计算机逻辑作业3

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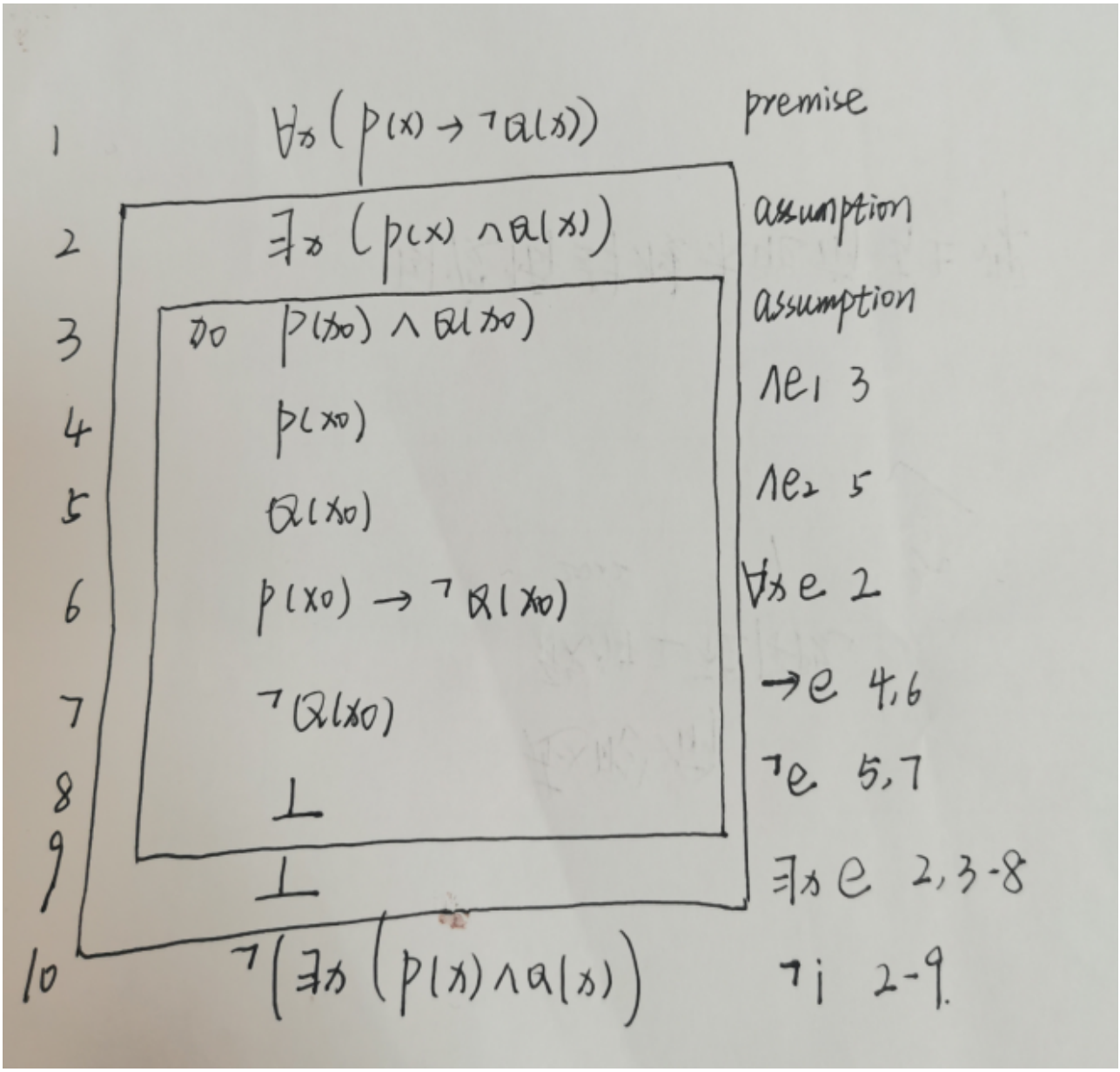
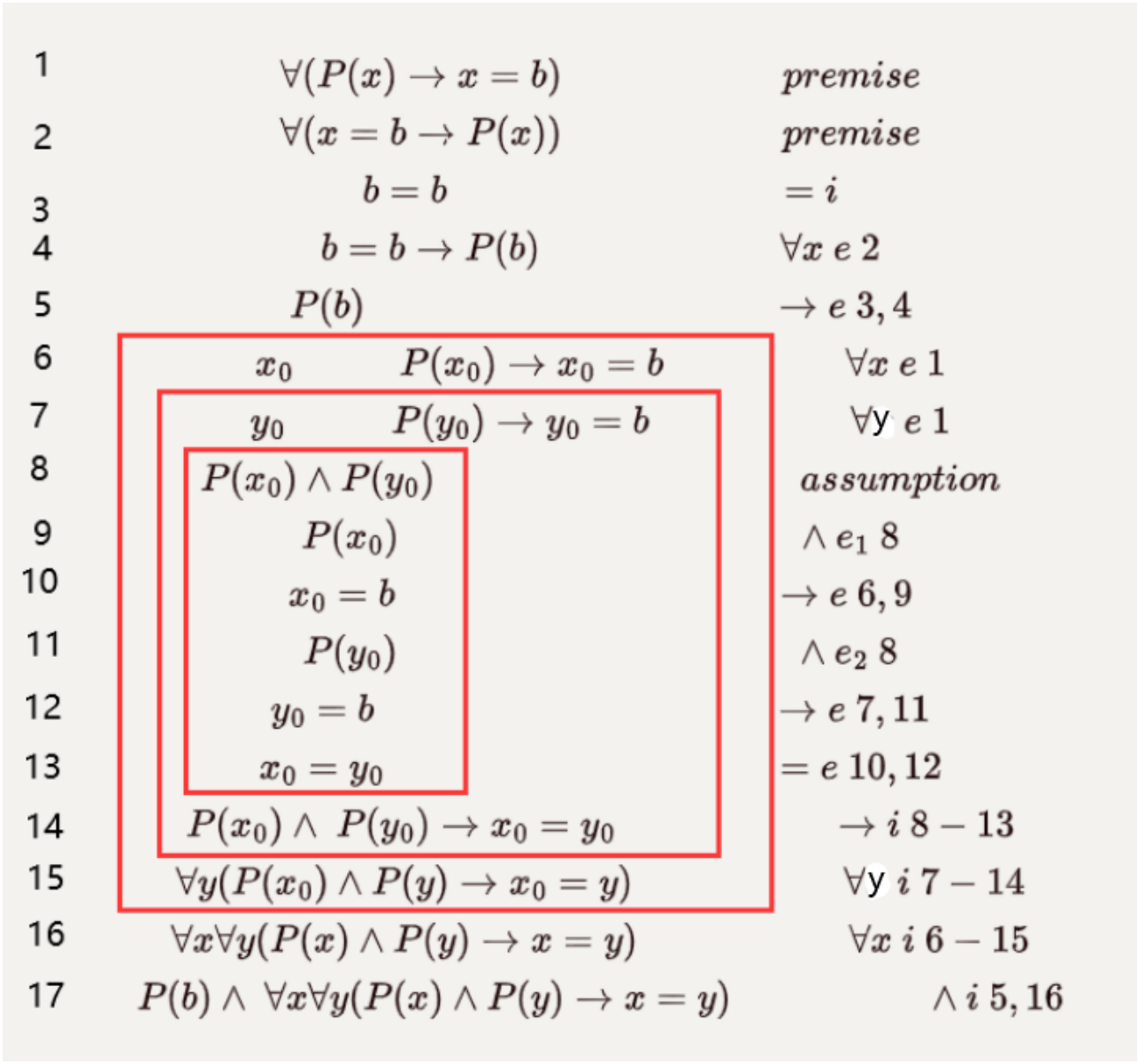
一.$\forall(P(x) \to \neg Q(x)) \vdash \neg(\exists(P(x) \wedge Q(x)))$



