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Started on	Sunday, 20 June 2021, 2:00 PM
State	Finished
Completed on	Sunday, 20 June 2021, 2:32 PM
Time taken	32 mins 40 secs
Grade	16.00 out of 17.00 (94%)

Question 1

Correct

Mark 4.00 out of 4.00

3.5 Minutes: In the knapsack problem (7 items with weights and benefits as below).

Item: 1 2 3 4 5 6 7

Benefit: 5 5 3 2 7 9 6

Weight: 7 3 4 10 4 6 6

Maximum wight of 24 pounds

Fill it to get the maximum benefit

Solutions take the form of a string of 1's and 0's: 1: item in, 0: item out.

* is a mark to separate parts of the chromosome (no real value beyond that).

Parent1: 0101*010

Parent2: 1101*100

Parent3: 0100*111

Please answer the following questions:

0110111 is a possible mutation of one of the parents



For chromosome 0110111



For Parent3: 0100111



0101111 is a possible crossover child of Parents 1 and 2



Your answer is correct.

The correct answer is:

0110111 is a possible mutation of one of the parents → True,

For chromosome 0110111 → Benefit=30 and Weight =23,

For Parent3: 0100111 → Benefit=27 and Weight =19,

0101111 is a possible crossover child of Parents 1 and 2 → False

Question 2

Correct

Mark 1.00 out of 1.00

1 Minute:The goodness (fitness) function for the Children resulting from Crossover in Genetic Algorithms is always better than the goodness function of the parents. This is the basic of the evolution process in GA.

Select one:

- True
- False ✓

The correct answer is 'False'.

Question 3

Correct

Mark 1.00 out of 1.00

1 Minute:The desired goal of Genetic Algorithms is to maximize the goodness function of the Chromosomes (solutions). However, achieving the max goodness may require more computational power than available. In such cases GA may settle for less than optimal solutions.

Select one:

- True ✓
- False

The correct answer is 'True'.

Question 4

Correct

Mark 1.00 out of 1.00

Omitting diacritics الحركات in Arabic results in more ambiguity but less storage needs.

Select one:

- True ✓
- False

The correct answer is 'True'.

Question 5

Correct

Mark 1.00 out of 1.00

1 Minute: A constraint satisfaction problem (CSP) consists of a set of variables, a set of domains (one domain for each variable), and a set of constraints that specify allowable combinations of values.

Select one:

- True ✓
- False

The correct answer is 'True'.

Question 6

Correct

Mark 1.00 out of 1.00

Syntactic ambiguity has to do with words having multiple meanings.

Select one:

- True
- False ✓

The correct answer is 'False'.

Question 7

Correct

Mark 1.00 out of 1.00

1 Minute: Using Crossover in genetic Algorithms, the number of iterations used to reach the optimal solution is influenced (depends on) by the selection criteria for the participating parents: the higher the value for the participating parents the faster we reach the optimum (give enough resources).

Select one:

- True ✓
- False

The correct answer is 'True'.

Question 8

Correct

Mark 6.00 out of 6.00

10 Minutes: Assume You are a map-coloring robot assigned to color this map of western Canada territories (The colors shown on the map are irrelevant).

Adjacent regions must be assigned a different color from the set (R=Red, G=Green, B=Blue). The constraint graph is shown.

AL = Alberta
BC = British Columbia
MA = Manitoba
NW = Northwest Territories
NU = Nunavut
ON = Ontario
SA = Saskatchewan
YU = Yukon Territory

Please answer the following questions based on CSP

ARC CONSISTENCY. NW has been assigned **B** and AL has been assigned **R**, as shown; but no constraint propagation has been done. Cross out all values that would be eliminated by Arc Consistency and list the remaining. The result is list of

Territory:Remaining Colors:

YU	NW	NU	BC	AL	SA	MA	ON
R G B	B	R G B	R G B	R	R G B	R G B	R G B

AL = Alberta
BC = British Columbia
MA = Manitoba
NW = Northwest Territories
NU = Nunavut
ON = Ontario
SA = Saskatchewan
YU = Yukon Territory


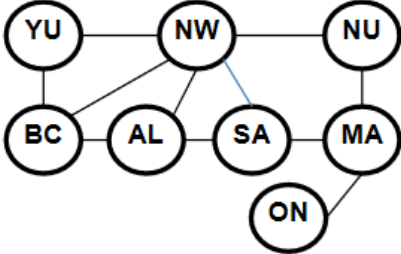
FORWARD CHECKING. NW has been assigned value B, as shown. Cross out all values that would be eliminated by Forward Checking (FC). The result is list of **Territory:Remaining Colors so that NU can be colored in R or G:**

YU	NW	NU	BC	AL	SA	MA	ON
R G B	B	R G B	R G B	R G B	R G B	R G B	R G B

AL = Alberta
BC = British Columbia
MA = Manitoba
NW = Northwest Territories
NU = Nunavut
ON = Ontario
SA = Saskatchewan
YU = Yukon Territory


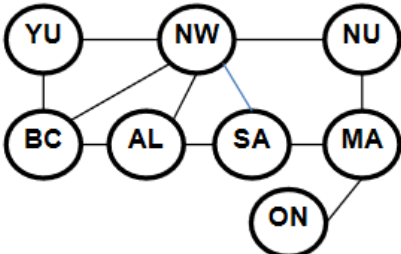
DEGREE (or Most Constraining variable MCV) HEURISTIC . Consider the assignment below. AL has been assigned B and constraint propagation has been done, as shown. Ignoring the MRV heuristic, list all unassigned variables (in any order) that might be selected now by the Degree (MCV) Heuristic

YU	NW	NU	BC	AL	SA	MA	ON
R G B	R G	R G B	R G	B	R G	R G B	R G B

AL = Alberta
BC = British Columbia
MA = Manitoba
NW = Northwest Territories
NU = Nunavut
ON = Ontario
SA = Saskatchewan
YU = Yukon Territory

LEAST-CONSTRAINING-VALUE HEURISTIC. Consider the assignment below. AL has been assigned B and constraint propagation has been done, as shown. MA has been chosen as the next variable to explore. List the values for MA that would be explored first by the Least-Constraining-Value Heuristic (LCV).


