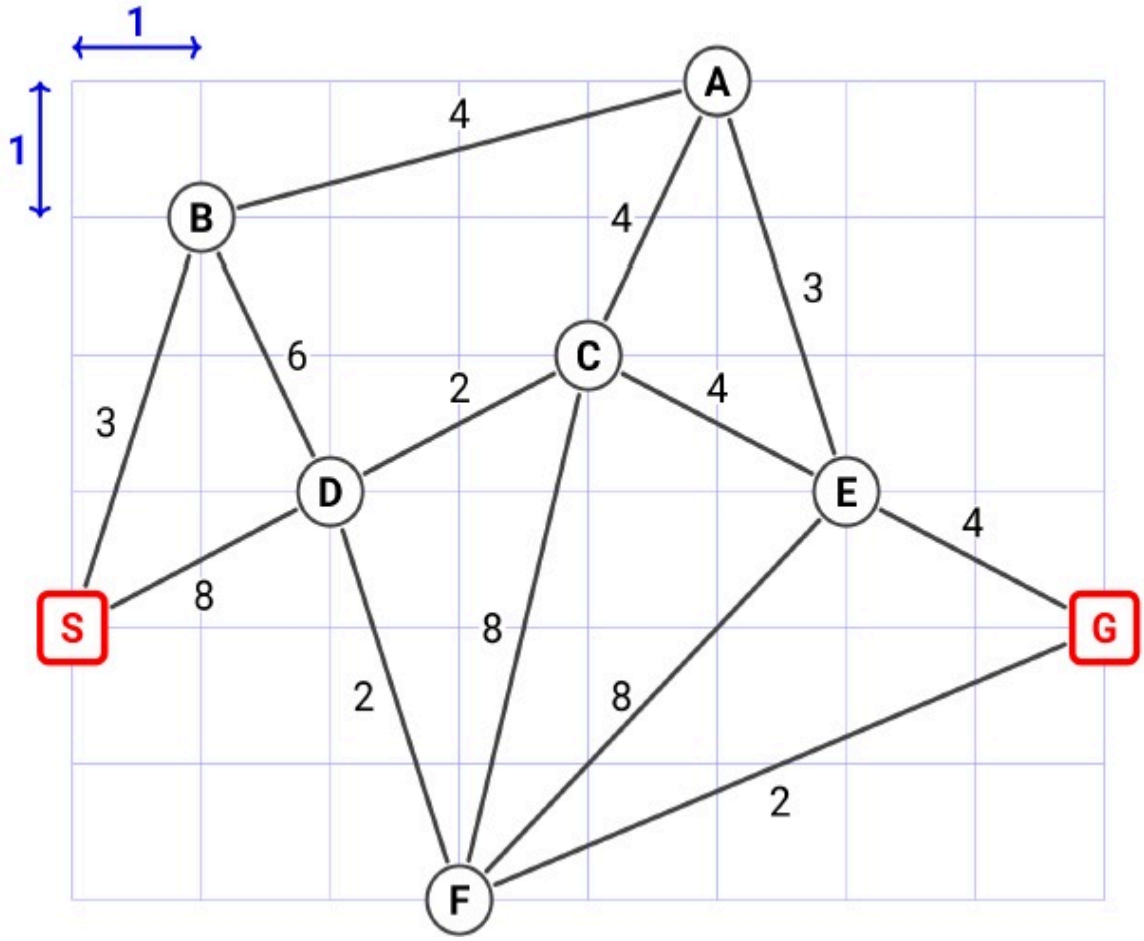
Question Id : 640653856498 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Question Numbers : (45 to 51)

Question Label : Comprehension

The figure shows a map with several locations on a grid where each tile is 1x1 in size. The locations are at grid points and are connected by two way edges (roads), where each edge has a cost that is the same in both directions. Observe that the edge costs are not necessarily proportional to the coordinate based distance estimates.

The start node is S and the goal node is G, the MoveGen function returns neighbours in alphabetical order. Use Manhattan distance as the heuristic function.

Tie-breaker: when several nodes have the same best cost, use alphabetical order to break ties.



Emulate A*, WA* and Branch-and-Bound on the given map, then answer the subquestions.

