Exam :   Quiz 2

Subject :   AI

Total Marks :   24.00

QP :   2024 Dec01: IIT M AN EXAM QIM4

Exam Mode	Learning Mode

✦ **View Question Paper Summary**

QUESTION MENU

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27
28	29	30	31					

TIMER

00:13 ▶ ↻

CONTROLS

✓✓ SUBMIT EXAM

Your Score

0.00 / 24.00
(0%)

Question 1 : 6406531031644   Total Mark : 0.00 | Type : MCQ

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 :

○ YES

○ NO

Your score : 0

💬 Discussions (0)   🚩

Question 2 : 6406531031645   Total Mark : 0.00 | Type : MCQ

OPTIONS :

○ Printed graph sheets were provided to me.

○ Printed graph sheets were not provided to me.

○ I did not use graph sheets.

Your score : 0

💬 Discussions (0)   🚩

Question 3 : 6406531031646   Total Mark : 0.00 | Type : COMPREHENSION
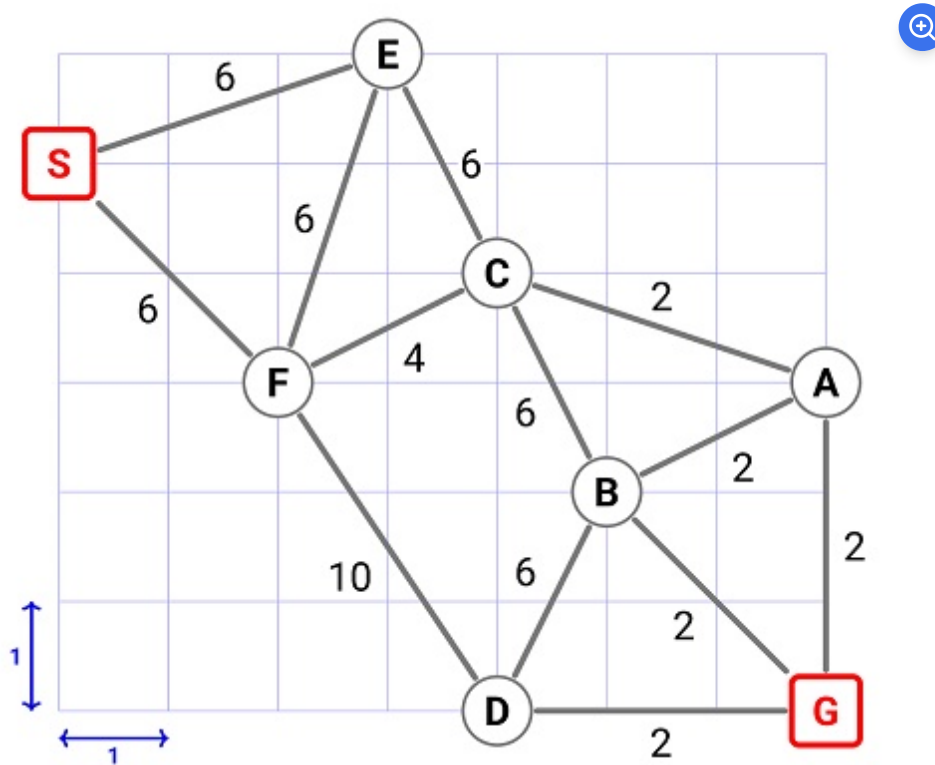
SEARCH

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 given subquestions.

