Wikiprint Book

Title: projects/jpf-mango/examples/ItsAWrap

Subject: Java Path Finder - projects/jpf-mango/examples/ItsAWrap

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ItsAWrap example, special considerations for loops

This example focusses on issues that arise in the consideration of loops. In particular, the introduction of "shadow rules" to imply the truth of automatically generated loop-exit conjectures. This example assumes you have already worked through the Hello World and CarRecall examples. If not, you might find the steps a little hard to follow. However, links have been provided to parallel steps in the earlier examples for your convenience.

Start by loading the ItsAWrap project, located inside the "rbk" folder.

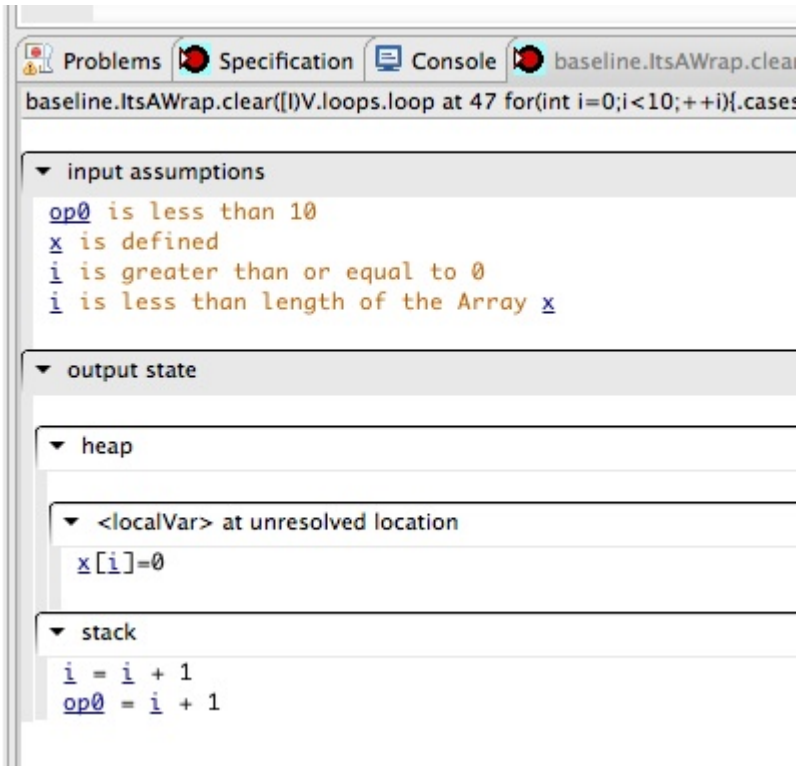
Restore the default preferences, then **check** preferences "Suppress advice dialogs" and "Do not pause for case-splits". Now **uncheck** "Suppress structural hypotheses".

Open the ItsAWrap class in an editor window.

Populate and run, using the ItsAWrap class as command target.

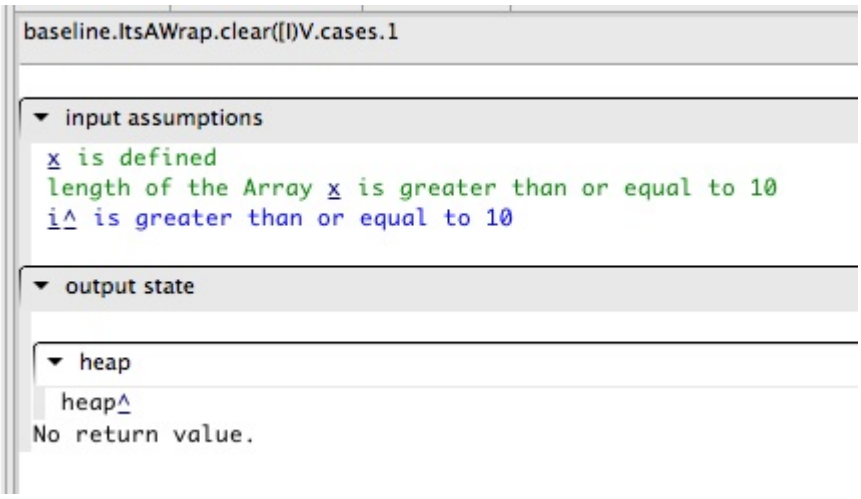
Observe that three specifications are generated,for the loop body of the clear method, for the clear method, and for the test method. We shall consider each of these in turn.