Sub questions

Question Number : 45 Question Id : 640653856499 Question Type : SA
Correct Marks : 1
Question Label : Short Answer Question
In the map, S is the first node to be refined, determine the next 3 nodes (from the 2nd to 4th node) refined by A*. Enter the nodes in the order they are refined.

Enter a comma separated list of node labels.
NO SPACES, TABS, DOTS, BRACKETS OR EXTRANEOUS CHARACTERS.
Answer format: W,X,Y,Z
Response Type : Alphanumeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Answers Case Sensitive : No
Text Areas : PlainText
Possible Answers :
B,A,E

Question Number : 46 Question Id : 640653856500 Question Type : SA

Correct Marks : 1

Question Label : Short Answer Question

For the 3 nodes from the 2nd to 4th node refined by A*, list the f-values of those nodes as a comma separated list.

Enter a comma separated list of natural numbers.
NO SPACES, TABS, DOTS, BRACKETS OR EXTRANEOUS CHARACTERS.
Answer format: 2,7,1,8

Response Type : Alphanumeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Answers Case Sensitive : No

Text Areas : PlainText

Possible Answers :

13,14,13

Question Number : 47 Question Id : 640653856501 Question Type : SA

Correct Marks : 1

Question Label : Short Answer Question

For the 3 nodes from the 2nd to 4th node refined by A*, list the parent nodes assigned by A*.

Enter a comma separated list of parent node labels.
NO SPACES, TABS, DOTS, BRACKETS OR EXTRANEOUS CHARACTERS.
Answer format: W,X,Y,Z

Response Type : Alphanumeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Answers Case Sensitive : No

Text Areas : PlainText

Possible Answers :

S,B,A

Question Number : 48 Question Id : 640653856502 Question Type : SA

Correct Marks : 1

Question Label : Short Answer Question

What is the final path found by A*?

Enter the path as a comma separated list.
NO SPACES, TABS, DOTS, BRACKETS OR EXTRANEOUS CHARACTERS.
Answer format: S,X,Y,G

Response Type : Alphanumeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Answers Case Sensitive : No
Text Areas : PlainText
Possible Answers :
S,B,A,E,G

Question Number : 49 Question Id : 640653856503 Question Type : SA
Correct Marks : 1
Question Label : Short Answer Question
For w=2, what is the final path found by WA* algorithm?

Enter the path as a comma separated list.
NO SPACES, TABS, DOTS, BRACKETS OR EXTRANEOUS CHARACTERS.
Answer format: S,X,Y,Z,G
Response Type : Alphanumeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Answers Case Sensitive : No
Text Areas : PlainText
Possible Answers :
S,D,C,E,G

Question Number : 50 Question Id : 640653856504 Question Type : SA
Correct Marks : 1
Question Label : Short Answer Question
What is the cost of the path found by Branch-and-Bound algorithm?

Enter a natural number.
NO SPACES, TABS, DOTS, BRACKETS OR EXTRANEOUS CHARACTERS.
Answer format: 42
Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
12

Question Number : 51 Question Id : 640653856505 Question Type : MCQ
Correct Marks : 1
Question Label : Multiple Choice Question
Is the heuristic admissible in the given map?
Options :
6406532878269. ✖ Yes
6406532878270. ✔ No
6406532878271. ✖ Cannot be determined

Sub-Section Number : 3
Sub-Section Id : 640653127882
Question Shuffling Allowed : No

Question Id : 640653856506 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix
Question Numbers : (52 to 56)
Question Label : Comprehension
The distance matrix for 6 cities are provided below. For each city the distances to other cities are listed in ascending order. For example, the distance from A to D is 42, and from A to F is 48, and so on.

A	D:42	F:48	E:64	C:86	B:96
B	C:72	F:88	A:96	D:104	E:144
C	D:62	B:72	A:86	F:114	E:150
D	A:42	C:62	F:86	E:100	B:104
E	F:58	A:64	D:100	B:144	C:150
F	A:48	E:58	D:86	B:88	C:114

Solve the sub-questions using the TSP Branch-and-Bound algorithm.

Attention: Infer as much as possible (and as early as possible) about the permanent segments in the partial solutions. A segment is a two-way edge between two cities.
Sub questions

Question Number : 52 Question Id : 640653856507 Question Type : SA
Correct Marks : 1
Question Label : Short Answer Question
What is the lower bound on the cost of the tours (S0) as per the TSP BnB algorithm discussed in

class?

