

The Tcl/Tk Soar Interface (TSI)

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Recent History

West of the Atlantic:

- When Karl Schwamb first created “tcl-soar”, he included an example graphical user interface, written in Tcl and Tk.
- When Soar 7 was adopted for TacAir-Soar, this GUI became the interface for the agents.
- This GUI was a big improvement (previously we were using a minimal X text window), but Randy wanted more more more and built a number of enhancements.

Recent History

East of the Atlantic:

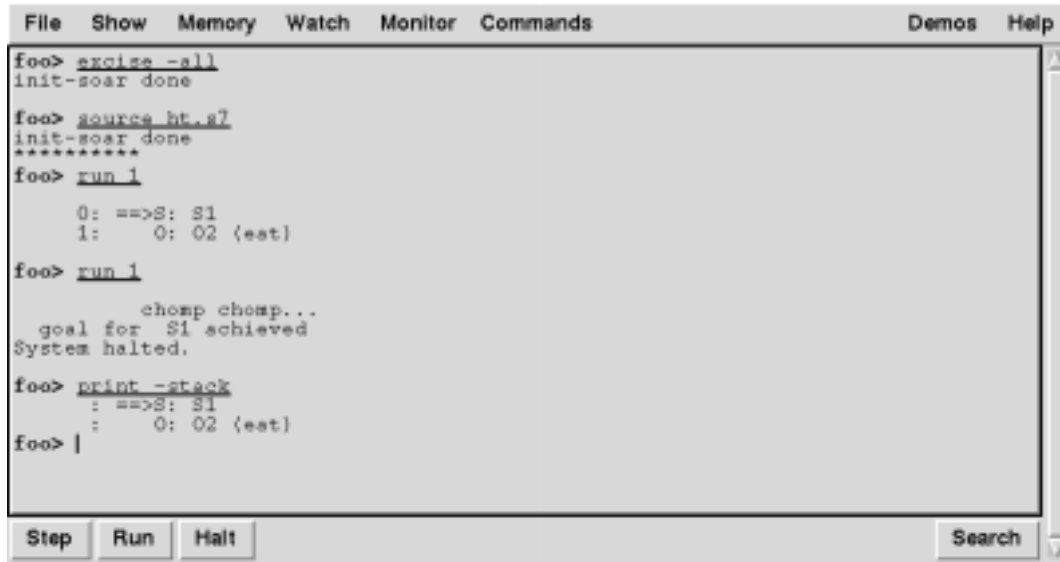
- Frank Ritter and Gordon Baxter created a new version of the ABLE-SOAR system, and wanted to use it as part of “The Psychological Soar Tutorial”.
- They used Tcl and Tk (on a Macintosh) to build a simple graphical interface, including a number of monitor windows for inspecting Soar’s memories.
- These initial displays proved very useful in demonstrating to novices how Soar (and ABLE-SOAR) work.

Bringing Them Together

The TSI now consists of . . .

- An interaction window for individual Soar agents, to take the place of the command-line interface and to support multiple agents.
- Various monitor windows that can be invoked from the interaction window.
- A comprehensive set of pull-down menus that organize Soar’s commands in logical categories.
- Context-sensitive pop-up menus for inspecting Soar’s memories.
- A control panel for easy interaction with multiple agent windows (this can be hidden when running only a single agent).
- A number of “shortcut keys” and aliases for the more expert user.

The Agent Interaction Window



The screenshot shows a window titled "The Agent Interaction Window" with a menu bar containing "File", "Show", "Memory", "Watch", "Monitor", "Commands", "Demos", and "Help". The main area is a text field with the following text:

```
foo> excise -all
init-soar done

foo> source ht.g7
init-soar done
*****
foo> run 1
      0: ==>S: S1
      1:   0: O2 (eat)

foo> run 1
      chomp chomp...
      goal for S1 achieved
      System halted.

foo> print -stack
      : ==>S: S1
      :   0: O2 (eat)
foo> |
```

At the bottom of the window, there are four buttons: "Step", "Run", "Halt", and "Search".

