Test1-SearchAlgorithms

- Due Feb 8 at 4:46pm
- Points 38
- Questions 19
- Available Feb 8 at 4:02pm - Feb 14 at 6:45am
- Time Limit 40 Minutes

Instructions

* Reference Figures in questions are uploaded on Canvas (SearchTestFigures.pdf and ConstraintProblems.pdf) for the test.

* You may need extra papers for scratch work. Submit the sheet after the exam with your name on it.

* Use the best answer, i.e., read all choices.

* Closed book test. Do not refer to any material or use any communication devices during the test.

* Use your honor code and do not talk to anyone about the test during or after the test

* In-class test, unless permitted otherwise

This quiz was locked Feb 14 at 6:45am.

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	39 minutes	30 out of 38

ⓘ Correct answers are hidden.

Score for this quiz: 30 out of 38
Submitted Feb 8 at 4:41pm
This attempt took 39 minutes.

Question 1
2 / 2 pts

Genetic algorithm is a type of stochastic beam search over an even number of current nodes.

◉ True

False

Question 2
2 / 2 pts

(Refer: SearhTestFigures, Figure 1) Consider an A* search algorithm using the function f(n) = the level of the node *n*, i.e., the distance from the root to *n* in terms of number of edges. This is same as:

Simulated annealing

Blind breadth first search

None of the above

Blind depth first search

Question 3
2 / 2 pts

(Refer: SearhTestFigures, Figure 2, use heuristic values f on nodes) In an A* search, current min-priority queue Q has nodes (c, b, d) with c at the top/root of the Q. Next, c is popped off and expanded with its children. Which nodes are in Q now as a sorted list with the best node on the left.

(b, f, g, d)

(f, b, g, d)

(f, b, d)

(e, f, g, goal)

Question 4
2 / 2 pts

(Refer: SearhTestFigures, Figure 3, 8-puzzle) How many grand-children of the root node *s* exist at level 2, starting with the start/root node as level 0*? [Visited nodes may be revisited, as in a tree-search.]*

12

8

6

10

IncorrectQuestion 5
0 / 2 pts

(Refer: SearhTestFigures, Figure 3, 8-puzzle) Using heuristic h1=number of misplaced tiles, what is the h1(d) value of the node *d*?

- 4
- 6
- 5
- 7

Question 6
2 / 2 pts

(Refer: SearhTestFigures, Figure 3, 8-puzzle) Using heuristic h2=Sum of Manhattan distances from each tile's correct position, where the h2(s) value of the start state = 1+1+0+0+1+1+0+2 (distances for tile #1 through #8, respectively) [*Note, Manhattan distance is measured by summing horizontal and vertical distances*.]

What is the h2(d) value of node *d*?

- 9
- 7
- 11
- 5

Question 7
2 / 2 pts

(Refer: SearhTestFigures, Figure 3, 8-puzzle) Using heuristic h2=Sum of Manhattan distances from each tile's correct tile position, where the h2(s) value of the start state = 1+1+0+0+1+1+0+2 (distances for tile #1 through #8),

which of the node(s) a, b, c, and/or d will be chosen by the A* algorithm at the level 1?

- node a or b
- node a or c
- node c or d
- node b or c

Question 8
2 / 2 pts

Adversarial/Game search: a maximizing node *n1* has its current maximum (alpha)=3 that it passed to *n1*'s currently active (minimizing) child node *n2*. Then, *n2* received 2 from *n2*'s latest executed child, which became *n2*'s current minimum (beta). Should *n2* continue executing its remaining children?

[You may refer SearchTestFigures 4th slide, if that helps.]

- ○ Yes
- ○ Should use the average value
- ◉ No
- ○ Depends

Question 9
2 / 2 pts

Refer SearchTestFigures fourth/last slide.

What will be the value at the root after running min-max algorithm WITHOUT alpha-beta pruning?

- ○ 15
- ◉ 3
- ○ 2
- ○ 0

Question 10
2 / 2 pts

Refer SearchTestFigures fourth/last slide.

What will be the value at the root after running min-max algorithm WITH alpha-beta pruning?

- ○ 2
- ○ 0
- ○ 15
- ◉ 3

Question 11
2 / 2 pts

Which of the following ones do not necessarily output a satisfiable solution in CSP?

- (selected) Constraint Propagation
- Forward Checking with Degree heuristics
- Backtracking
- Forward Checking with Min-remaining Value heuristic

Incorrect Question 12
0 / 2 pts

Refer to the file ConstraintProblems.

Is the network Arc-consistent? If no domain changes when an AC algorithm is run it is arc consistent.

- (selected) True
- False

Question 13
2 / 2 pts

A Constraint problem over three variables and respective domains, x1: {1,2,3}, x2: {2,3}, x3:{3}, and constraints are x1 <=x2, and x2<=x3.

How many solutions exist for the problem?

- 6
- 0
- (selected) 5
- 2

Incorrect Question 14
0 / 2 pts

Consider the 4-queens problem: four variables c1, c2, c3, and c4 for four columns, each variable has the same domain {r1, r2, r3, r4} for the row-position of each queen in the respective column. Constraints for the problem is that no two queens may be in the same diagonal or row (column-constraint is being taken care of by the design).

During a Forward Checking algorithm the state (board) is: c1=r1 and c3=r2. FC will reduce available domain values of c2 and c4. What are those reduced domains?

- c2: {r4}, c4:{r3}
- c2: {r3}, c4:{r4}
- c2: {r4}, c4:{empty}
- c2: {empty}, c4:{r3}

Question 15
2 / 2 pts

Consider a 5-queens (CSP) problem represented with each column as a variable in {c1, c2, c3, c4,c5}, and the row index of the placed queen as the variable's domain {r1,r2,r3,r4,r5}. What is the size of the search space?

- 5*5
- 5^5
- 5
- 5+5

Question 16
2 / 2 pts

Refer to the file ConstraintProblems.

Start the Forward Checking algorithm with WA=r. What are the values of the other variables after the first iteration?

- SA={b}, NT ={g}, Q={b,g}, NSW={b}, V ={g}
- SA={b}, NT ={g}, Q={g}, NSW={g,b}, V ={g,b}
- SA={b}, NT ={g}, Q={b,g}, NSW={g,b}, V ={g,b}
- SA={b}, NT ={g}, Q={b,g}, NSW={g}, V ={b}

Question 17
2 / 2 pts

Refer to the file ConstraintProblems.

Which one of the following is a solution to the problem?

- WA=r, NT=r, SA=b, Q=g, NSW=g, V=b
- WA=g, NT=g, SA=b, Q=g, NSW=b, V=b
- WA=r, NT=g, SA=b, Q=g, NSW=g, V=b
- None of the above

Question 18
2 / 2 pts

Consider a constraints satisfaction problem over three variables and domains v1:{1,2}, v2:{2,3}, and v3:{3,4}, with a constraint v1+v2<5, v1+v3<6. Is the input arc-consistent, i.e., will running AC algorithm reduce any domain?

- depends on the algorithm
- yes
- no
- depends on the data structure

IncorrectQuestion 19
0 / 2 pts

A Constraint problem over three variables and respective domains, x1: {1,2,3}, x2: {2,3}, x3:{3}, x1 <=x2, and x2<x3.

After running Arc-consistency algorithm, what will be the output?

- x1:{}, x2:{}, x3:{}
- x1:{1,2}, x2:{2}, x3:{3}
- x1:{1,2}, x2:{2,3}, x3:{3}
- x1:{1}, x2:{2}, x3:{3}

Quiz Score: 30 out of 38