פתרון תרגיל 14 – לוגיקה 2011

פתרון החלק הראשון של התרגיל:

.1

$$
\begin{array}{ll}
1.\ N \to W & \\
2.\ B \to S & /\therefore (N \cdot B) \to (W \cdot S) \\
\rightarrow 3.\ N \cdot B & \\
4.\ N & 3, Simp \\
5.\ B & 3, Simp \\
6.\ W & 1,4, M.P. \\
7.\ S & 2,5, M.P. \\
8.\ W \cdot S & 6,7, Conj \\
9.\ (N \cdot B) \to (W \cdot S) & 3-8, C.P.
\end{array}
$$

.2

$$
\begin{array}{ll}
1.\ T \to B & \\
2.\ M \to D & /\therefore (T \vee M) \to (B \vee D) \\
\rightarrow 3.\ T \vee M & \\
4.\ (T \to B) \cdot (M \to D) & 1,2, Conj \\
5.\ B \vee D & 3,4, C.D. \\
6.\ (T \vee M) \to (B \vee D) & 3-5, C.P.
\end{array}
$$

.3

1. $E \rightarrow N$
2. $E \rightarrow (N \rightarrow M)$
3. $N \rightarrow (M \rightarrow B) \quad / \therefore E \rightarrow B$
4. E
5. $N \quad 1,4, M.P.$
6. $N \rightarrow M \quad 2,4, M.P.$
7. $M \quad 5,6, M.P.$
8. $M \rightarrow B \quad 3,5, M.P.$
9. $B \quad 7,8, M.P.$
10. $E \rightarrow B \quad 4-9, C.P.$

.4

1. $R \rightarrow (T \vee S)$
2. $N \rightarrow (S \vee B)$
3. $\sim S \quad / \therefore (\sim T \cdot \sim B) \rightarrow (\sim R \cdot \sim N)$
4. $\sim T \cdot \sim B$
5. $\sim T \quad 4, Simp$
6. $\sim T \cdot \sim S \quad 5,3, Conj$
7. $\sim (T \vee S) \quad 6, DeM.$
8. $\sim R \quad 1,7, M.T.$
9. $\sim B \quad 4, Simp$
10. $\sim S \cdot \sim B \quad 3,9, Conj$
11. $\sim (S \vee B) \quad 10, DeM.$
12. $\sim N \quad 2,11, M.T.$
13. $\sim R \cdot \sim N \quad 8,12, Conj$
14. $(\sim T \cdot \sim B) \rightarrow (\sim R \cdot \sim N) \quad 4-13, C.P.$

פתרון החלק השני של התרגיל:

עמודים 84 – 85:

תרגיל 2

$Cx - x\ is\ a\ contestant$

$Dx - x\ was\ deceived$

$Ex - x\ is\ an\ engineer$

$1.(x)(Cx \to Dx)$

$2.(\exists x)(Cx \cdot Ex) \quad / \therefore (\exists x)(Ex \cdot Dx)$

$3.Ca \cdot Ea \qquad 2, EI \quad (x \mapsto a)$

$4.Ca \to Da \qquad 1, UI \quad (x \mapsto a)$

$5.Ca \qquad 3, simp$

$6.Ea \qquad 3, simp$

$7.Da \qquad 4,5, M.P.$

$8.Ea \cdot Da \qquad 6,7, conj$

$9.(\exists x)(Ex \cdot Dx) \qquad 8, EG$

תרגיל 5

$Lx - x\ is\ a\ leader$

$Mx - x\ is\ masterful$

$b - Brown$

$1.(x)(Lx \to Mx)$

$2. \sim Mb \qquad / \therefore \sim Lb$

$3.Lb \to Mb \qquad 1, UI\ (x \mapsto b)$

$4. \sim Lb \qquad 2,3, M.T.$

תרגיל 6

$Ox - x \text{ is an officer}$

$Nx - x \text{ is a navigator}$

$Px - x \text{ has a pistol}$

$1.(x)(Nx \to Ox)$

$2.(x)(Ox \to Px) \quad / \therefore (x)(Nx \to Px)$

$3.Ny \to Oy \qquad 1, UI\ (x \mapsto y)$

$4.Oy \to Py \qquad 2, UI\ (x \mapsto y)$

$5.Ny \to Py \qquad 3,4, H.S.$

$6.(x)(Nx \to Px) \quad 5, UG$

תרגיל 12

$Sx - x \text{ is a snake}$

$Lx - x \text{ is a lizard}$

$Rx - x \text{ is a reptile}$

$Bx - x \text{ is a bird}$

$Ox - x \text{ is oviparous}$

$1.(x)(Sx \to Rx)$

$2.(x)(Lx \to Rx)$

$3.(x)(Rx \to Ox)$

$4.(x)(Bx \to Ox) \quad / \therefore (x)(Sx \to Ox)$

$\rightarrow 5.Sy$

$6.Sy \to Ry \qquad 1, UI\ (x \mapsto y)$

$7.Ry \to Oy \qquad 2, UI\ (x \mapsto y)$

$8.Sy \to Oy \qquad 6,8, H.S.$

$9.Oy \qquad 5,8, M.P.$

$10.Sy \to Oy \qquad 5-9\ C.P.$

$11.(x)(Sx \to Ox) \quad 10, UG$

תרגיל 14

$Px - x\ was\ present$

$Sx - x\ was\ surprised$

$Rx - x\ was\ resentful$

$Ix - x\ was\ interested$

$1.(x)(Px \to (Sx \cdot Rx))$

$2.(x)(Ix \to Px) \quad / \therefore (x)(Ix \to Sx)$

$3.Iy$	
$4.Iy \to Py$	$2, UI \ (x \mapsto y)$
$5.Py$	$3,4, M.P.$
$6.Py \to (Sy \cdot Ry)$	$1, UI \ (x \mapsto y)$
$7.Sy \cdot Ry$	$5,6, M.P.$
$8.Sy$	$7, simp$
$9.Iy \to Sy$	$3,8, C.P.$
$10.(x)(Ix \to Sx)$	$10, UG$

תרגיל 15

$Cx - x\ is\ a\ crow$

$Bx - x\ is\ black$

$Px - x\ is\ a\ pest$

$1.(x)(Cx \to Bx)$

$2.(x)((Cx \cdot Bx) \to Px) \quad / \therefore (x)(Cx \to (Bx \cdot Px))$

$3.Cy$	
$4.Cy \to By$	$1, UI \ (x \mapsto y)$
$5.By$	$3,4, M.P.$
$6.Cy \cdot By$	$3,5, conj$
$7.(Cy \cdot By) \to Py$	$2, UI \ (x \mapsto y)$
$8.Py$	$6,7, M.P.$
$9.By \cdot Py$	$5,8, conj$
$10.Cy \to (By \cdot Py)$	$3-9, C.P.$
$11.(x)(Cx \to (Bx \cdot Px))$	$10, UG$