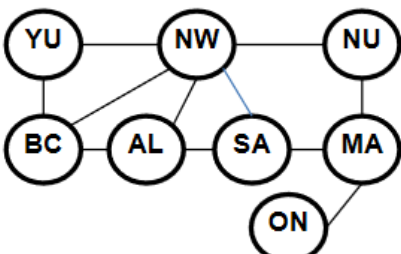



AL = Alberta
BC = British Columbia
MA = Manitoba
NW = Northwest Territories
NU = Nunavut
ON = Ontario
SA = Saskatchewan
YU = Yukon Territory

YU	NW	NU	BC	AL	SA	MA	ON
R G B	R G	R G B	R G	B	R G	R G B	R G B

MINIMUM-REMAINING-VALUES HEURISTIC. Consider the assignment below. AL has been assigned B and constraint propagation **has been done**, as shown. List all unassigned variables (in any order) that might be selected now by the **Minimum-Remaining-Values** (MRV) Heuristic:

YU	NW	NU	BC	AL	SA	MA	ON
R G B	R G	R G B	R G	B	R G	R G B	R G B

AL = Alberta
BC = British Columbia
MA = Manitoba
NW = Northwest Territories
NU = Nunavut
ON = Ontario
SA = Saskatchewan
YU = Yukon Territory

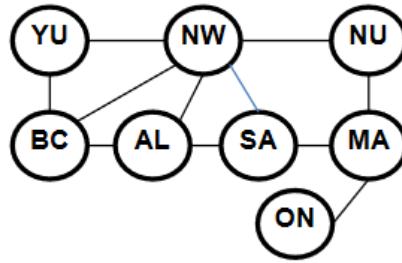
Your answer is correct.

The correct answer is:

ARC CONSISTENCY. NW has been assigned **B** and AL has been assigned **R**, as shown; but no constraint propagation has been done. Cross out all values that would be eliminated by Arc Consistency and list the remaining. The result is list of

Territory:Remaining Colors:

YU	NW	NU	BC	AL	SA	MA	ON
RGB	B	RGB	RGB	R	RGB	RGB	RGB

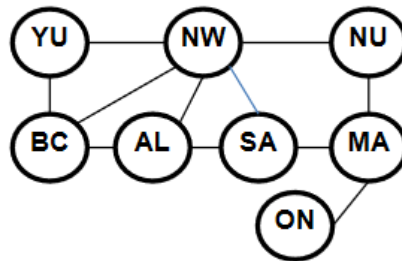


AL = Alberta
 BC = British Columbia
 MA = Manitoba
 NW = Northwest Territories
 NU = Nunavut
 ON = Ontario
 SA = Saskatchewan
 YU = Yukon Territory

→ YU:R | NW:B | NU:RG | BC:G | AL:R | SA:G | MA:RB | ON:RGB,

FORWARD CHECKING. NW has been assigned value B, as shown. Cross out all values that would be eliminated by Forward Checking (FC). The result is list of **Territory:Remaining Colors so that NU can be colored in R or G**:

YU	NW	NU	BC	AL	SA	MA	ON
RGB	B	RGB	RGB	RGB	RGB	RGB	RGB

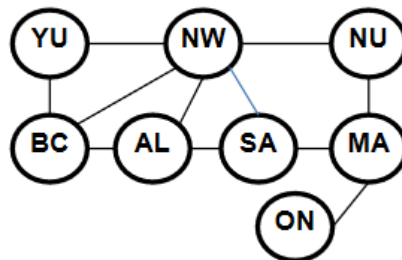


AL = Alberta
 BC = British Columbia
 MA = Manitoba
 NW = Northwest Territories
 NU = Nunavut
 ON = Ontario
 SA = Saskatchewan
 YU = Yukon Territory

→ YU:RG | NW:B | NU:RG | BC:RG | AL:RG | SA:RG | MA:RGB | ON:RGB,

DEGREE (or Most Constraining variable MCV) HEURISTIC. Consider the assignment below. AL has been assigned B and constraint propagation has been done, as shown. Ignoring the MRV heuristic, list all unassigned variables (in any order) that might be selected now by the Degree (MCV) Heuristic

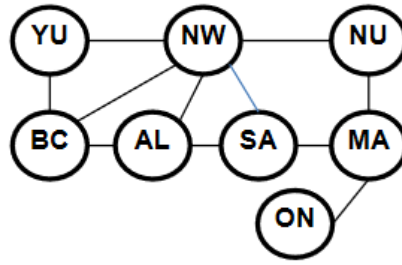
YU	NW	NU	BC	AL	SA	MA	ON
RGB	RG	RGB	RG	B	RG	RGB	RGB



AL = Alberta
 BC = British Columbia
 MA = Manitoba
 NW = Northwest Territories
 NU = Nunavut
 ON = Ontario
 SA = Saskatchewan
 YU = Yukon Territory

→ NW,

LEAST-CONSTRAINING-VALUE HEURISTIC. Consider the assignment below. AL has been assigned B and constraint propagation has been done, as shown. MA has been chosen as the next variable to explore. List the values for MA that would be explored first by the Least-Constraining-Value Heuristic (LCV).



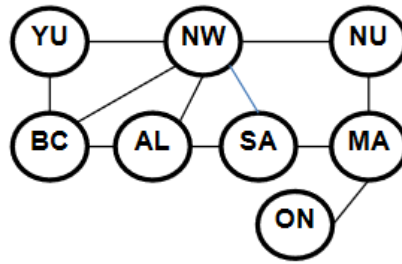
AL = Alberta
 BC = British Columbia
 MA = Manitoba
 NW = Northwest Territories
 NU = Nunavut
 ON = Ontario
 SA = Saskatchewan
 YU = Yukon Territory

YU	NW	NU	BC	AL	SA	MA	ON
RGB	RG	RGB	RG	B	RG	RGB	RGB

→ B,

MINIMUM-REMAINING-VALUES HEURISTIC. Consider the assignment below. AL has been assigned B and constraint propagation **has been done**, as shown. List all unassigned variables (in any order) that might be selected now by the **Minimum-Remaining-Values** (MRV) Heuristic:

YU	NW	NU	BC	AL	SA	MA	ON
RGB	RG	RGB	RG	B	RG	RGB	RGB



AL = Alberta
 BC = British Columbia
 MA = Manitoba
 NW = Northwest Territories
 NU = Nunavut
 ON = Ontario
 SA = Saskatchewan
 YU = Yukon Territory

→ BC,NW,SA

Question 9

Incorrect

Mark 0.00 out of 1.00

1 Minute: A consistent assignment is one in which every variable is assigned.

Select one:

- True **✘**
 False

The correct answer is 'False'.