Open the loop specification (see figure).



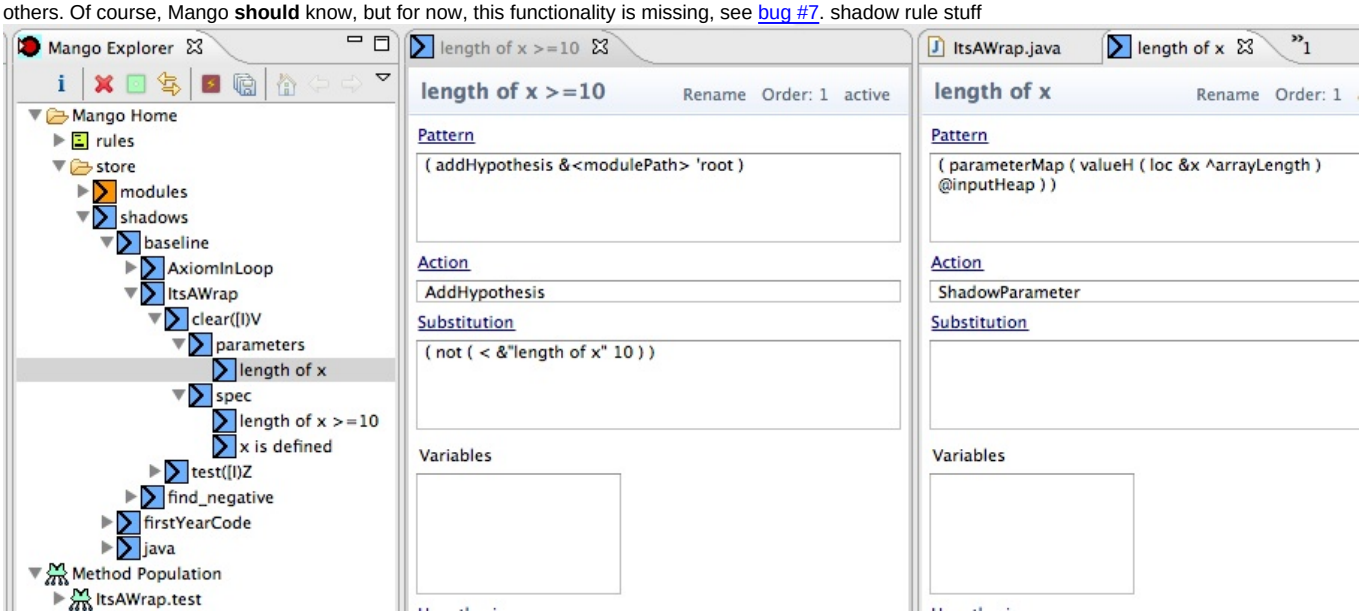
The specification describes the state transition of one pass through the loop. In order to remain in the loop, "i" must be within bounds. The output state sets x[i]=0 and increments "i". The rest of the specification concerns "op0". The point is that "i" is pushed onto the operand stack for a compare against 10, just prior to the pass through the loop. Likewise, the loop output state pushes "i+1" onto the operand stack.