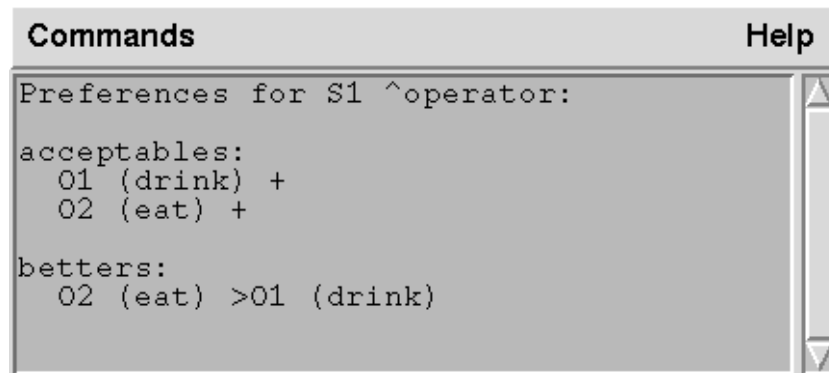
The Agent Interaction Window

- Provides xterm-like interaction.
- Copy and paste text with other windows
- Emacs-like editing of command line
- Handles pasting of multiple commands
- Allows asynchronous interaction with a running Soar program
- Search facility
- Easy-access **Run**, **Step**, and **Stop** buttons

Monitor Windows

Monitor windows continuously display the results of a Soar command, executed every elaboration.

There are currently monitor windows for the operator stack, the current match set, and the operator preferences for the current state.



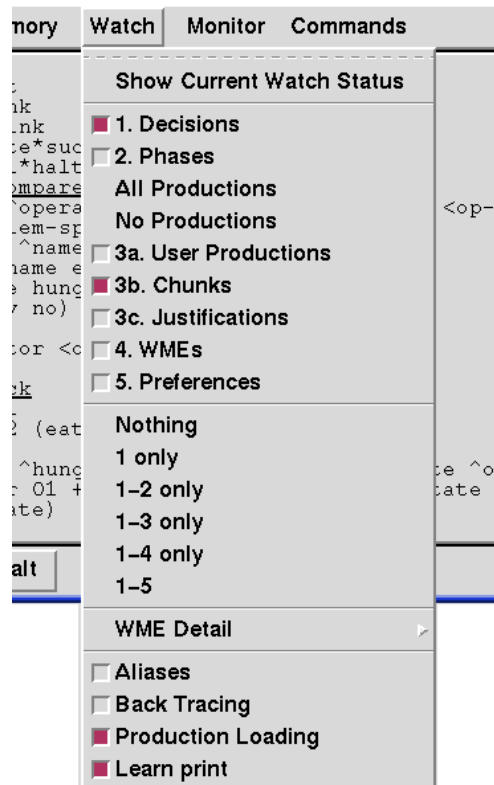
```
Commands Help
Preferences for S1 ^operator:
acceptables:
  O1 (drink) +
  O2 (eat) +
betters:
  O2 (eat) >O1 (drink)
```

Pull-Down Menus

The agent interaction window contains a menu bar, with menus organizing various Soar commands for that agent...

- File: load a file, load or save the rete net, log to a file, quit
- Show: operator stack, match set, productions, variables, commands, stats
- Memory: clear working memory, add a WME, excise productions, select an operator
- Watch: all options for the watch command laid out with check-buttons
- Monitor: turn monitor windows on or off
- Commands: run Soar, indifferent selection, manipulate interaction window
- Demos: run one of the demos released with Soar or the TSI
- Help: various types of help on Soar, Tcl, or Tk

The Watch Menu



Pop-up Menus

Clicking the right button (on UNIX systems) over some text in the agent interaction window or a monitor window causes a context-sensitive menu to pop up.

