

# Pysoarlib Language Model Connector



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Cognition**

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# Pysoarlib

- Python library for Soar SML and I/O
  - Developed by Aaron Mininger, extended by Nathan Glenn
- `pip install pysoarlib`
  - `pip install langchain_openai`
  - Set env variable `OPENAI_API_KEY` to api key
- Git clone <https://github.com/Center-for-Integrated-Cognition/pysoarlib.git>
  - `pip install -e <location>`
- Use in many Soar projects (ThorSoar, Rosie, ...)
- I/O Connectors
  - Time, Timer, Database connector in the future (Peter?)
  - **+ Language Model Connector**



# Soar usage

- Python

```
from pysoarlib.connectors.language_model.LMConnector import LMConnector
self.language_model_connector = LMConnector(client)
client.add_connector("language-model", self.language_model_connector)
```

- Output-link

```
-->
(<output-link> ^language-model <lm>)
(<lm> ^query <query>)
(<query> ^sequence-number <sequence-number>)
(<query> ^type TEMPLATE-name ^argument1 <context> ^argument-count 1)
```

- Input-link

```
(I2 ^language-model L3)
  (L3 ^responses.response R81)
    (R81 ^query Q2 ^results R82 ^sequence-number 0 ^type TEMPLATE-name)
      (R82 ^result R83 ^result-count 1)
        (R83 ^response |Response from LLM|)
```



# Configuration of templates, settings

```
{  
  "llm-template": << "thor-question-mode-A" "ship-question-mode-B" "context-history-desired" >> ,  
  "example-context": "context-pot-counter",  
  "examples": [ "clean-pot-counter",...],  
  "domain": "thor-soar",  
  "system-prompt": << "json-goals" "json-query" "json-tree" "succinct">> ,  
  "world-context": true,  
  "history-context": [ "state", "dialog"],  
  "prompt-template": << "input-1-argument" "question-1-argument" "expected-destination" >> ,  
  "response-type": << "json" "string">> ,  
  "output-template": << "json-desireds" "str-answer" "output" >> ,  
  "model": << "gpt-4o" "gpt-4.1-mini" "o1" ... >> ,  
  "api": "langchain",  
  "number-of-results": 1,  
  "temperature": 0.0  
}
```

