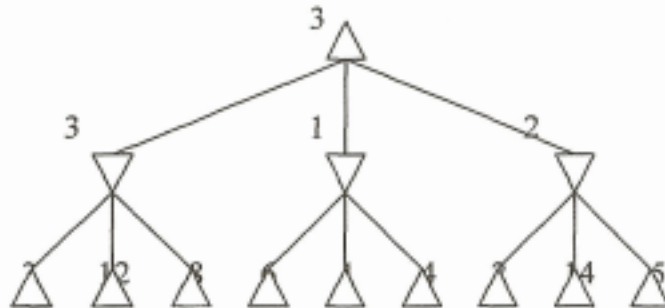


2002 Comprehensive Examination Artificial Intelligence

1. Search.



- (a) Left is the best move for the maximizer. Left is the best response for the minimizer.
 (b) Unexpanded nodes are those with values 4, 14, and 5.

2. Logic.

- (a) True
 (b) False
 (c) True
 (d) False
 (e) True

3. Automated Reasoning.

1. $\{p(x, f(x))\}$
2. $\{p(f(x), x)\}$
3. $\{\neg p(x, y), \neg p(y, z), p(x, z)\}$
4. $\{\neg p(c, c)\}$
5. $\{\neg p(c, y), \neg p(y, c)\}$
6. $\{p(f(c), c)\}$
7. $\{\}$

4. Probability.

$$\begin{aligned} p(b1|r) &= p(r|b1) * p(b1) / p(r) \\ &= 2/11 * 1/3 / (2/11 + 4/9 + 3/10) * 1/3 \\ &= 0.1963 \end{aligned}$$

5. Belief Networks.

$$\begin{aligned} p(-a, -b, c, d, e) &= p(-a) * p(-b) * p(c|-a, -b) * p(d|c) * p(e, c) \\ &= 0.9 * 0.8 * 0.1 * 0.9 * 0.7 \\ &= 0.04536 \end{aligned}$$