



[Course](#) > [Week 4](#) > [Home...](#) > [hw2\\_cs...](#)

## hw2\_csps\_q8\_backtracking\_arc\_consistency

### Question 8: Backtracking Arc Consistency

12/12 points (ungraded)

We are given a CSP with only binary constraints. Assume we run backtracking search with arc consistency as follows. Initially, when presented with the CSP, one round of arc consistency is enforced. This first round of arc consistency will typically result in variables having pruned domains. Then we start a backtracking search using the pruned domains. In this backtracking search we use filtering through enforcing arc consistency after every assignment in the search. Which of the following are true about this algorithm?

#### Part 1

Which of the following are true about this algorithm?

- ☐ If after a run of arc consistency during the backtracking search we end up with the filtered domains of all of the not yet assigned variables being empty, this means the CSP has no solution.
- ☐ If after a run of arc consistency during the backtracking search we end up with the filtered domain of one of the not yet assigned variables being empty, this means the CSP has no solution.
- ☒ None of the above.



#### Part 2

Which of the following are true about this algorithm?

- ☒ If after a run of arc consistency during the backtracking search we end up with the filtered domains of all of the not yet assigned variables being empty, this means the search should backtrack because this particular branch in the search tree has no solution.
- ☒ If after a run of arc consistency during the backtracking search we end up with the filtered domain of one of the not yet assigned variables being empty, this means the search should backtrack because this particular branch in the search tree has no solution.
- ☐ None of the above.



### Part 3

Which of the following are true about this algorithm?

- ☒ If after a run of arc consistency during the backtracking search we end up with the filtered domains of all of the not yet assigned variables each having exactly one value left, this means we have found a solution.
- ☐ If after a run of arc consistency during the backtracking search we end up with the filtered domains of all of the not yet assigned variables each having more than one value left, this means we have found a whole space of solutions and we can just pick any combination of values still left in the domains and that will be a solution.
- ☒ If after a run of arc consistency during the backtracking search we end up with the filtered domains of all of the not yet assigned variables each having more than one value left, this means we can't know yet whether there is a solution somewhere further down this branch of the tree, and search has to continue down this branch to determine this.



Submit

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✓ Correct (12/12 points)