Enter a natural number.
NO SPACES, TABS, DOTS, BRACKETS OR EXTRANEOUS CHARACTERS.
Answer format: 17

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

358

Question Number : 53 Question Id : 640653856508 Question Type : SA

Correct Marks : 1

Question Label : Short Answer Question

Infer all the permanently included segments in the node (S0,AD,~AF,EF,CD,~AE) in the TSP BnB search tree. Enter the total number of permanently included segments in the text box.

Enter a natural number.
NO SPACES, TABS, DOTS, BRACKETS OR EXTRANEOUS CHARACTERS.
Answer format: 17

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

4

Question Number : 54 Question Id : 640653856509 Question Type : SA

Correct Marks : 1

Question Label : Short Answer Question

Infer all the permanently excluded segments in the node (S0,AD,~AF,EF,CD,~AE) in the TSP BnB search tree. Enter the total number of permanently excluded segments in the text box.

Enter a natural number.
NO SPACES, TABS, DOTS, BRACKETS OR EXTRANEOUS CHARACTERS.
Answer format: 17

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

7

Question Number : 55 Question Id : 640653856510 Question Type : SA

Correct Marks : 1

Question Label : Short Answer Question

How many tours are represented by the node (S0,AD,~AF,EF,CD,~AE) in the TSP BnB search tree?

Enter a natural number.
NO SPACES, TABS, DOTS, BRACKETS OR EXTRANEOUS CHARACTERS.
Answer format: 17

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

2

Question Number : 56 Question Id : 640653856511 Question Type : SA

Correct Marks : 1

Question Label : Short Answer Question

What is the cost of the node (S0,AD,~AF,EF,CD,~AE) in the TSP BnB search tree?

Enter a natural number.
NO SPACES, TABS, DOTS, BRACKETS OR EXTRANEOUS CHARACTERS.
Answer format: 17.3

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

475

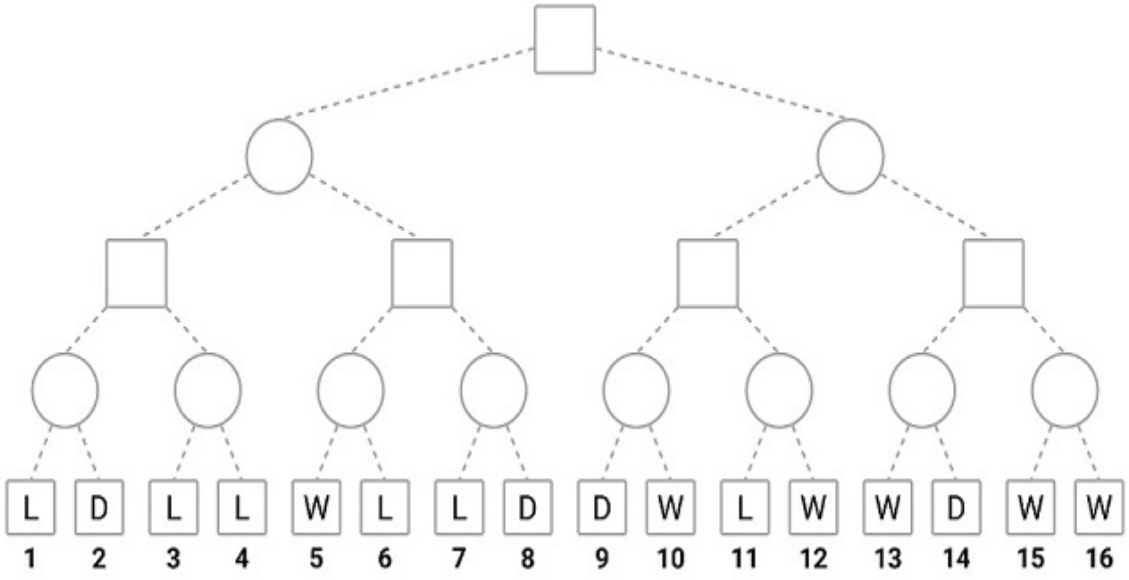
Sub-Section Number :	4
Sub-Section Id :	640653127883
Question Shuffling Allowed :	No

Question Id : 640653856512 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix

Question Numbers : (57 to 58)

Question Label : Comprehension

The figure shows a game tree with evaluations W (win), D (draw) and L (loss) from Max's perspective. The horizon nodes carry evals (W/D/L) and node labels (1 to 16).