◀ MidtermExam_Part3_Global_Search_IncludingAdversarial_MinMax

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Started on	Sunday, 20 June 2021, 2:32 PM
State	Finished
Completed on	Sunday, 20 June 2021, 3:13 PM
Time taken	40 mins 21 secs
Marks	19.45/22.50
Grade	18.59 out of 21.50 (86%)

Question 1

Partially correct

Mark 3.20 out of 4.00

7 minutes:

KB: 1- $P(w) \rightarrow Q(w)$ 2- $Q(y) \rightarrow S(y)$ 3- $\text{True} \rightarrow P(x) \vee R(x)$ 4- $R(w) \rightarrow S(w)$ Goal: 5- $S(A)$

3 in clausal form is:

 $P(x) \vee R(x)$ 

A possible refutation proof for the above after

conversion to

clausal form is as follows:

1+2 to generate 6; 6+3 to generate 7, 7+4 to generate 8; 8+query negation to generate the empty clause.



2 in clausal form is:

 $\sim Q(y) \vee S(y)$ 

KB in clausal form is HORN

Yes



1+2 in clausal form can resolve to give:

 $\sim P(w) \vee S(w)$ 

Your answer is partially correct.

You have correctly selected 4.

The correct answer is:

3 in clausal form is: $\rightarrow P(x) \vee R(x)$,A possible refutation proof for the above after conversion to clausal form is as follows: \rightarrow 1+2 to generate 6; 6+3 to generate 7, 7+4 to generate 8; 8+query negation to generate the empty clause.,2 in clausal form is: $\rightarrow \sim Q(y) \vee S(y)$,KB in clausal form is HORN \rightarrow No,1+2 in clausal form can resolve to give: $\rightarrow \sim P(w) \vee S(w)$

Question 2

Correct

Mark 1.00 out of 1.00

1.5 Minute: Match the statement and the formula (read K' as negation of K , for any formula K):

If formula K is Valid then K' is:	Unsatisfiable	✓
If formula K is Unsatisfiable then K' is:	Valid	✓
If formula K is Satisfiable then K' is:	Satisfiable or unsatisfiable	✓
The empty clause is never	Satisfiable	✓

Your answer is correct.

The correct answer is:

If formula K is Valid then K' is: \rightarrow Unsatisfiable,

If formula K is Unsatisfiable then K' is: \rightarrow Valid,

If formula K is Satisfiable then K' is: \rightarrow Satisfiable or unsatisfiable,

The empty clause is never \rightarrow Satisfiable

Question 3

Correct

Mark 1.00 out of 1.00

1 Minute: $(A \text{ AND } B) \models (A \Leftrightarrow B)$

Select one:

- True ✓
 False

The correct answer is 'True'.

Question 4

Correct

Mark 2.00 out of 2.00

In the sentences given below in the implicit quantifier form,

'Ali' is a constant and so is Dev and 'x' and 'y' are variables, and 'Mother' and 'Father' are functions.

\neg knows (Father(Ali), x) knows(y, Mother(y))

Which of the following substitutions unify the given expressions?

- a. {y/Dev, x/Mother{Ali}}
- b. Not Unifiable, No Unifier
- c. {y/Father{Ali}, x/Mother{Father{Ali}} ✔
- d. {y/Mother{Ali}, x/Father{Mother{Ali}}}
- e. {y/Ali, x/Dev}

Your answer is correct.

The correct answer is:

{y/Father{Ali}, x/Mother{Father{Ali}}}

Question 5

Correct

Mark 1.00 out of 1.00

1 Minute: $(A \Leftrightarrow B) \models (A \text{ AND } B)$

Select one:

- True
- False ✔

The correct answer is 'False'.

Question 6

Correct

Mark 1.00 out of 1.00

Which of the following are among NLP applications (mark all that apply):

- a. **Question answering** ✓
- b. **Storage of Arabic and English names of employees**
- c. **Text summarization** ✓
- d. **Named Entity Recognition (NER)** ✓
- e. **Code conversion of language letters**

Your answer is correct.

The correct answers are:

Named Entity Recognition (NER),

Text summarization,

Question answering

Question 7

Partially correct

Mark 0.75 out of 1.00

1.5 Minute: Match the statement and example (K' is the negation of K). If needed: use True/False to label statements, and 1 or 0 to denote formulas that are always true/false.

Derivable from $(B \rightarrow C), (A \vee B), (A \rightarrow C)$

C ✓

$(A \vee C')$, $(A' \vee C)$, (C') Can be proved by contradiction:

False ✓

Resolution of $A' \vee B, A \vee B'$

None of the mentioned ✗

Resolution of the clauses $(A), (A')$

Empty Clause ✓

Your answer is partially correct.

You have correctly selected 3.

The correct answer is:

Derivable from $(B \rightarrow C), (A \vee B), (A \rightarrow C) \rightarrow C,$

$(A \vee C')$, $(A' \vee C)$, (C') Can be proved by contradiction: \rightarrow False,

Resolution of $A' \vee B, A \vee B' \rightarrow 1$, Resolution of the clauses $(A), (A') \rightarrow$ Empty Clause

Question 8

Correct

Mark 1.50 out of 1.50

1 Minute: Match the sentence "All persons are mortal." with the corresponding formula

- a. $\exists x \text{ Person}(x) \Rightarrow \text{Mortal}(x)$
- b. None of the mentioned
- c. $\exists x \text{ Person}(x) \wedge \text{Mortal}(x)$
- d. $\forall x \text{ Person}(x) \wedge \text{Mortal}(x)$
- e. $\forall x \text{ Person}(x) \Rightarrow \text{Mortal}(x)$



Your answer is correct.

The correct answer is:

$\forall x \text{ Person}(x) \Rightarrow \text{Mortal}(x)$

Question 9

Correct

Mark 1.50 out of 1.50

1 Minute: Match the sentence "Everybody likes somebody." with the corresponding formula

- a. None of the mentioned
- b. $\forall x \forall y \text{ Person}(x) \wedge \text{Person}(y) \wedge \text{Likes}(x, y)$
- c. $\forall x \forall y \text{ Person}(x) \Rightarrow (\text{Person}(y) \wedge \text{Likes}(x, y))$
- d. $\forall x \exists y \text{ Person}(x) \Rightarrow (\text{Person}(y) \wedge \text{Likes}(x, y))$
- e. $\forall x \exists y \text{ Person}(x) \wedge \text{Person}(y) \wedge \text{Likes}(x, y)$



Your answer is correct.

The correct answer is:

$\forall x \exists y \text{ Person}(x) \Rightarrow (\text{Person}(y) \wedge \text{Likes}(x, y))$

Question 10

Incorrect

Mark 0.00 out of 2.00

Find a most general unifier (MGU) for the set $W = \{P(a, x, f(g(y))), P(z, f(z), f(u))\}$:

- a. $\{a/z, f(z)/x, g(y)/u\}$
- b. $\{a/z, f(a)/x, g(a)/u\}$
- c. None: they don't Unify
- d. $\{a/z, f(a)/x, g(y)/u\}$



Your answer is incorrect.