二.$\forall(P(x) \leftrightarrow x = b) \vdash P(b) \wedge \forall x \forall y(P(x) \wedge P(y) \to x = y)$


1 $\forall(P(x) \to x = b)$ premise
2 $\forall(x = b \to P(x))$ premise
3 $b = b$ $= i$
4 $b = b \to P(b)$ $\forall x\ e\ 2$
5 $P(b)$ $\to e\ 3, 4$
6 x_0 $P(x_0) \to x_0 = b$ $\forall x\ e\ 1$
7 y_0 $P(y_0) \to y_0 = b$ $\forall y\ e\ 1$
8 $P(x_0) \wedge P(y_0)$ assumption
9 $P(x_0)$ $\wedge e_1\ 8$
10 $x_0 = b$ $\to e\ 6, 9$
11 $P(y_0)$ $\wedge e_2\ 8$
12 $y_0 = b$ $\to e\ 7, 11$
13 $x_0 = y_0$ $= e\ 10, 12$
14 $P(x_0) \wedge P(y_0) \to x_0 = y_0$ $\to i\ 8 - 13$
15 $\forall y(P(x_0) \wedge P(y) \to x_0 = y)$ $\forall y\ i\ 7 - 14$
16 $\forall x \forall y(P(x) \wedge P(y) \to x = y)$ $\forall x\ i\ 6 - 15$
17 $P(b) \wedge \forall x \forall y(P(x) \wedge P(y) \to x = y)$ $\wedge i\ 5, 16$