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CPTS 440

Artificial Intelligence

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Homework #6

1.

A)

$\forall x \text{ Like}(x, \text{Computers}) \Rightarrow \text{Like}(x, \text{Coding})$

$\forall x (\text{Like}(x, \text{Coding}) \wedge \text{Like}(x, \text{Chess})) \Rightarrow \text{Learn}(x, \text{AI})$

$\forall x \exists y \text{ Learn}(x, \text{AI}) \Rightarrow \text{Hire}(y, x)$

$\forall x \exists y \text{ Hire}(y, x) \Rightarrow (\text{Rich}(x) \wedge \text{Famous}(x))$

B)

1. $\neg \text{Like}(x, \text{Computers}) \vee \text{Like}(x, \text{Coding})$

2. $\neg \text{Like}(x, \text{Coding}) \vee \neg \text{Like}(x, \text{Chess}) \vee \text{Learn}(x, \text{AI})$

3. $\neg \text{Learn}(x, \text{AI}) \vee \text{Hire}(\text{F1}(x), x)$

4. $\neg \text{Hire}(\text{F1}(x), x) \vee \text{Rich}(x) \wedge \vee \text{Famous}(x)$

C)

Step	Clause	Clauses Used	Substitutions
1	$\neg \text{Like}(x, \text{Computers}) \vee \text{Like}(x, \text{Coding})$	.	.
2	$\neg \text{Like}(x, \text{Coding}) \vee \neg \text{Like}(x, \text{Chess}) \vee \text{Learn}(x, \text{AI})$	.	.
3	$\neg \text{Learn}(x, \text{AI}) \vee \text{Hire}(\text{F1}(x), x)$	.	.
4	$(\neg \text{Hire}(\text{F1}(x), x) \vee \text{Rich}(x)) \wedge (\neg \text{Hire}(\text{F1}(x), x) \vee \text{Famous}(x))$	.	.
5	$\text{Like}(\text{Larry}, \text{Computers})$	.	.
6	$\text{Like}(\text{Larry}, \text{Chess})$	.	.
7	$\neg \text{Rich}(\text{Larry})$	.	.
8	$\text{Like}(x1, \text{Coding})$	1, 5	$x1 = \text{Larry}$
9	$\text{Like}(x2, \text{Coding}) \vee \text{Like}(x2, \text{Chess})$	6, 8	$x2 = \text{Larry}$
10	$\text{Learn}(x3, \text{AI})$	2, 9	$x3 = \text{Larry}$
11	$\text{Hire}(\text{F1}(x4), x4)$	3, 10	$x4 = \text{Larry}$
12	$\text{Rich}(x5)$	11, 4	$x5 = \text{Larry}$
13	Proof by Refutation	7, 12	.

D)

Step	Clause	Clauses Used	Substitutions
1	$\neg \text{Like}(x, \text{Computers}) \vee \text{Like}(x, \text{Coding})$	.	.
2	$\neg \text{Like}(x, \text{Coding}) \vee \neg \text{Like}(x, \text{Chess}) \vee \text{Learn}(x, \text{AI})$	.	.
3	$\neg \text{Learn}(x, \text{AI}) \vee \text{Hire}(\text{F1}(x), x)$	.	.
4	$(\neg \text{Hire}(\text{F1}(x), x) \vee \text{Rich}(x)) \wedge (\neg \text{Hire}(\text{F1}(x), x) \vee \text{Famous}(x))$	.	.
5	$\text{Learn}(x, \text{AI})$	.	.
6	$\neg \text{Famous}(x)$	.	.
7	$\text{Hire}(\text{F1}(x_1), x_1)$	3, 5	$x_1 = x$
8	$\text{Famous}(x_2)$	4, 7	$x_2 = x$
9	Proof by Refutation	6, 8	.