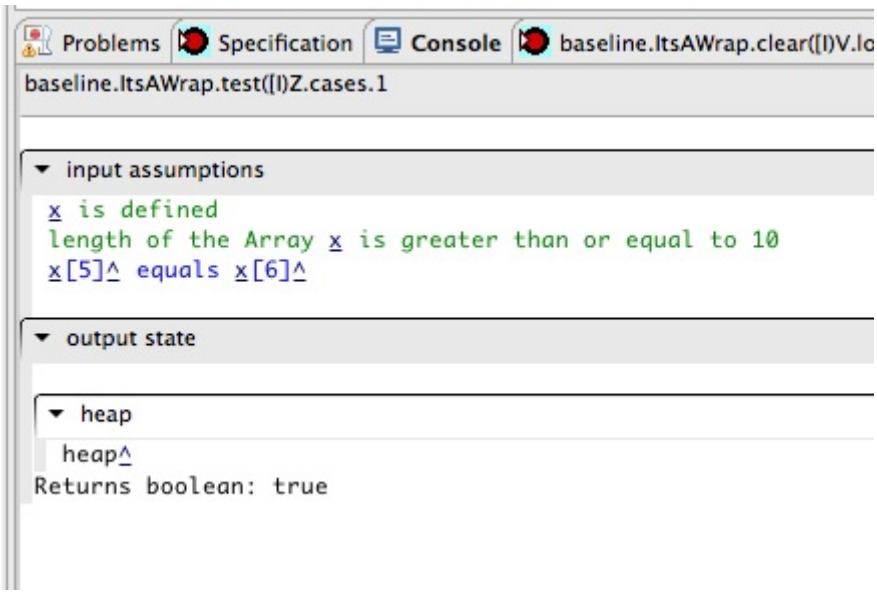
Now consider the specification for the clear method.

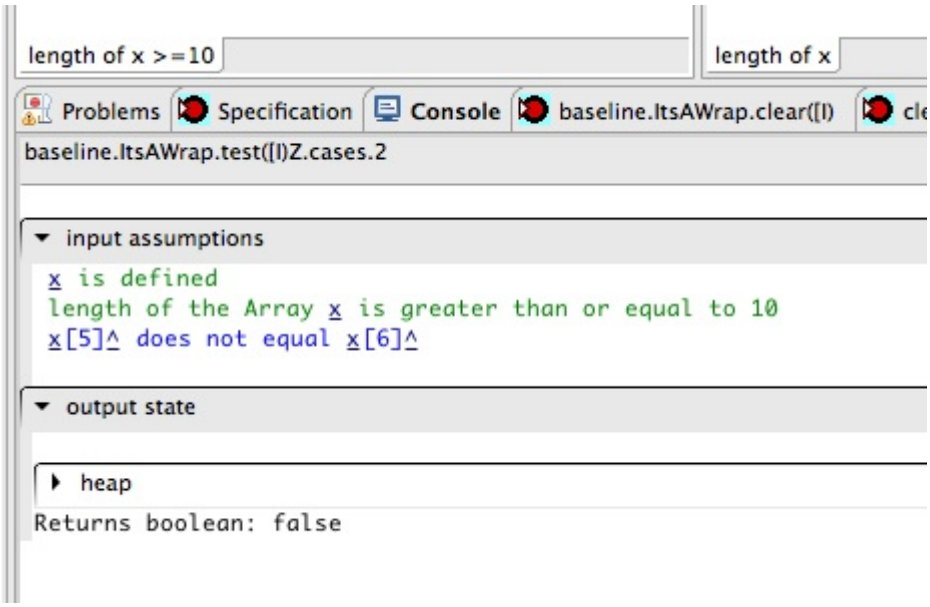


The appearance of the "^" links indicates quantities that are derived from the output state of a loop. Clicking on the "^" reveals a new page with link to the loop and a separate link to the loop input state. Following the loop link reveals the specification for the loop in the Mango Explorer, whereas following the state link reveals a new page with a description of the loop input state. Notice you can go back and forth between pages of a view using the familiar "forwards arrow", "backwards array" and "home" buttons.

Now observer that two of the assumptions are green while the third is blue. A blue assumption is actually a conjecture generated by Mango. In this case, the conjecture is the criterion for exiting the loop. A priori, any loop has the potential to hang, so conditions are always generated which imply loop termination. In this case, the loop exit condition states that the output value of "i" is greater than or equal to ten. Because this assumption is stated in terms of loop output, it is a conjecture. Mango just doesn't know if this statement is true or false, or possible true for some input states and false for others. Of course, Mango **should** know, but for now, this functionality is missing, see bug #7. shadow rule stuff





main good case

main nonexistent case