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## ▼ Final Exam Setup

**Final Exam**

Final Exam due Apr 18, 2017 05:00 IST

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**Final Exam**

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**Artificial Intelligence in general (A)**

4/4 points (graded)

In this course, we studied intelligent agents that act rationally.

☐ false☒ true ✓

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You have used 1 of 1 attempt

✓ Correct (4/4 points)

**BFS vs. DFS (A)**

4/4 points (graded)

BFS versus DFS. (Select all that apply)

☐ DFS and BFS use a similar amount of space.☒ DFS uses less space than BFS.☒ Both of them have exponential time.

✓

Submit

You have used 1 of 1 attempt

✓ Correct (4/4 points)

**Search criteria (A)**

4/4 points (graded)

What are the criteria used to compare search algorithms? (Select all that apply)

☒ Time complexity☒ Space complexity☒ Completeness☒ Optimality

✓

Submit

You have used 1 of 1 attempt

✓ Correct (4/4 points)

### BFS and IDS (A)

4/4 points (graded)

In comparing Breadth First Search (BFS) versus iterative deepening search (IDS): (Select all that apply)

☐ BFS uses less space than IDS☒ BFS uses more space than IDS☐ BFS and IDS use the same space☒ IDS repeats searching already explored nodes. BFS does not repeat.

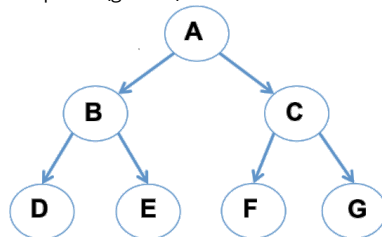
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You have used 1 of 1 attempt

✓ Correct (4/4 points)

### BFS (A)

4/4 points (graded)



Using DFS, indicate the order in which the nodes are visited. Where an arbitrary choice has to be made, visit from left to right.

☐ A, B, C, D, F, E, G☐ A, B, D, C, E, F, G☒ A, B, C, D, E, F, G

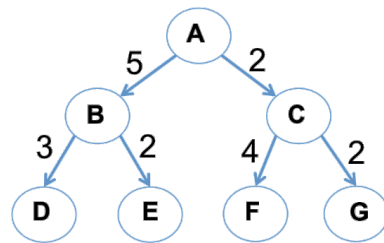
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✓ Correct (4/4 points)

### UCS (A)

4/4 points (graded)



Using UCS, indicate the order in which the nodes are visited. Where an arbitrary choice has to be made, visit from left to right.

☐ A, B, C, D, F, E, G

☒ A, C, G, B, F, E, D

☐ A, B, G, D, C, F, E



Submit

You have used 1 of 1 attempt

✓ Correct (4/4 points)

### Heuristics (A)

4/4 points (graded)

Let  $h_1$  and  $h_2$  be two admissible heuristics. Which of the following heuristics are admissible? (Select all that apply)

☒  $h(n) = \max\{h_1(n), h_2(n)\}$

☐  $h(n) = 2h_1(n) + 3h_2(n)$

☒  $h(n) = w \cdot h_1(n) + (1 - w) \cdot h_2(n)$  with  $0 \leq w \leq 1$

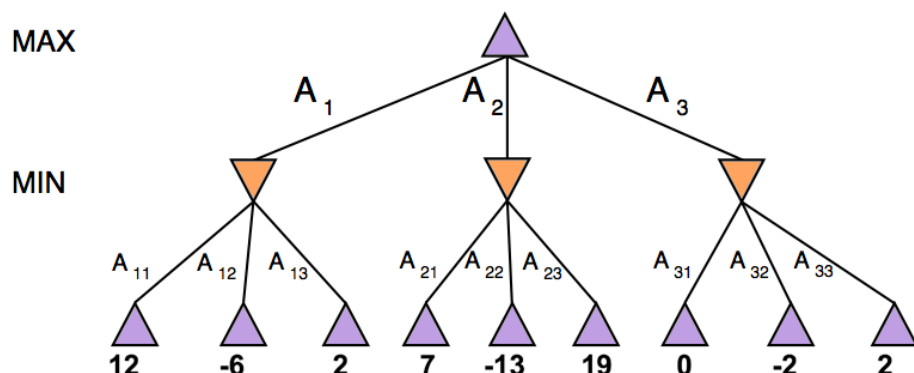


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✓ Correct (4/4 points)

Consider the following search tree.



