

Key Sample-4 (Page 1 of 2)

A* SEARCH: S -> G

Expanded	Search Fringe (g+h=f)
S	B(5+5=10)
B	J(6+7=13), C(10+4=14), I(12+6=18), E(14+5=19)
J	C(10+4=14), I(8+6=14), K(8+7=15), E(14+5=19)
C	I(8+6=14), K(8+7=15), G(16+0=16), C(14+4=18), E(14+5=19)
I	K(8+7=15), G(16+0=16), C(14+4=18), I(12+6=18), E(14+5=19) H(17+5=22)
K	H(10+5=15), G(16+0=16), C(14+4=18), I(12+6=18), E(14+5=19)
H	F(11+3=14), G(16+0=16), C(14+4=18), I(12+6=18), E(14+5=19) H(17+5=22)
F	G(16+0=16), C(14+4=18), I(12+6=18), E(14+5=19), H(17+5=22)
G	[]
	Solution path: S -> B -> C -> G

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Question 2: Alpha-Beta Minimax
A=13

B=13

C=13

D=13

E=13

F=13

H=3

I=13

J=13

K=8

L=13

M=3

N=3

O=5

Pruned Nodes: G, K, N, O

Question 3: Decision Tree
Information Gain Computations:

Node: Wind

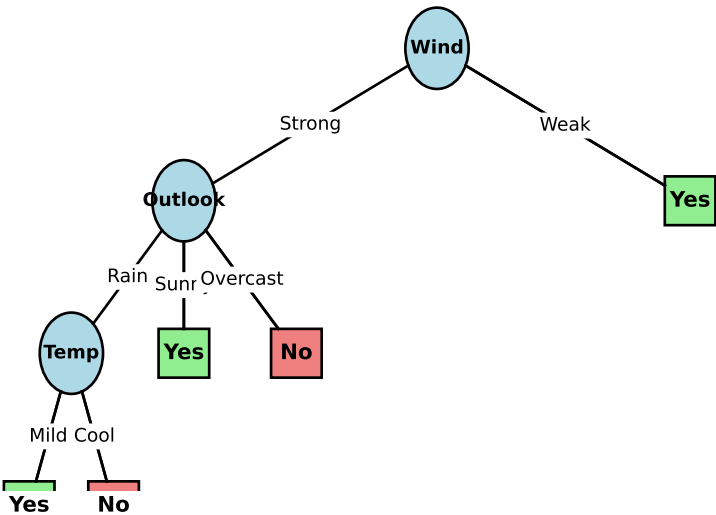
- ✓ Wind: 0.3476
- Outlook: 0.2657
- Temp: 0.2657

Node: Outlook

- ✓ Outlook: 0.5710
- Temp: 0.4200

Node: Temp

- ✓ Temp: 1.0000



Question 4: First-Order Logic Translation

Predicates: Market(x), Vendor(x), SellsAt(x, x), Local(x)

a. English to First-Order Logic:

1. Every market has vendors.

Solution: $\forall x (Market(x) \Rightarrow \exists y (Vendor(y) \wedge SellsAt(y, x)))$

2. Local vendors sell at markets that have other local vendors.

Solution: $\forall x (Vendor(x) \wedge Local(x) \Rightarrow \exists y (Market(y) \wedge SellsAt(x, y) \wedge \exists z (Vendor(z) \wedge Local(z) \wedge SellsAt(z, y) \wedge \neg(x=z))))$

3. There is a market where all vendors are local.

Solution: $\exists x (Market(x) \wedge \forall y (Vendor(y) \wedge SellsAt(y, x) \Rightarrow Local(y)))$

b. First-Order Logic to English:

1. $\forall x (Market(x) \Rightarrow \exists y (Vendor(y) \wedge SellsAt(y, x) \wedge Local(y)))$

Solution: Every market has at least one vendor who is local.

2. $\exists x (Vendor(x) \wedge Local(x) \wedge \forall y (Market(y) \wedge SellsAt(x, y) \Rightarrow Local(x)))$

Solution: There exists a local vendor such that if they sell at any market, then they are local.

3. $\forall x \forall y (Vendor(x) \wedge Market(y) \wedge SellsAt(x, y) \Rightarrow \exists z (Vendor(z) \wedge SellsAt(z, y) \wedge \neg(x=z)))$

Solution: For every vendor at a market, there exists another vendor at the same market.