Study Exercises

The following are on pages 299–301 of the text.

Exercise 1.
Huth & Ryan’s Exercise 4.2.2 (p. 299) describes a for-statement like that found in C, C++ and related languages.

(a) Write a program equivalent to

\[
\text{for}\ (C_1; B; C_2)\ \{C_3\}
\]

which uses only while and if-then-else as control statements.

(b) Based on your equivalent code (or by direct arguments), give a deduction rule appropriate for the partial correctness of for-statements, of the following form.

\[
\frac{P}{\text{for}\ (C_1; B; C_2)\ C_3\ Q} \quad \text{(partial-for)}
\]

You will need to refer to a loop invariant.

Exercise 2.
Any or all of Exercises 4.4.13–20, pp. 301–302, in Huth & Ryan.

Exercise 3.
An advanced question, for those wishing to go further.
Show that the triple

\[
\{\text{true}\} \\
A[A[2]] = 3 \\
\{A[A[2]] = 3\}
\]

does NOT hold under partial correctness.

What is the proper pre-condition for the above code, to satisfy the post-condition? Does a nested array assignment (like the above) obey the array-assignment rule, or is an augmented rule required?