### Minimax (A)

4/4 points (graded)

Using minimax, which of the three possible moves should MAX take at the root node?

☐ A1

☐ A2

☒ A3 ✓

Submit

You have used 1 of 1 attempt

✓ Correct (4/4 points)

### Minimax (A)

4/4 points (graded)

Using minimax, what is the value of MAX at the root?

☐ 6

☐ -13

☐ 19

☒ -2 ✓

Submit

You have used 1 of 1 attempt

✓ Correct (4/4 points)

### Minimax with alpha-beta pruning (A)

4/4 points (graded)

Using minimax with alpha-beta pruning, what branches are pruned? Check all that apply:

☐ A1

☐ A2

☐ A3

☐ A11

☐ A12

☐ A13☐ A21☐ A22☒ A23☐ A31☐ A32☐ A33

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You have used 1 of 1 attempt

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✓ Correct (4/4 points)

### Association Rules (A)

4/4 points (graded)

Select all that apply:

☐ The search space of frequent itemsets is a lattice of size  $2^{\text{(number of transactions)}}$ .☒ Deriving association rules relies on frequent itemsets.☒ Finding frequent itemsets requires scanning the dataset.☒ The search space of frequent itemsets is a lattice of size  $2^{\text{(number of items)}}$ .☐ In association rules, if an itemset is frequent, then all its supersets are frequent.

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You have used 1 of 1 attempt

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✓ Correct (4/4 points)

### Machine learning (A)

4/4 points (graded)

If the performance of a classification model on the test set is poor, you can just re-calibrate your model parameters to achieve a better model.

☐ true☒ false ✓

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You have used 1 of 1 attempt

✓ Correct (4/4 points)

### Machine learning: Linear Regression (A)

4/4 points (graded)

Linear regression with least squares gets the optimal solution.

☒ true ✓

☐ false

Submit

You have used 1 of 1 attempt

✓ Correct (4/4 points)

### Machine learning (A)

4/4 points (graded)

The examples in the validation set are used to fine tune the parameters but never to train the classification model.

☒ true ✓

☐ false

Submit

You have used 1 of 1 attempt

✓ Correct (4/4 points)

### Machine learning (A)

0/4 points (graded)

In comparing supervised versus unsupervised learning...(select all that applies)

☒ Supervised learning use features and labels.

☒ Unsupervised learning use only features.

☒ Supervised learning finds a function  $f$  from the set of features to the labels.

☐ Unsupervised learning finds a function from the set of features to a set of clusters.

✗

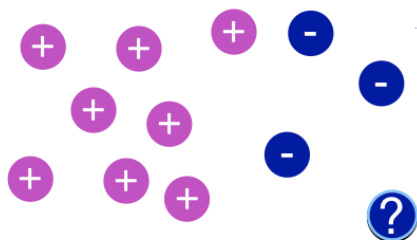
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You have used 1 of 1 attempt

✖ Incorrect (0/4 points)

## Machine learning (A)

4/4 points (graded)



Using KNN with simple majority voting, for what minimal value of  $k$  will the point "?" be positive in the following labeled dataset?

☐ 3

☐ 5

☒ 7 ✓

☐ 9

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You have used 1 of 1 attempt

✓ Correct (4/4 points)

Unisex names can be cute but sometimes confusing. Examples include Charlie, Tyler, Gabriel, Jesse, etc. We assume we have enough kids in a dataset to be able to predict the gender based on the kids physical features. The label is Gender.