The correct answer is:

$\{a/z, f(a)/x, g(y)/u\}$

Question 11

Correct

Mark 4.00 out of 4.00

8 Minutes: Given Knowledge Base (KB) we need to decide whether or not the input goal is entailed by KB. The current KB is (given as clauses S1-S5)

S1: (P1 P2)

S2: (¬P1 P2)

S3: (P1 ¬P2)

S4: (¬P1 P3 ¬P4)

S5: (¬P1 P3 P2 P4)

The input goal sentence is: (P1 ∧ P2 ∧ P3).

1 is the logic constant that is always true.

S4 and S5 resolve to give

Don't resolve



The negated goal is:

(¬P1 ¬P2 ¬P3)



S1 and S5 resolve to give

(P3 P4 P2)



S3 and S4 resolve to give

(¬P2 P3)



The goal is derivable from KB (If YES, give a paper resolution REFUTATION proof and send the photo).

True



S5 and S3 resolve to give

1



S1 and S2 resolve to give

(P2)



Your answer is correct.

The correct answer is:

S4 and S5 resolve to give → Don't resolve, The negated goal is: → (¬P1 ¬P2 ¬P3),

S1 and S5 resolve to give → (P3 P4 P2),

S3 and S4 resolve to give → (¬P2 P3),

The goal is derivable from KB (If YES, give a paper resolution REFUTATION proof and send the photo). → True, S5 and S3 resolve to give → 1,

S1 and S2 resolve to give → (P2)

Question 12

Correct

Mark 1.00 out of 1.00

What is concerned with the (literal) meaning of words, phrases, and sentences.

- a. Pragmatics
- b. Semantics
- c. all of the mentioned
- d. Syntax
- e. None of the mentioned



Your answer is correct.

The correct answer is:
Semantics

Question 13

Correct

Mark 1.50 out of 1.50

1 Minute: Match the sentence "Everyone at BZU is smart." with the corresponding formula

- a. $\exists x \text{ Person}(x) \Rightarrow [\text{At}(x, \text{BZU})] \wedge \text{Smart}(x)$
- b. $\forall x \text{ Person}(x) \wedge \text{At}(x, \text{UCI}) \wedge \text{Smart}(x)$
- c. $\forall x [\text{Person}(x) \wedge \text{At}(x, \text{BZU})] \Rightarrow \text{Smart}(x)$
- d. None of the mentioned
- e. $\exists x \text{ Person}(x) \wedge \text{At}(x, \text{BZU}) \wedge \text{Smart}(x)$



Your answer is correct.

The correct answer is:
 $\forall x [\text{Person}(x) \wedge \text{At}(x, \text{BZU})] \Rightarrow \text{Smart}(x)$

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Started on Sunday, 20 June 2021, 3:13 PM

State Finished

Completed on Sunday, 20 June 2021, 3:43 PM

Time taken 30 mins 7 secs

Grade 19.00 out of 19.50 (97%)

Question 1

Correct

Mark 1.00 out of 1.00

Match the following NLP related tasks:

Textual Entailment	Does one natural language text entail a given sentence.	✓
Anaphora Resolution	Determine the entity referred to by a natural language pronoun.	✓
Information Extraction	Does one database tuple follow from a given text.	✓

Your answer is correct.

The correct answer is:

Textual Entailment → Does one natural language text entail a given sentence.,

Anaphora Resolution → Determine the entity referred to by a natural language pronoun.,

Information Extraction → Does one database tuple follow from a given text.

Question 2

Partially correct

Mark 0.50 out of 1.00

Which sentences are ambiguous. Mark all the apply.

- a. "رأيت الرجل يلعب مع صديقه وابنه" ✓
- b. "I saw the man on the hill with a telescope." ✓
- c. "رأيت الرجل يلعب الجولف مع صديقه" ✗
- d. "Ali and Sama visited their home town"

Your answer is partially correct.

You have selected too many options.

The correct answers are: "I saw the man on the hill with a telescope., "رأيت الرجل يلعب مع صديقه وابنه"

Question 3

Correct

Mark 1.00 out of 1.00

In Communication using NLP, for the **speaker** one needs the following steps: Generation, Synthesis, Intention: what is the order:

Intention	1	✓
Generation	2	✓
Synthesis	3	✓

Your answer is correct.

The correct answer is:

Intention → 1,

Generation → 2,

Synthesis → 3

Question 4

Correct

Mark 1.00 out of 1.00

Which of the following tasks/application rely heavily on NLP(mark all that apply):

- a. **Storage of Arabic and English place of residence for employees**
- b. Web Question Answering
- c. **Dialect Identification in Arabic**
- d. **Text to Speech (TTS)**
- e. Inference in First Order Logic



Your answer is correct.

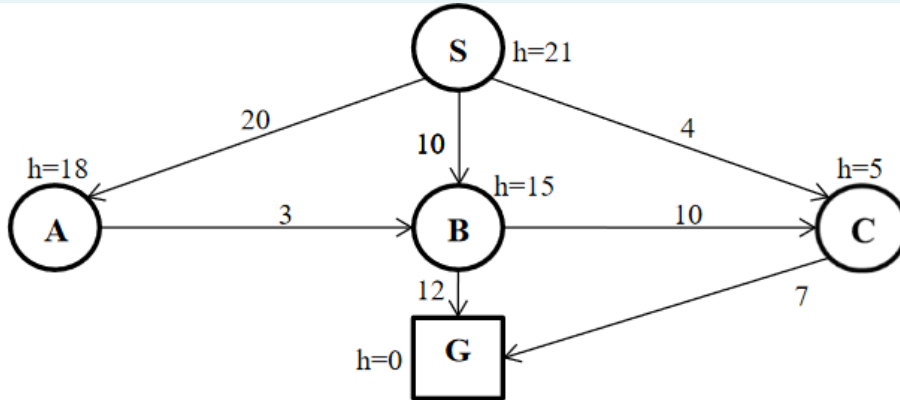
The correct answers are: Web Question Answering,
Text to Speech (TTS), Dialect Identification in Arabic

Question 5

Correct

Mark 6.00 out of 6.00

7 Minutes: Given the following graph, with start node S, Goal Node G and arc label is cost and h is the heuristic. Answer the questions below for each type of search. Left to right is the default and needs to be followed when necessary. You are asked to find the nodes expanded, path to goal and cost of path to goal for 6 search algorithms studied in class (18 answers).



