Key Sample-2 (Page 1 of 2)

A* SEARCH: S -> G

Expanded	Search Fringe (g+h=f)
S	H(6+6=12), B(10+6=16), E(10+7=17)
H	D(7+6=13), G(14+0=14), F(13+2=15), B(10+6=16), E(10+7=17)
D	G(14+0=14), J(13+1=14), F(13+2=15), B(10+6=16), E(10+7=17) C(17+6=23)
G	[]
	Solution path: S -> H -> G

Key Sample-2 (Page 2 of 2)

Question 2: Alpha-Beta Minimax

A=13

B=13 **C=12**

D=14 **E=13** **F=12**

H=10 **I=14** **J=4** **K=13** **L=12** **M=4** **N=12** **O=14**

Pruned Nodes: G, N, O

Question 3: Decision Tree

Information Gain Computations:

Node: Outlook

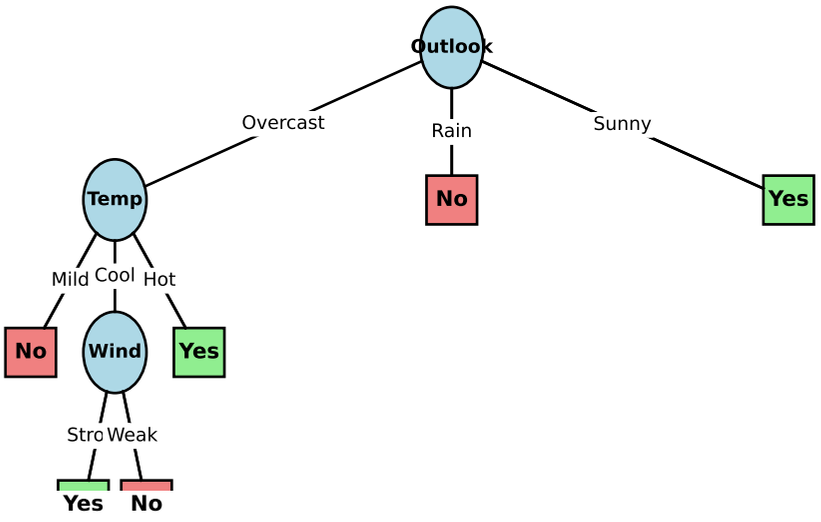
✓ Outlook: 0.5000
Wind: 0.0488
Temp: 0.0000

Node: Temp

✓ Temp: 0.5000
Wind: 0.0000

Node: Wind

✓ Wind: 1.0000



Question 4: First-Order Logic Translation

Predicates: Book(x), Author(x, x), Popular(x), Reads(x, x)

a. English to First-Order Logic:

1. Popular books are read by many people.

   Solution: $\forall x\ (Popular(x) \land Book(x) \Rightarrow \exists y\ Reads(y, x))$

2. People who read books by the same author like similar books.

   Solution: $\forall x\ \forall y\ \forall z\ (Reads(x, y) \land Reads(x, z) \land Book(y) \land Book(z) \land \exists w\ (Author(y, w) \land Author(z, w)) \Rightarrow \exists v\ (Reads(x, v) \land Book(v)))$

3. Every book has an author.

   Solution: $\forall x\ (Book(x) \Rightarrow \exists y\ Author(x, y))$

b. First-Order Logic to English:

1. $\forall x\ (Book(x) \Rightarrow \exists y\ (Author(x, y) \land Popular(y)))$

   Solution: Every book has an author who is popular.

2. $\exists x\ (Book(x) \land \forall y\ (Reads(y, x) \Rightarrow Popular(x)))$

   Solution: There exists a book such that if anyone reads it, then that book is popular.

3. $\forall x\ \forall y\ (Book(x) \land Author(x, y) \Rightarrow \exists z\ (Reads(z, x) \land \exists w\ (Book(w) \land Author(w, y) \land Reads(z, w))))$

   Solution: For every book and its author, there exists someone who reads the book and also reads another book by the same author.