Kid_id	Name	Tall	Hair	Gender
1	Tyler	no	short	boy
2	Salma	yes	long	girl
3	Tyler	no	long	girl
4	Leila	no	long	girl
5	Tyler	yes	short	boy
6	Leila	no	long	girl
7	Salma	yes	short	girl
8	Tyler	yes	long	boy

## Decision trees (A)

0/4 points (graded)

Derive "the first level ONLY of a decision tree" based on the method seen in class, using the Gini index (instead of entropy to ease calculations) and information gain. Use the features: Name, Tall, Hair, and the label Gender. Which feature is picked first? Recall:

$$Gini = 1 - p_{\oplus}^2 - p_{\ominus}^2$$

$$Gain(S, A) = Gini(S) - \sum_{v \in \text{Values}(A)} \frac{|S_v|}{|S|} Gini(S_v)$$

☐ Tall

☒ Hair ✖

☐ Name

You have used 1 of 1 attempt

✖ Incorrect (0/4 points)

### Decision trees (A)

4/4 points (graded)

Suppose we forgot to eliminate a feature "kid\_id" and derived a decision tree. What would be the gain of this feature at the root?

☒ 0.46 ✔

☐ 0.15

☐ 0.72

You have used 1 of 1 attempt

✔ Correct (4/4 points)

### Propositional Logic (PL) (A)

4/4 points (graded)

Modus ponens/tollens?

**Linda is an excellent swimmer** → **she can work as a lifeguard**     **Linda is an excellent swimmer**  
**Linda can work as a lifeguard**

☒ Modus ponens ✔

☐ Modus Tollens

You have used 1 of 1 attempt

✔ Correct (4/4 points)

### Propositional Logic (A)



4/4 points (graded)

Let  $p$  be a proposition in propositional logic.  $p$ : Maria likes math and Maria does not like physics. What is the  $\neg p$  (negation of  $p$ )?

- ☒ Maria does not like math or Maria likes physics
- ☐ Maria does not like math and Maria likes physics
- ☐ Maria likes math or Maria likes physics
- ☐ Maria does not like math and Maria does not like physics



Submit

You have used 1 of 1 attempt

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✓ Correct (4/4 points)

### CNF (A)

4/4 points (graded)

The CNF of  $p \vee (\neg p \wedge q \wedge r)$  is:

- ☒  $(p \vee q) \wedge (p \vee r)$
- ☐  $(p \vee q) \wedge (\neg p \vee r)$
- ☐  $(p \vee q) \vee (p \vee r)$



Submit

You have used 1 of 1 attempt

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✓ Correct (4/4 points)

### Propositional logic (A)

4/4 points (graded)

$$(p \rightarrow q) \rightarrow (q \rightarrow p)$$

Consider the above proposition in propositional logic. Is this proposition a:

- ☐ tautology
- ☐ fallacy
- ☒ contingency



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You have used 1 of 1 attempt

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✓ Correct (4/4 points)

## Propositional Logic: Inference (A)

4/4 points (graded)

Use a truth table to decide whether the inference below is valid.

$$\frac{p \vee q \quad \neg p \vee r}{q \vee r}$$

☒ valid ✓

☐ not valid

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You have used 1 of 1 attempt

✓ Correct (4/4 points)

## PL: resolution (A)

4.0/4.0 points (graded)

Given the following KB:

$$KB = \{p \vee \neg q, q \vee \neg r, q \vee r\}$$

Using resolution for propositional logic or truth table, does  $KB \models p$ ?
☒ Yes ✓

☐ No

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You have used 1 of 1 attempt

## CSPs (A)

4/4 points (graded)

In checking arc consistency of  $X \rightarrow Y$ , if the domain of  $X$  becomes empty, then the CSP is not arc-consistent.
☒ true ✓

☐ false

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You have used 1 of 1 attempt

✓ Correct (4/4 points)



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