Your score : 0

Question 4 :

64406531031647

Total Mark : 1.00 | Type : SA

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: X,Y,Z

Answer (Alphanumeric):

Answer

Accepted Answer : F,E,C

Your score : 0

💬 Discussions (0)   🏳

Question 5 :

6406531031648

🔷 View Parent QN   ⊘ View Solutions (0)

Total Mark : 1.00 | Type : SA

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

Answer (Alphanumeric):

Answer

Accepted Answer : 14,16,17

Your score : 0

💬 Discussions (0)   🏳

Question 6 :

6406531031649

🔷 View Parent QN   ⊘ View Solutions (0)

Total Mark : 1.00 | Type : SA

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: X,Y,Z

Answer (Alphanumeric):

Answer

Accepted Answer : S,S,F

Your score : 0

💬 Discussions (0)   🚩

Question 7 :   🎲 View Parent QN   ⊘ View Solutions (0)
6406531031650
                                                    Total Mark : 1.00 | Type : SA

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

Answer (Alphanumeric):

[Answer]

Accepted Answer : S,F,C,A,G

Your score : 0

💬 Discussions (0)   🚩

Question 8 :   🎲 View Parent QN   ⊘ View Solutions (0)
6406531031651
                                                    Total Mark : 1.00 | Type : SA

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,G

Answer (Alphanumeric):

[Answer]

Accepted Answer : S,F,D,G

Your score : 0

💬 **Discussions (0)**   🚩

Question 9 : 6406531031652

🎲 **View Parent QN**   ⊘ **View Solutions (0)**

Total Mark : 1.00 | Type : SA

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

Answer (Numeric):

[Answer]

Accepted Answer : 14

Your score : 0

💬 **Discussions (0)**   🚩

Question 10 : 6406531031653

🎲 **View Parent QN**   ⊘ **View Solutions (0)**

Total Mark : 1.00 | Type : MCQ

Is the heuristic admissible in the given map?

OPTIONS :

○ Yes

○ No

○ Cannot be determined

Your score : 0

💬 **Discussions (0)**   🚩

Question 11 : 6406531031654

Total Mark : 0.00 | Type : COMPREHENSION

TSP

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 C is 42, and from A to E is 48, and so on.

Solve the given 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.

A	C: 42	E: 48	D: 56	F: 66	B: 82
B	F: 36	C: 42	E: 56	D: 72	A: 82
C	D: 40	A: 42	B: 42	E: 44	F: 44
D	C: 40	A: 56	B: 72	E: 82	F: 84
E	F: 26	C: 44	A: 48	B: 56	D: 82
F	E: 26	B: 36	C: 44	A: 66	D: 84

Your score : 0

Question 12 :
6406531031655

    🔗 View Parent QN   ✅ View Solutions (0)

Total Mark : 1.00 | Type : SA

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

Answer (Numeric):

Answer

Accepted Answer : 239

Your score : 0

💬 Discussions (0)   🏳

Question 13 :
6406531031656

⚛ View Parent QN   ⊘ View Solutions (0)

Total Mark : 1.00 | Type : SA

Infer all the permanently included segments in the node (S0,EF,BF,CD,~AC) 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

Answer (Numeric):

Answer

Accepted Answer : ["3", "4"]

Your score : 0

💬 Discussions (0)   🏳

Question 14 :
6406531031657

⚛ View Parent QN   ⊘ View Solutions (0)

Total Mark : 1.00 | Type : SA

Infer all the permanently excluded segments in the node (S0,EF,BF,CD,~AC) 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

Answer (Numeric):

Answer

Accepted Answer : ["5", "7"]

Your score : 0

💬 **Discussions (0)**   🚩

Question 15 : 64406531031658

⚅ View Parent QN   ⊘ View Solutions (0)

Total Mark : 1.00 | Type : SA

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

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

Answer (Numeric):

```
Answer
```

Accepted Answer : 2

Your score : 0

💬 **Discussions (0)**   🚩

Question 16 : 64406531031659

⚅ View Parent QN   ⊘ View Solutions (0)

Total Mark : 1.00 | Type : SA

What is the cost of the node (S0,EF,BF,CD,~AC) in the TSP BnB search tree?