UNIFORM COST SEARCH: Order of expansion

S C B G



ITERATIVE DEEPENING SEARCH: Path to goal found cost:

22



A* SEARCH: Path to goal found cost:

11



DEPTH-FIRST SEARCH: Path to goal found: [order by listing]

S A B G



A* SEARCH: Order of expansion [order using listing]

S C G



ITERATIVE DEEPENING SEARCH: Path to goal found: [order using arrows]

S--> B--> G



ITERATIVE DEEPENING SEARCH: Order of expansion

S S A B G



h in this case is admissible

True



Your answer is correct.

The correct answer is:

UNIFORM COST SEARCH: Order of expansion → S C B G,

ITERATIVE DEEPENING SEARCH: Path to goal found cost: → 22,

A* SEARCH: Path to goal found cost: → 11,

DEPTH-FIRST SEARCH: Path to goal found: [order by listing] → S A B G,

A* SEARCH: Order of expansion [order using listing] → S C G,

ITERATIVE DEEPENING SEARCH: Path to goal found: [order using arrows] → S--> B--> G,

ITERATIVE DEEPENING SEARCH: Order of expansion → S S A B G,

h in this case is admissible → True

Question 6

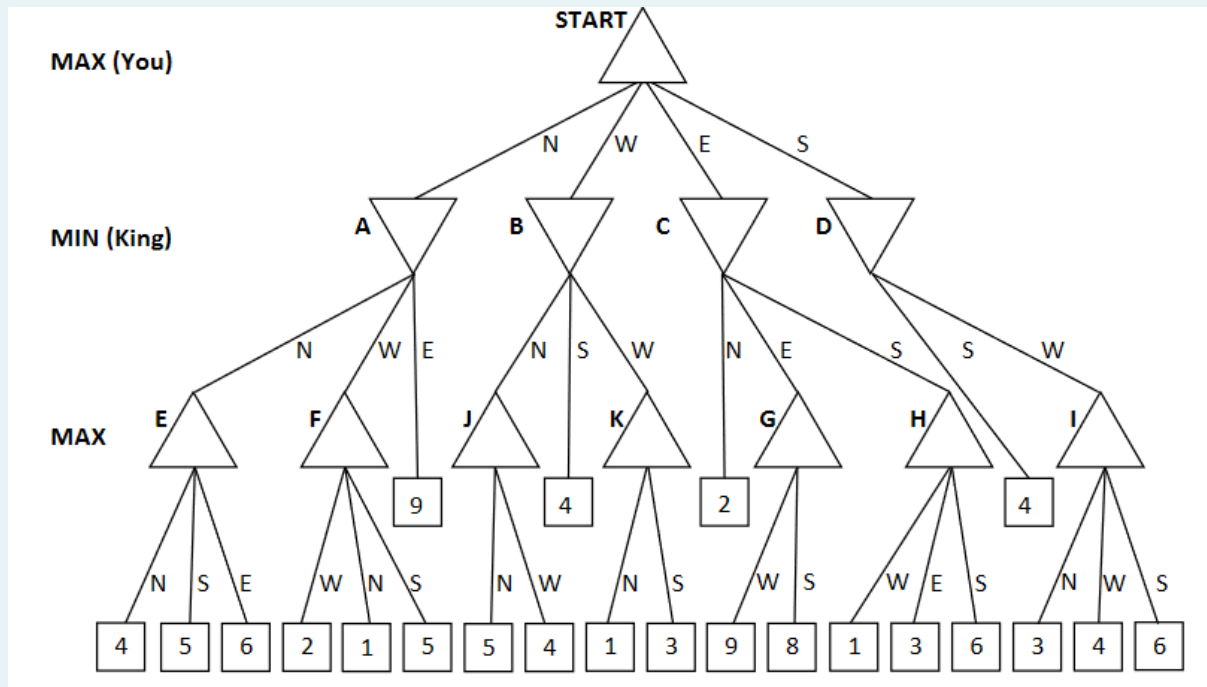
Correct

Mark 5.00 out of 5.00

6 Minutes:In the following graph: you are MAX and king is MIN. Nodes are named by letters of the alphabet (A,B,...).

Edges with directions (N,E,W,S) and leaf nodes are referenced by the parent node and edge: so the rightmost leaf is I-S and the leftmost is E-N and the leaf A-E has the value 9.

We'll perform Minimax search with and without pruning (alpha,Beta). Please answer the following questions.



After full evaluation with no pruning: G=	9	✓
After evaluation with pruning: F-S is pruned	False	✓
After evaluation with pruning: C-E is pruned	True	✓
After evaluation with pruning: I-W is pruned	True	✓
After full evaluation with no pruning: C=	2	✓
After full evaluation with no pruning: E=	6	✓
After full evaluation with no pruning: D=	4	✓
After evaluation with pruning: A-E is pruned	False	✓
After full evaluation with no pruning: A=	5	✓
After full evaluation with no pruning: Start=	5	✓

Your answer is correct.

The correct answer is:

After full evaluation with no pruning: G= → 9,

After evaluation with pruning: F-S is pruned → False,

After evaluation with pruning: C-E is pruned → True,

After evaluation with pruning: I-W is pruned \rightarrow True,
After full evaluation with no pruning: C= \rightarrow 2,
After full evaluation with no pruning: E= \rightarrow 6,
After full evaluation with no pruning: D= \rightarrow 4,
After evaluation with pruning: A-E is pruned \rightarrow False,
After full evaluation with no pruning: A= \rightarrow 5,
After full evaluation with no pruning: Start= \rightarrow 5

Question 7

Correct

Mark 1.50 out of 1.50

What is the evaluation function in Uniform Cost Search approach?

- a. Average of Path cost from start node to current node and Heuristic cost
- b. Heuristic function
- c. None of the mentioned
- d. Path cost from start node to current node + Heuristic cost
- e. Path cost from start node to current node



Your answer is correct.