Based on the above data, answer the given subquestions.

Sub questions

Question Number : 57 Question Id : 640653856513 Question Type : SA

Correct Marks : 1

Question Label : Short Answer Question

What is the outcome (W, D or L) of the game when both players play perfectly?

NO SPACES, TABS, DOTS, BRACKETS OR EXTRANEOUS CHARACTERS.
Answer format: X

Response Type : Alphanumeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Answers Case Sensitive : No

Text Areas : PlainText

Possible Answers :

D

Question Number : 58 Question Id : 640653856514 Question Type : SA

Correct Marks : 1

Question Label : Short Answer Question

Change the value of only one horizon node such that the outcome of the game changes. Which horizon node will you change and what will be its new value? Enter the label of the horizon node and the new value as a comma separated list.

NO SPACES, TABS, DOTS, BRACKETS OR EXTRANEOUS CHARACTERS.
Answer format: 16,X

Response Type : Alphanumeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Set

Answers Case Sensitive : No

Text Areas : PlainText

Possible Answers :

9,W

9,L

10,L

11,W

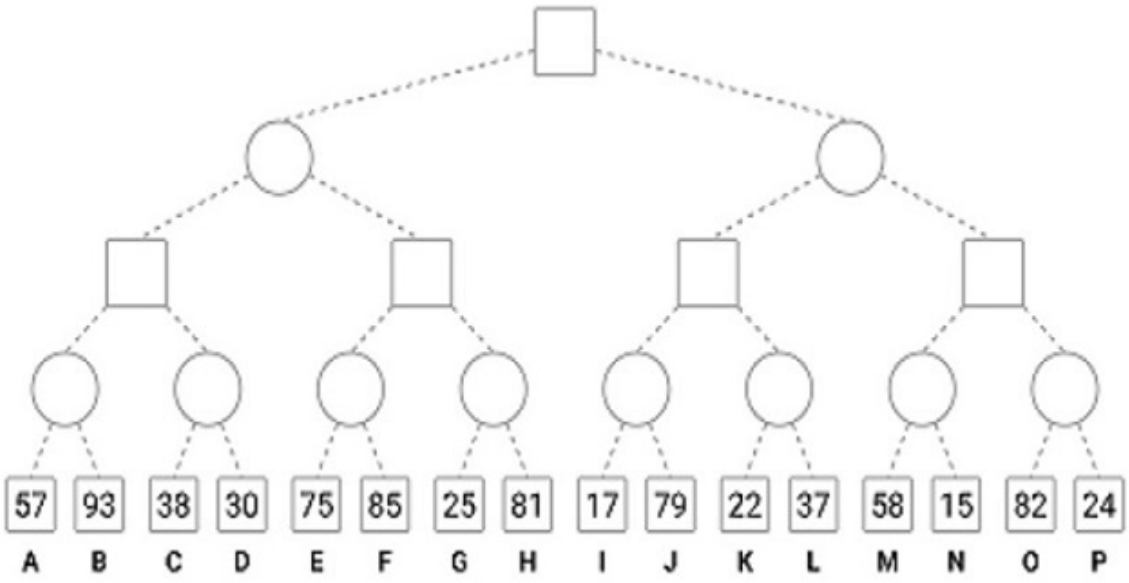
Sub-Section Number :	5
Sub-Section Id :	640653127884
Question Shuffling Allowed :	No

Question Id : 640653856515 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix

Question Numbers : (59 to 62)

Question Label : Comprehension

The figure shows a game tree with evaluations at the horizon from Max's perspective. The horizon nodes carry evals (numbers) and node labels (A to P).



Based on the above data, answer the given subquestions.

Sub questions

Question Number : 59 Question Id : 640653856516 Question Type : SA

Correct Marks : 1

Question Label : Short Answer Question
List the horizon nodes in the best strategy. Enter the node labels.

Enter the node labels as a comma separated list in ASCENDING order.
NO SPACES, TABS, DOTS, BRACKETS OR EXTRANEOUS CHARACTERS.
Answer format: X,Y,Z
Response Type : Alphanumeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Answers Case Sensitive : No
Text Areas : PlainText
Possible Answers :
A,B,E,F

Question Number : 60 Question Id : 640653856517 Question Type : SA
Correct Marks : 1
Question Label : Short Answer Question
List the horizon nodes pruned by Alpha-Beta algorithm.