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

Answer (Numeric):

```
Answer
```

Accepted Answer : 246
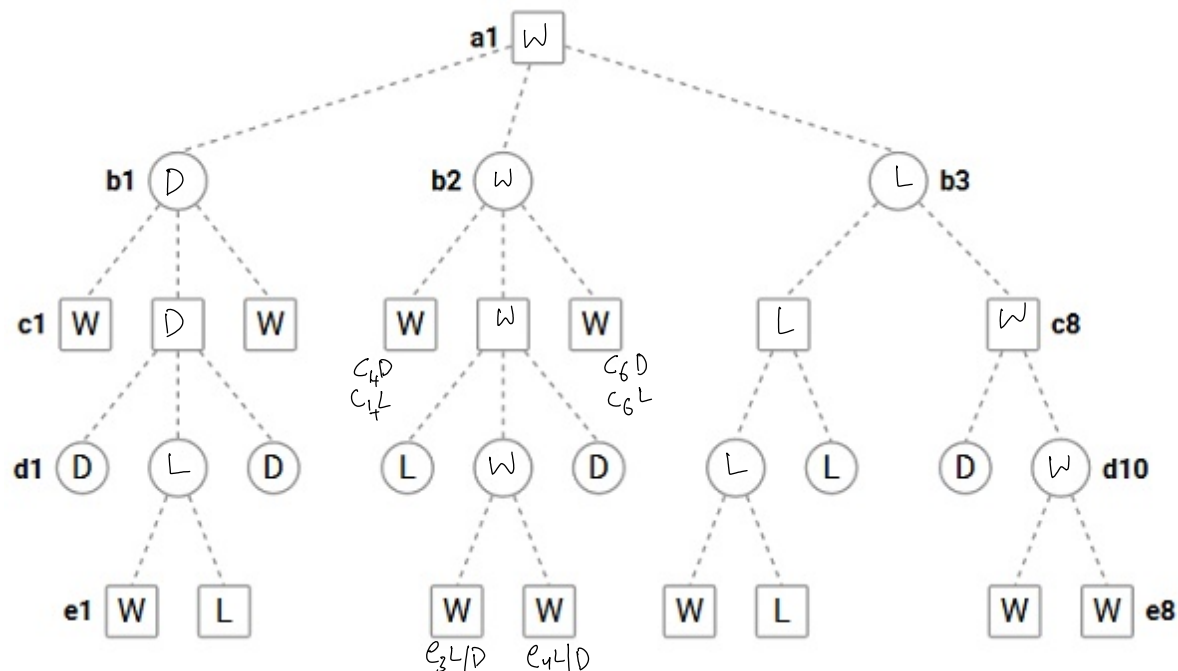
Your score : 0

💬 **Discussions (0)**   🚩

Question 17 : 6406531031660

Total Mark : 0.00 | Type : COMPREHENSION

GAMES

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 a1, b1, b2, b3, c1, ..., c8, d1, ..., d10, e1, ..., e8.
Based on the above data answer the given subquestions.

Your score : 0

Question 18 : 6406531031661

[View Parent QN]   [View Solutions (0)]

Total Mark : 1.00 | Type : SA

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

Answer (Alphanumeric):

Answer

Accepted Answer : W

Your score : 0

💬 Discussions (0)   🚩

Question 19 :
6406531031662

⚙ View Parent QN   ✓ View Solutions (0)

Total Mark : 1.00 | Type : SA

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 its new value as a comma separated list.
NO SPACES, TABS, DOTS, BRACKETS OR EXTRANEOUS CHARACTERS. Answer format: c9,X