The correct answer is:

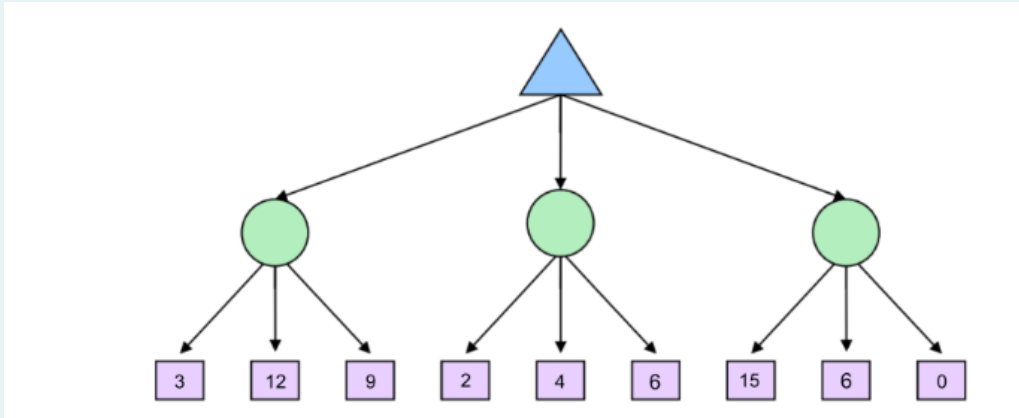
Path cost from start node to current node

Question 8

Correct

Mark 3.00 out of 3.00

3 Minutes: Given the following two-player game tree (where root is max)



The pruned nodes are:

- a. 4 and 6 in the middle subtree
- b. the entire rightmost subtree
- c. None of the mentioned.
- d. all leaves with value 6.
- e. 6 and 0 in the rightmost subtree



Your answer is correct.

The correct answer is:

4 and 6 in the middle subtree

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Started on Sunday, 20 June 2021, 3:45 PM

State Finished

Completed on Sunday, 20 June 2021, 4:39 PM

Time taken 54 mins 27 secs

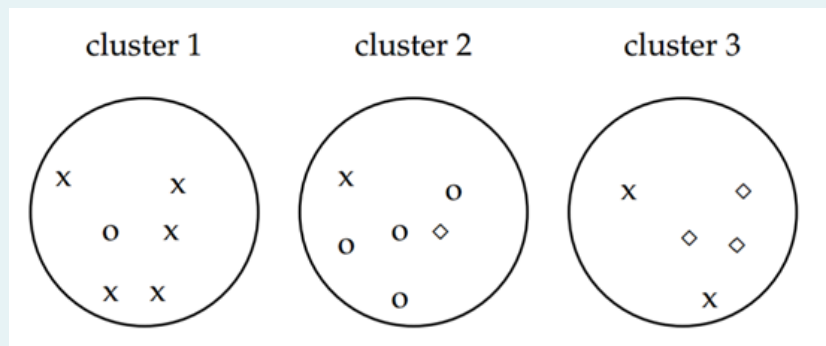
Grade 21.93 out of 27.50 (80%)

Question 1

Correct

Mark 2.00 out of 2.00

Given the following clustering results: 3 clusters A,B,C the Purity for Clusters 1,2,3 : the entire clustering system (1,2,3) are:



- a. 0.16, 0.67, 0.60: 0.48
- b. 0.83, 0.67, 0.60: 0.70
- c. None of the mentioned
- d. 0.83, 0.60, 0.60: 0.68



Your answer is correct.

The correct answer is:

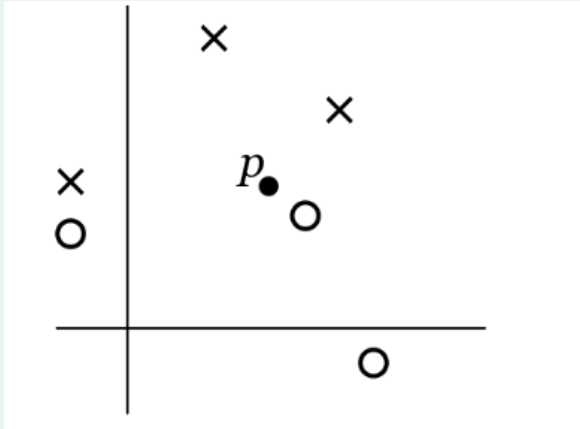
0.83, 0.67, 0.60: 0.70

Question 2

Correct

Mark 1.00 out of 1.00

We would like to use K-Nearest Neighbor to classify the point p as either X or O using the training data shown below. What is the prediction if Euclidean distance is used: for $K=1$ and $K=5$



- a. $K=1$: O, $K=5$: X
- b. $K=1$: X, $K=5$: X
- c. $K=1$: O, $K=5$: O
- d. None of the mentioned
- e. $K=1$: X, $K=5$: O



Your answer is correct.

The correct answer is:

$K=1$: O, $K=5$: X

Question 3

Correct

Mark 1.00 out of 1.00

All leaf nodes of the decision tree should end with one single value (never more than one) of the classification category.

Select one:

- True
- False

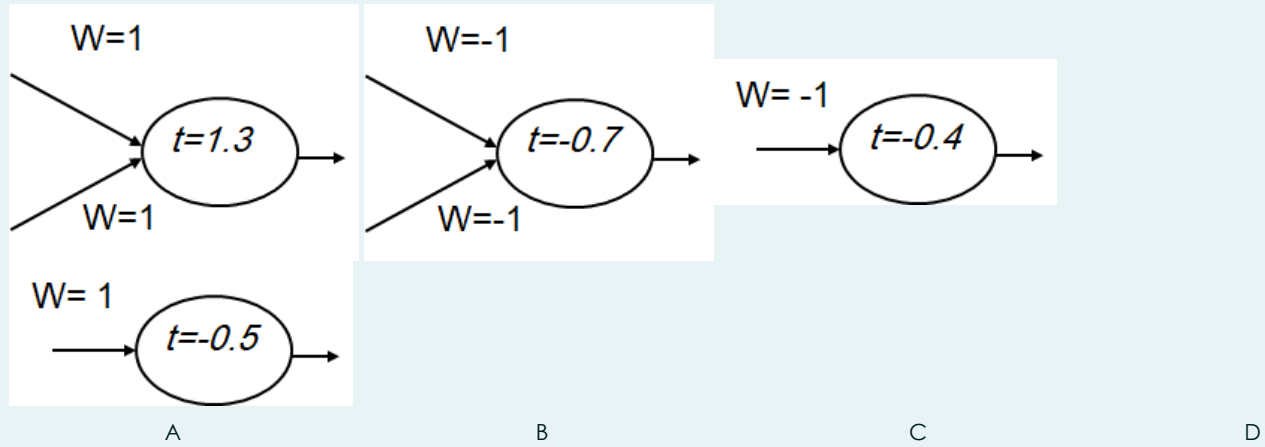
The correct answer is 'True'.

Question 4

Correct

Mark 2.00 out of 2.00

4 minutes: In the following figures with ANN what is the functions done by A,B,C,D. If needed assume active high logic.



