

## Predicate Calculus Translation Tutor

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Logical Notation: Since the PC keyboard doesn't have all the usual logic symbols, we use the follow symbols to enter symbolic statements into the computer:

ENGLISH TERM	USUAL SYMBOL	COMPUTER REPLACEMENT	WHAT TO TYPE
and	&	&	& or ;
or	v	v	v or V
not	~	~	~ or `
if...then	⊃	>	> or ,
if and only if	≡	≡	=
left parend	(	(	( or [
right parend	)	)	) or ]
existential q.	(∃x)	(Ex)	(Ex)
universal q.	(∀x)	(x)	(x)

"One Finger" Typing: If you are not a touch typist, you can enter all statements with a single finger, without even touching the "shift" keys. To do this, use the following special keys:

type [	for (
type ]	for )
type , (comma)	for >
type ` (single quote)	for ~
type V	for v
type ;	for &

Whenever you are asked to enter a statement, the computer will edit the statement as you type it, indicating errors with a beep and an explanatory message. Use the "backspace" key to erase the erroneous character(s), then retype the rest of the statement correctly.

### THE TRANSLATION TUTOR

To start the program, type PREDTRAN and press enter. When the program begins, type 1 or 2 to choose the first or second problem set. For now, there is no third problem set. After you select a problem set, the box on left is a "light bar" menu of available problems. Use the arrow keys to move the light bar to the problem you want, and press the return key to select it.

After you select a problem number, the program will type an English sentence for you to translate in the box on the on the right center of the screen. You will then be asked to type your translation in the box just below. If you make grammatical mistakes, an error message will appear in the small box to the upper center of the screen, with black characters on a light background.

If the statement you type is a correct translation you may go on to the next problem. The computer will count a number of variations on a translation as correct. For example, if "(x)(Ax > ~Bx)" is correct, "~(Ex)(Ax & Bx)" will also be accepted, but "(x)(Ax v Bx)" will not. If your translation is incorrect, the computer will tell you what your statement means in English. By comparing this English meaning with the original English statement, you should be able to figure out where you went wrong, and try the problem again. When you have finished all the problems you want to try in the first problem set, press "Q" to and then "Y" to finish your translation session. If you want to work on the second problem set, restart the program by typing PREDTRAN and select problem set 2.

## PROBLEMS AND WARNINGS

(1) **BUGS:** This program still has bugs. Please be patient and report any weird or incorrect behavior to the instructor.

(2) **PARENTHESES:** The program will insist on more parentheses than are required by Teller's conventions on the omission of parentheses. In particular, in the expression  $(Ex)((Ax \ \& \ Bx) \ \& \ Cx)$ , all the parentheses are required, although the translation  $(Ex)((Ax \ \& \ Bx) \ \& \ Cx)$  is equally acceptable. It is perfectly O. K. to omit outer parentheses when the main connective is binary. For example, either  $((Ex)Bx \vee Rab)$  or  $(Ex)Bx \vee Rab$  may be typed.

(3) **ERROR MESSAGES:** Most error messages will have an obvious meaning. You are already familiar with many of them from earlier programs. Several need comment, however.

**"Cannot match variable x [or y, etc.] in your answer to correct answer"** To evaluate your answer, the program first compares it with a model answer. This message means that your answer is not sufficiently close to the model to compare the two. For example if the correct answer is "Lab" and you type "(x)Lxx", you will get this message because the variable x cannot be matched with any variable in the model answer.

**"Free variables: x [or y, etc.] in your answer"** Free variables are not allowed in your answers. If you don't think you have any free variables, you have probably omitted or misplaced parentheses. For example, "all dogs are cute" should be translated  $(x)(Dx \supset Cx)$ . If you type  $(x)Dx \supset Cx$ , you will get the free variable message.

**"Grammar error in your answer"** You should not get this message. If you do, inform the instructor immediately.

**"PROLOG ERROR 1010"** If you get this in the lower left of your screen, you will need to inform the instructor and then restart the program.

(4) **RULE OF THUMB:** This rule of thumb works very often: "If the quantifier outside a pair of parentheses is universal, the connective inside is  $\supset$ . If the quantifier outside the parentheses is existential the connective inside is  $\&$ ." Example:  $(x)(Fx \ \& \ Gx)$  will almost never occur, but  $(Ex)(Fx \ \& \ Gx)$  is plausible. This rule works for part of statements, not just whole statements. Example:  $(y)(Gx \supset Hxy)$  might well occur inside a larger expression, but  $(Ex)(Gx \supset Hxy)$  is very unlikely to occur.