Answer (Alphanumeric):
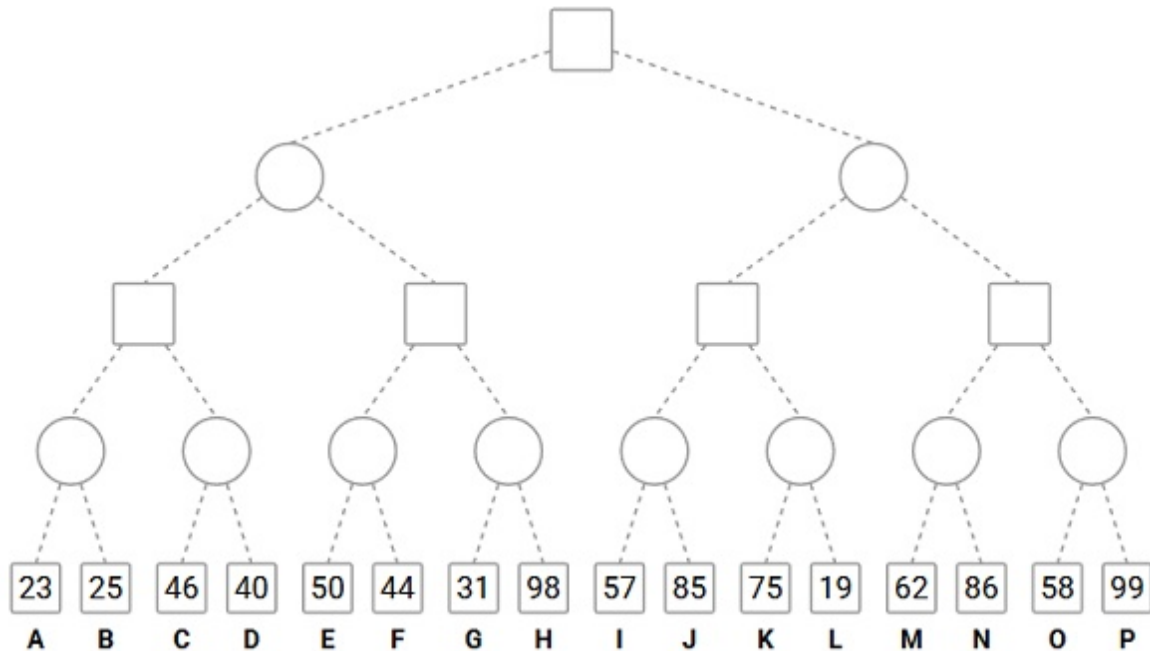
| Answer |

Accepted Answer : c4,D

Your score : 0

💬 Discussions (0)   🚩

Question 20 : 6406531031663

Total Mark : 0.00 | Type : 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.

Your score : 0

Question 21 :
6406531031664

View Parent QN   View Solutions (0)

Total Mark : 1.00 | Type : SA

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

Answer (Alphanumeric):

[Answer]

Accepted Answer : I,J,M,N

Your score : 0

Discussions (0)

Question 22 :
6406531031665

View Parent QN   View Solutions (0)

Total Mark : 1.00 | Type : SA

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

Answer (Alphanumeric):

Answer

Accepted Answer : G,H,O,P

Your score : 0

💬 Discussions (0)   🚩

Question 23 :
6406531031666

⚛ View Parent QN   ⊘ View Solutions (0)

Total Mark : 1.00 | Type : SA

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

Answer (Alphanumeric):

Answer

Accepted Answer : A,C,I,K

Your score : 0

💬 Discussions (0)   🚩

Question 24 :
6406531031667

⚛ View Parent QN   ⊘ View Solutions (0)

Total Mark : 1.00 | Type : SA

List the horizon nodes (other than the initial cluster) that are 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

Answer (Alphanumeric):

Answer

Accepted Answer : J,L,M,N

Your score : 0

Discussions (0)   🏳

Question 25 : 6406531031668   Total Mark : 0.00 | Type : COMPREHENSION

AUTOMATED PANNING

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.
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.