- a. AND,NAND,NOT,Buffer
- b. None of the mentioned
- c. AND,NOR,NOT,Buffer
- d. OR,AND,Buffer,NOT
- e. NAND,NOR,NOT,Buffer

✓ NAND,OR,Buffer,NOT

Your answer is correct.

The correct answer is:
AND,NOR,NOT,Buffer

Question 5

Correct

Mark 1.00 out of 1.00

Supervised learning requires a set of examples with known outcomes for training.

Select one:

- True ✓
- False

The correct answer is 'True'.

Question 6

Partially correct

Mark 3.43 out of 4.00

7 minutes: We are doing K-Means for $K=2$ (Clusters C1 and C2) and the distance is $|\text{mean} - \text{Datapoint value}|$. The initial seeds for C1 and C2, respectively, are

$M1=4$ and $M2 = 11$. After the first iteration the clustering is as follows table:

Datapoint	D1	D2	Cluster
2	2	9	C1
4	0	7	C1
10	6	1	C2
12	8	1	C2
3	1	8	C1
20	16	9	C2
30	26	19	C2
11	7	0	C2
25	21	14	C2

How many iterations are needed to stop (which iteration produces no changes first)



The clusters after the second iteration are:



The means for third (3rd) iteration are:



The clusters after third (3rd) iteration are:



The clusters after fourth (4th) iteration are:



The means for the second (2nd) iteration are:



The means for fourth (4th) iteration are:



Your answer is partially correct.

You have correctly selected 6.

The correct answer is: How many iterations are needed to stop (which iteration produces no changes first) → 4,

The clusters after the second iteration are: → $C1 = \{2, 3, 4, 10\}$ and $C2 = \{12, 20, 30, 11, 25\}$,

The means for third (3rd) iteration are: → $M1 = 4.75$ and $M2 = 19.6$,

The clusters after third (3rd) iteration are: → $C1 = \{2, 3, 4, 10, 12, 11\}$ $C2 = \{20, 30, 25\}$,

The clusters after fourth (4th) iteration are: → $C1 = \{2, 3, 4, 10, 12, 11\}$ $C2 = \{20, 30, 25\}$,

The means for the second (2nd) iteration are: → $M1 = 3$ and $M2 = 18$,

The means for fourth (4th) iteration are: → $M1 = 7$ and $M2 = 25$

Question 7

Incorrect

Mark 0.00 out of 1.50

If precision $p=0.6$, $F1=0.48$ then recall $r=$

- a. 0.5
- b. 0.6
- c. 0.4
- d. 0.4
- e. 0.45



Your answer is incorrect.

The correct answer is:

0.4

Question 8

Incorrect

Mark 0.00 out of 1.50

4 minutes: The perceptron can be used to implement linearly separable functions.

Given the following 4 gates which ones can be implemented using a preceptron (yes) and which cannot (no).

- a. None of the mentioned
- b. AND (yes), Buffer (no), NOR(yes), Equivalence(no)
- c. OR (yes), Not (yes), NOR(yes), Equivalence(yes)
- d. OR (yes), Not (yes), NAND(yes), Equivalence(no)
- e. OR (yes), Not (yes), NAND(no), Equivalence(no)



Your answer is incorrect.

The correct answer is:

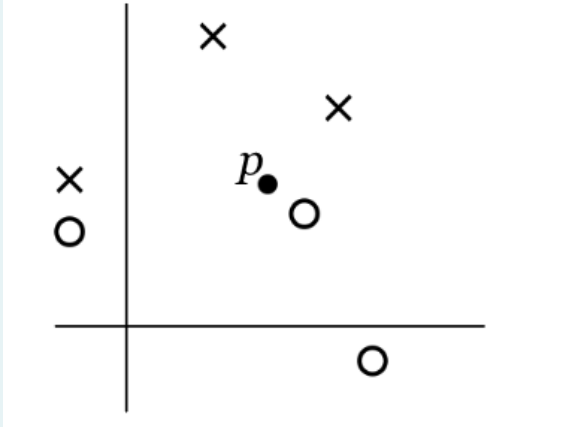
OR (yes), Not (yes), NAND(yes), Equivalence(no)

Question 9

Correct

Mark 1.00 out of 1.00

We would like to use K-Nearest Neighbor to classify the point p as either X or O using the training data shown below. What is the prediction if Euclidean distance is used: for $K=1$ and $K=3$



- a. $K=1$: X, $K=3$: X
- b. $K=1$: O, $K=3$: O
- c. $K=1$: X, $K=3$: O
- d. None of the mentioned
- e. $K=1$: O, $K=3$: X



Your answer is correct.

The correct answer is:

$K=1$: O, $K=3$: X

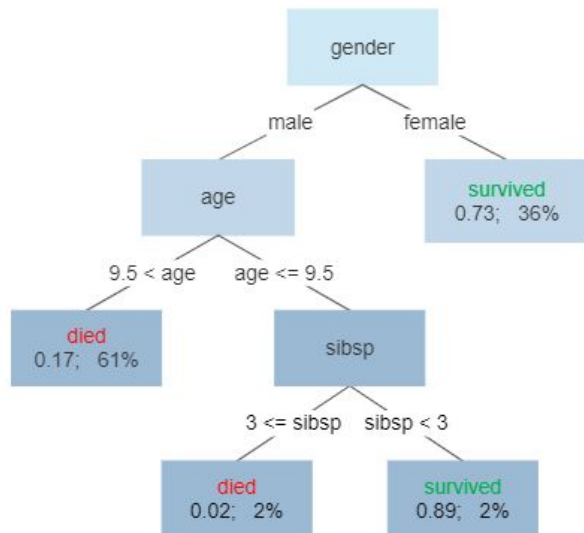
Question 10

Partially correct

Mark 1.00 out of 2.00

Given the following decision tree on survival of Titanic passengers:

Survival of passengers on the Titanic



Survived= ❌

died= ✅

Your answer is partially correct.

You have correctly selected 1.