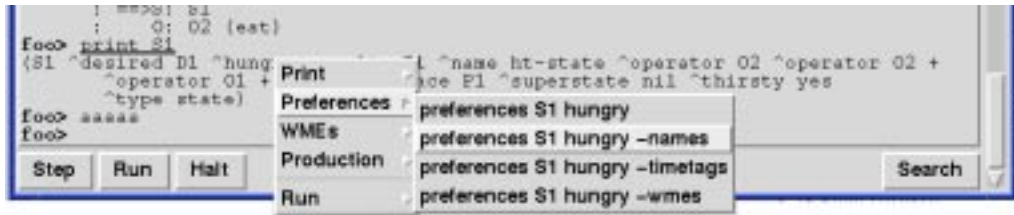
The TSI makes an educated guess as to the type of object under the mouse cursor. . .

- Augmentation, WME time tag, Constant, Identifier, Variable, Production, or something else

Based on the type of object, the pop-up menu provides the user with a number of possible commands, instantiated with the information under the mouse cursor. . .

- Print an object or WME, see preferences for an augmentation, remove a WME, excise or print matches for a production
- Always provide options to print the stack, print the match set, or run Soar

Pop-up Menus



Agent Control Panel

The Agent Control Panel is primarily useful for controlling multiple Soar agents.

- Provides a set of buttons for running the Soar agents
- Allows the easy creation and destruction of individual agents
 - “Destroy Agent” bug goes away in Soar 7.1!
- Provides menus for simple interaction with individual agents or all agents at the same time

Shortcuts

Frank Ritter has done some studies in an attempt to determine the best shortcuts and aliases for expert Soar users.

The aliases are now included in the standard Soar release, but have also been included in the prototype versions of the TSI.

Shortcut keystrokes allow the user to issue some simple commands from within the display windows (without having to press the return key)...

- *space bar* runs 1 decision
- *1-9* runs *n* decisions
- *r* or *e* runs 1 elaboration
- *i* does an **init-soar**
- Select some text in any window and *p* will open a window and print the selected object, production, etc.

Current Status

The TSI has gone through a number of internal prototype versions, and is planned to be released along with Soar 7.1.

The latest “stable” version is TSI 2.3.5. It runs with Soar version 7.0.4 or 7.0.5, and is available from

`ftp://vpsyc.psychology.nottingham.ac.uk/pub/ritter/tsi235.tgz`

Soar 7.1 will use Tcl version 7.6 or greater, which has allowed us to clean up many parts of the TSI and to make it much less platform-specific (we will be using a working version of the TSI with Soar 7.1 on Windows and Macintosh machines at AAI).

Anybody is welcome to offer criticism and suggestions, but comments that include implemented Tcl and Tk code will likely be taken more seriously.

There is a mailing list for interested participants:

`soar-tsi@cs.cmu.edu`

Nuggets

One of the designers of the TSI actually does research in human-computer interaction (the other two just know how to hack).

The TSI has been used a few times in various tutorials and cognitive science courses in the United Kingdom, and has been well received.

The TSI will be used at the AAI Soar tutorial.

Ritter, F. E., Jones, R. M., & Baxter, G. D. (in press). Reusable models and graphical interfaces: Realising the potential of a unified theory of cognition. In U. Schmid, J. Krems, & F. Wysotzki (Eds.), *Mind modeling: A cognitive science approach to reasoning, learning and discovery*. Cambridge, England: Cambridge University Press(?).

It's pretty cool.

Lumps

Version 2.3.5 contains a number of known bugs, which will only be fixed in the version that comes out with Soar 7.1.

Much of the multi-agent support was designed with TacAir-Soar in mind, but TSI 2.3.5 crashes in SoarSF for some reason (but the multi-agent support works great for the AAI tutorial).

There have been some hassles in developing an interface for multiple operating system platforms (but many of these go away with more modern versions of Tcl and Tk).

There is as yet no interaction with other existing tools (such as SDE).

There are still lots of improvements to be made (and so little time).