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) }
```

AUTOMATED PANNING

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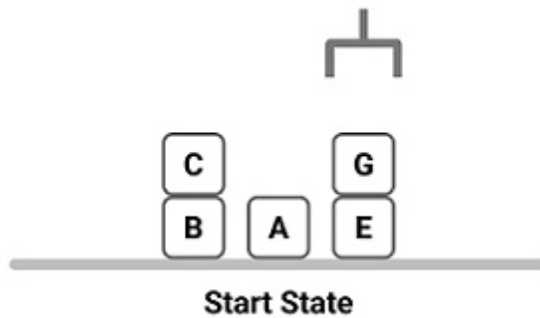
Tie-breaker: When actions are chosen non-deterministically, choose actions that lead to a plan. Throw away the actions that lead to deadends and cycles.

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
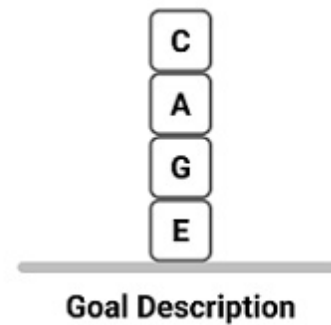
reversing the list.

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

Based on the above data answer the given subquestions.

Start State

{ armEmpty,
  clear(C), clear(A), clear(G),
  on(C,B), on(G,E),
  onTable(B), onTable(A), onTable(E) }

Goal Description

{ on(C,A), on(A,G), on(G,E),
  onTable(E) }

Your score : 0

Question 26 :
6406531031669

View Parent QN   **View Solutions (0)**

Total Mark : 1.00 | Type : SA

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

Answer (Numeric):

Answer

Accepted Answer : 4

Your score : 0

Discussions (0)

Question 27 :
6406531031670

View Parent QN   View Solutions (0)

Total Mark : 1.00 | Type : MSQ

Which of the following are **applicable** actions in the start state for the given planning problem?

OPTIONS :

☐ Pickup(A)

☐ Pickup(C)

☐ Stack(A,G)

☐ Stack(C,A)

☐ Unstack(C,B)

☐ Unstack(G,E)

Your score : 0

💬 Discussions (0)   🏳

Question 28 :
6406531031671

View Parent QN   View Solutions (0)

Total Mark : 1.00 | Type : MSQ

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

OPTIONS :

☐ Pickup(A)

☐ Pickup(C)

☐ Stack(A,G)

☐ Stack(C,A)

☐ Unstack(C,B)

☐ Unstack(G,E)

Your score : 0

💬 **Discussions (0)**   🚩

Question 29 :   ⬡ **View Parent QN**   ⊘ **View Solutions (0)**
6406531031672

Total Mark : 1.00 | Type : MCQ

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 :

○ on(C,A); on(A,G); on(G,E); onTable(E); { on(C,A), on(A,G), on(G,E), onTable(E) };BOTTOM

○ onTable(E); on(G,E); on(A,G); on(C,A); { on(C,A), on(A,G), on(G,E), onTable(E) };BOTTOM

○ { on(C,A), on(A,G), on(G,E), onTable(E) }; on(C,A); on(A,G); on(G,E); onTable(E);BOTTOM

○ { on(C,A), on(A,G), on(G,E), onTable(E) }; onTable(E); on(G,E); on(A,G); on(C,A);BOTTOM

Your score : 0

💬 **Discussions (0)**   🚩

Question 30 :   ⬡ **View Parent QN**   ⊘ **View Solutions (0)**
6406531031673

Total Mark : 1.00 | Type : MCQ

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

OPTIONS :

○ on(C,A)

○ on(A,G)

○ on(G,E)

○ onTable(E)

Your score : 0

💬 **Discussions (0)**   🏳

Question 31 :   ⬡ View Parent QN   ⊘ View Solutions (0)
6406531031674
                                               Total Mark : 1.00 | Type : MCQ

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 :

◯ Pickup(A)

◯ Pickup(C)

◯ Stack(A,G)

◯ Stack(C,A)

◯ Unstack(C,B)

◯ Unstack(G,E)

Your score : 0

💬 **Discussions (0)**   🏳

✓✓ SUBMIT EXAM