The correct answer is:

Survived= \rightarrow (gender=female) or (gender =male and age,

died= \rightarrow (gender=male and age>9.5) or (gender =male and age=3)

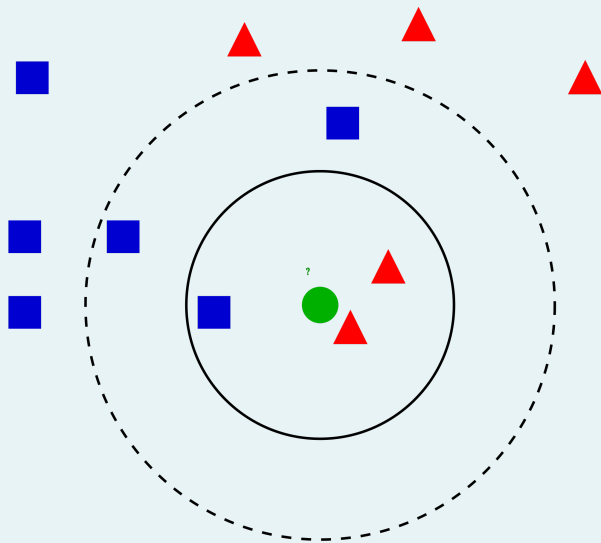
Question 11

Incorrect

Mark 0.00 out of 1.00

We would like to use K-Nearest Neighbor to classify the green point as either red (R) or blue (B) using the training data shown below.

What is the prediction if Euclidean distance is used



- a. K=2: B, K=4: B
- b. K=2: B, K=4: R
- c. None of the mentioned
- d. K=2: Unknown, K=4: Unknown
- e. K=2: R, K=4: R
- f. K=2: R, K=4: B
- g. K=2: Unknown, K=4: B
- h. K=2: R, K=4: Unknown

✘

Your answer is incorrect.

The correct answer is:

K=2: R, K=4: Unknown

Question 12

Correct

Mark 2.00 out of 2.00

5 minutes: Given the following dataset:

Example No.	Color	Type	Origin	Stolen?
1	Red	Sports	Domestic	Yes
2	Red	Sports	Domestic	No
3	Red	Sports	Domestic	Yes
4	Yellow	Sports	Domestic	No
5	Yellow	Sports	Imported	Yes
6	Yellow	SUV	Imported	No
7	Yellow	SUV	Imported	Yes
8	Yellow	SUV	Domestic	No
9	Red	SUV	Imported	No
10	Red	Sports	Imported	Yes

The likelihood: $P(\text{origin}=\text{imported} \mid \text{stolen}=\text{No})$ = as a fraction:

2/5

The likelihood: $P(\text{color}=\text{sports} \mid \text{stolen}=\text{Yes})$ = as a percentage:

80%

The likelihood: $P(\text{type}=\text{SUV} \mid \text{stolen}=\text{Yes})$ = as a percentage:

20%

The likelihood: $P(\text{color}=\text{Yellow} \mid \text{stolen}=\text{Yes})$ = as a percentage:

40%

The likelihood: $P(\text{color}=\text{Yellow} \mid \text{stolen}=\text{No})$ = as a fraction:

3/5



Your answer is correct.

The correct answer is:

The likelihood: $P(\text{origin}=\text{imported} \mid \text{stolen}=\text{No})$ = as a fraction: → 2/5,The likelihood: $P(\text{color}=\text{sports} \mid \text{stolen}=\text{Yes})$ = as a percentage: → 80%,The likelihood: $P(\text{type}=\text{SUV} \mid \text{stolen}=\text{Yes})$ = as a percentage: → 20%,The likelihood: $P(\text{color}=\text{Yellow} \mid \text{stolen}=\text{Yes})$ = as a percentage: → 40%,The likelihood: $P(\text{color}=\text{Yellow} \mid \text{stolen}=\text{No})$ = as a fraction: → 3/5

Question 13

Correct

Mark 2.50 out of 2.50

5 minutes: In an experiment: we have 1000 cases (instances) with class positive/negative
Our system tested the 1000 and 100 were declared positive. 90 were really positive.
The total number of real positive is 160.

TP (false Positive) count=	90	✓
recall r=	0.56	✓
TN (true Negative) count=	830	✓
precision p=	0.9	✓
FN (false Negative) count=	70	✓
FP (false Positive) count=	10	✓
accuracy=	0.92	✓

Your answer is correct.

The correct answer is:

TP (false Positive) count= → 90,

recall r= → 0.56,

TN (true Negative) count= → 830,

precision p= → 0.9,

FN (false Negative) count= → 70,

FP (false Positive) count= → 10,

accuracy= → 0.92

Question 14

Correct

Mark 1.00 out of 1.00

How many lectures did you miss during the current semester for this course?

Missing a lecture means attending less than half a lecture at any one time.

كم عدد المرات التي تغيبت فيها عن محاضرات هذا المساق خلال الفصل

التغيب يعني عدم الحضور أو حضور أقل من نصف المحاضرة في أي مرة خلال الفصل

أي جواب علامة كاملة. عدم الإجابة تنقص 3 علامات

- a. 12-15
- b. 5-6
- c. 7-9
- d. 3-4
- e. 1-2
- f. 10-12
- g. 0



Your answer is correct.

The correct answers are:

0,

1-2,

3-4,

5-6,

7-9,

10-12,

12-15

Question 15

Correct

Mark 4.00 out of 4.00

8 minutes: For the Play or not to Play problem based on weather conditions, we had the following tables:

$$P(y|x_1, \dots, x_n) = \frac{P(y) \prod_{i=1}^n P(x_i|y)}{P(x_1)P(x_2)\dots P(x_n)}$$

Outlook

	Yes	No	P(Yes)	P(no)
Sunny	2	3	2/9	3/5
Overcast	4	0	4/9	0/5
Rainy	3	2	3/9	2/5
Total	9	5	100%	100%

Temperature

	Yes	No	P(Yes)	P(no)
Hot	2	2	2/9	2/5
Mild	4	2	4/9	2/5
Cool	3	1	3/9	1/5
Total	9	5	100%	100%

Humidity

	Yes	No	P(Yes)	P(no)
High	3	4	3/9	4/5
Normal	6	1	6/9	1/5
Total	9	5	100%	100%

Wind

	Yes	No	P(Yes)	P(no)
False	6	2	6/9	2/5
True	3	3	3/9	3/5
Total	9	5	100%	100%

Play		P(Yes)/P(No)
Yes	9	9/14
No	5	5/14
Total	14	100%

If $\text{today} = (\text{Sunny}, \text{Hot}, \text{High}, \text{True})$

The prediction for Today is:

Play=No ✓

For Today: $P(\text{Play}=\text{No} | \text{Today}) =$

0.041 ✓

For Today: $P(\text{Play}=\text{Yes} | \text{Today}) =$

0.0035 ✓

Your answer is correct.

The correct answer is:

The prediction for Today is: $\rightarrow \text{Play}=\text{No},$

For Today: $P(\text{Play}=\text{No} | \text{Today}) = \rightarrow 0.041,$

For Today: $P(\text{Play}=\text{Yes} | \text{Today}) = \rightarrow 0.0035$

◀ Part3OfFinalExam

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