Enter the node labels as a comma separated list in ASCENDING order.
NO SPACES, TABS, DOTS, BRACKETS OR EXTRANEOUS CHARACTERS.
Answer format: X,Y,Z
Response Type : Alphanumeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Answers Case Sensitive : No
Text Areas : PlainText
Possible Answers :
D,G,H,J,K,M,N,O,P

Question Number : 61 Question Id : 640653856518 Question Type : SA
Correct Marks : 1
Question Label : Short Answer Question
List the horizon nodes in the initial cluster formed by SSS* algorithm.

Enter the node labels as a comma separated list in ASCENDING order.
NO SPACES, TABS, DOTS, BRACKETS OR EXTRANEOUS CHARACTERS.
Answer format: X,Y,Z
Response Type : Alphanumeric
Evaluation Required For SA : Yes
Show Word Count : Yes

Answers Type : Equal

Answers Case Sensitive : No

Text Areas : PlainText

Possible Answers :

A,C,I,K

Question Number : 62 Question Id : 640653856519 Question Type : SA

Correct Marks : 1

Question Label : Short Answer Question

List the horizon nodes assigned SOLVED status by the SSS* algorithm.

Enter the node labels as a comma separated list in ASCENDING order.
NO SPACES, TABS, DOTS, BRACKETS OR EXTRANEOUS CHARACTERS.
Answer format: X,Y,Z

Response Type : Alphanumeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Set

Answers Case Sensitive : No

Text Areas : PlainText

Possible Answers :

A,B,C,E,F,I,K

A,C,I,K,B,E,F

Sub-Section Number :	6
Sub-Section Id :	640653127885
Question Shuffling Allowed :	No

Question Id : 640653856520 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix

Question Numbers : (63 to 69)

Question Label : Comprehension

The domain description of a blocks-world with a single one-armed robot is provided below. **Note:** this is the same domain description used in the weekly assignments.

PREDICATES

```
armEmpty    The arm is not holding any block, it is empty.
holding(X)  The arm is holding X.
onTable(X)  X is on the table.
clear(X)    X has nothing above it, it is clear.
on(X,Y)     X is directly on Y.
```

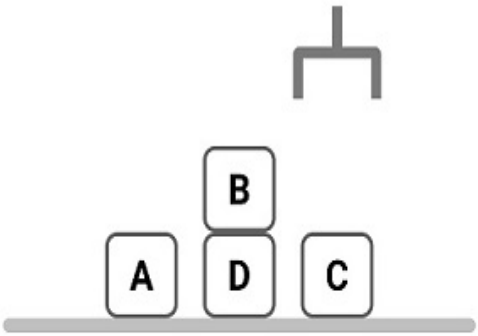
OPERATORS

```
Pickup(X): pick up X from the table.

   Preconditions: { armEmpty, clear(X), onTable(X) }
   Add Effects  : { holding(X) }
   Del Effects  : { armEmpty, onTable(X) }

Putdown(X): place X on the table.

   Preconditions: { holding(X) }
   Add Effects  : { armEmpty, onTable(X) }
   Del Effects  : { holding(X) }

Unstack(X,Y): pick up X that is directly sitting on Y.

   Preconditions: { armEmpty, clear(X), on(X,Y) }
   Add Effects  : { clear(Y), holding(X) }
   Del Effects  : { armempty, on(X,Y) }

Stack(X,Y): place X directly on top of Y.

   Preconditions: { holding(X), clear(Y) }
   Add Effects  : { armEmpty, on(X,Y) }
   Del Effects  : { holding(X), clear(Y) }
```

Tie-breaker: When actions are chosen non-deterministically, choose actions that lead to a plan. Throw away the actions that lead to deadends and cycles.

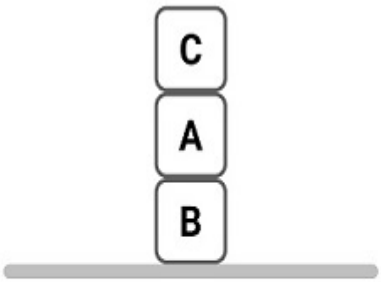
Tie-breaker: Treat the goal description, preconditions and effects as lists that are accessed from left to right. When the elements in a list are pushed one by one to a stack, the last element in the list will be at the top of the stack. It has the effect of reversing the list.

