338 (guarded command) In "Dijkstra's little language" there is a conditional program with the syntax

$$\textbf{if } b \rightarrow P \ [] \ c \rightarrow Q \textbf{ fi}$$

where b and c are binary and P and Q are programs. It can be executed as follows. If exactly one of b and c is true initially, then the corresponding program is executed; if both b and c are true initially, then either one of P or Q (arbitrary choice) is executed; if neither b nor c is true initially, then execution is completely arbitrary.

(a) Express this program as a specification using the notations of this book.
(b) Refine this specification as a program using the notations of this book.

After trying the question, scroll down to the solution.

(a)   Express this program as a specification using the notations of this book.

§ $b \lor c \implies b \land P \lor c \land Q$

(b)   Refine this specification as a program using the notations of this book.

§ $b \lor c \implies b \land P \lor c \land Q \impliedby$ **if** b **then** P **else** Q **fi**