A planning problem is given below, find a plan using the operators and predicates defined in the blocks-world domain.



Start State

{ on(B,D),
clear(A), clear(B), clear(C),
onTable(A), onTable(D), onTable(C) }



Goal Description

{ on(C,A), on(A,B),
onTable(B) }

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 63 Question Id : 640653856521 Question Type : SA
Correct Marks : 1
Question Label : Short Answer Question
What is the length of the optimal plan? Enter the number of actions in the optimal plan.

NO SPACES, TABS, DOTS, BRACKETS OR EXTRANEOUS CHARACTERS.
Answer format: 42
Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
6

Question Number : 64 Question Id : 640653856522 Question Type : MSQ
Correct Marks : 1 Max. Selectable Options : 0
Question Label : Multiple Select Question
Which of the following are **applicable** actions in the start state for the given planning problem?
Options :
6406532878284. ✔ Pickup(A)
6406532878285. ✔ Pickup(C)
6406532878286. ✖ Stack(A,B)
6406532878287. ✖ Stack(C,A)
6406532878288. ✔ Unstack(B,D)

6406532878289. ✖ Unstack(A,B)

Question Number : 65 Question Id : 640653856523 Question Type : MSQ

Correct Marks : 1 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following are **relevant** actions for the goal description in the given planning problem?

Options :

6406532878290. ✖ Pickup(B)

6406532878291. ✖ Pickup(C)

6406532878292. ✔ Putdown(B)

6406532878293. ✔ Stack(A,B)

6406532878294. ✔ Stack(C,A)

6406532878295. ✖ Unstack(C,A)

Question Number : 66 Question Id : 640653856524 Question Type : MCQ

Correct Marks : 1

Question Label : Multiple Choice Question

For the subgoal ordering given in the goal description (and using the given tie breaking rules) which of the following can be pushed as the first four elements onto the stack by the Goal Stack Planning algorithm? In the representation below, the bottom of the stack is on the right end, marked by BOTTOM.

Options :

6406532878296. ✖ { on(C,A), on(A,B), onTable(B) }; on(C,A); on(A,B); onTable(B); BOTTOM

6406532878297. ✖ { on(C,A), on(A,B), onTable(B) }; onTable(B); on(A,B); on(C,A); BOTTOM

6406532878298. ✖ on(C,A); on(A,B); onTable(B); { on(C,A), on(A,B), onTable(B) }; BOTTOM

6406532878299. ✔ onTable(B); on(A,B); on(C,A); { on(C,A), on(A,B), onTable(B) }; BOTTOM

Question Number : 67 Question Id : 640653856525 Question Type : MCQ

Correct Marks : 1

Question Label : Multiple Choice Question

For the subgoal ordering given in the goal description (and using the given tie breaking rules), which of the following is the first action popped out of the stack in Goal Stack Planning?

Options :

6406532878300. ✖ Putdown(B)

6406532878301. ✖ Pickup(C)

6406532878302. ✖ Stack(C,A)

6406532878303. ✖ Stack(A,B)

6406532878304. ✔ Unstack(B,D)

Question Number : 68 Question Id : 640653856526 Question Type : MCQ

Correct Marks : 1

Question Label : Multiple Choice Question

For the subgoal ordering given in the goal description (and using the given tie breaking rules), does the Goal Stack Planning algorithm find an optimal plan?

Options :

6406532878305. ✔ Yes

6406532878306. ✖ No

6406532878307. ✖ Cannot be determined

Question Number : 69 Question Id : 640653856527 Question Type : MCQ

Correct Marks : 1

Question Label : Multiple Choice Question

If the subgoals in the goal description (list) are reversed then does the Goal Stack Planning algorithm find an optimal plan?

Options :

6406532878308. ✖ Yes

6406532878309. ✔ No

6406532878310. ✖ Cannot be determined

Deep Learning

Section Id :	64065361110
Section Number :	4
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	16
Number of Questions to be attempted :	16
Section Marks :	50
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Section Maximum Duration :	0
Section Minimum Duration :	0
Section Time In :	Minutes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653127886
Question Shuffling Allowed :	No