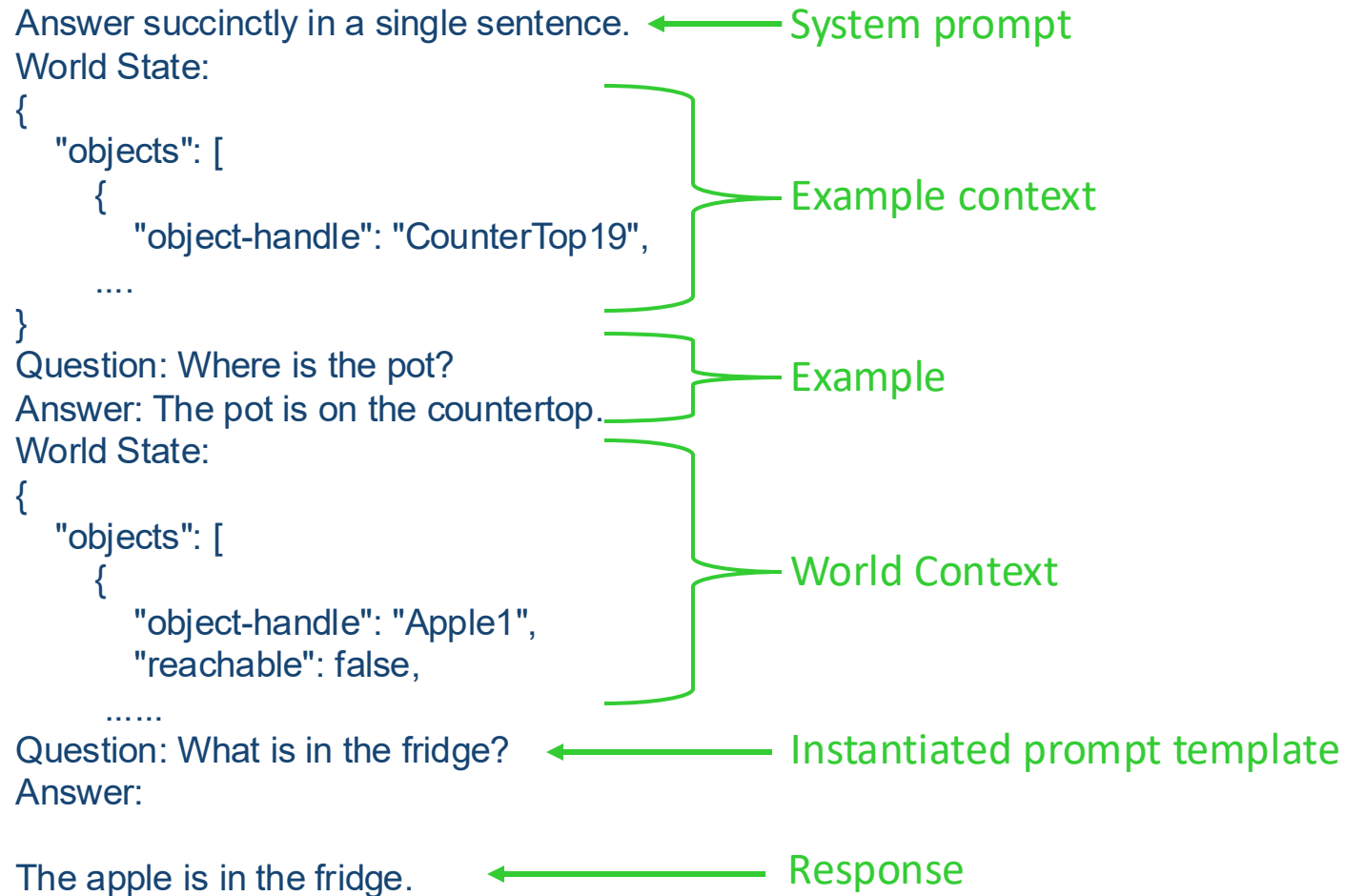


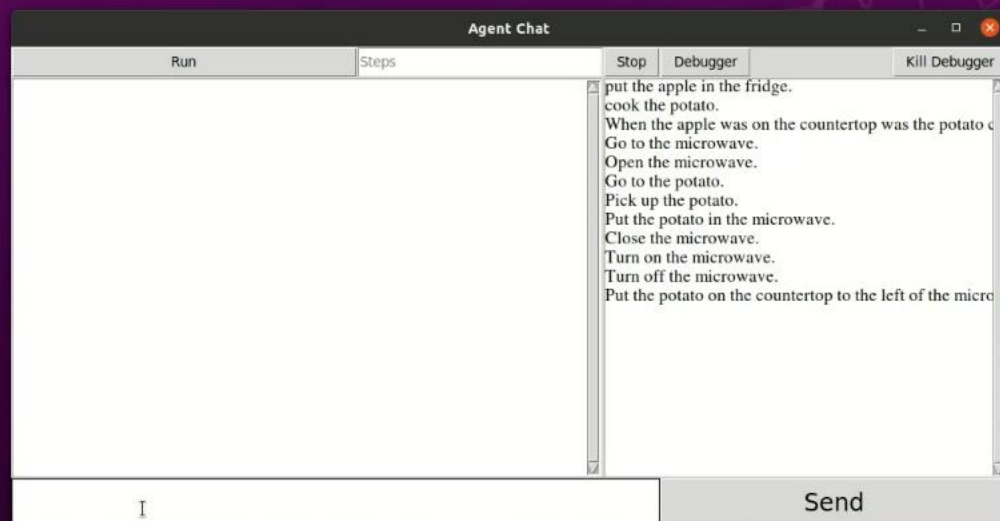
# Thor Question Template

```
{  
  "llm-template": "thor-question-mode-A",  
  "example-context": "context-pot-counter",  
  "examples": [ "state-query"],  
  "domain": "thor-soar",  
  "system-prompt": "succinct",  
  "world-context": true,  
  "soar-context": false,  
  "history-context": [ "dialog"],  
  "prompt-template": "question-1-argument",  
  "response-type": "string",  
  "output-template": "str-answer",  
  "model": "gpt-4o",  
  "api": "langchain",  
  "number-of-results": 1,  
  "temperature": 0.0  
}
```



# Instantiated template example





```

Jrkirk@Jrkirk-VBox: ~/THOR-Soar/configs/llm-agent

Ignoring evaluate-operator*elaborate*symbolic-evaluation*from-tie-subgoal*depth-exceeded because it is a duplicate of evaluate-operator*
elaborate*symbolic-evaluation*from-subgoal*depth-exceeded
1 production excised.
Total: 824 productions sourced. 39 productions excised.
Excised productions:
  apply*all-set*result-set
  selection*compare*same-symbolic-evaluations-are-indifferent
  selection*select*failure-evaluation-becomes-reject-preference
  selection*propose*evaluate-operator
  selection*elaborate*current-evaluate-depth
  selection*select*success-evaluation-becomes-best-preference
  selection*compare*prefer-lower-evaluation
  selection*compare*higher-evaluation-better
  evaluate-operator*elaborate*state*look-ahead-operator*copy
  evaluate-operator*elaborate*current-evaluate-depth
  evaluate-operator*elaborate*state*name
  evaluate-operator*elaborate*default-for-default-state-copy-is-yes
  evaluate-operator*elaborate*default-state-copy-from-problem-space
  evaluate-operator*elaborate*state*default-copy-is-all-attributes-at-level-one
  evaluate-operator*elaborate*state*create-duplicates-table-for-operator-only
  evaluate-operator*elaborate*state*default-copy-is-all-attributes-at-level-one*no-problem-space
  evaluate-operator*elaborate*state*copy-all-attributes-at-level-one-from-problem-space
  evaluate-operator*elaborate*state*create-duplicates-table
  evaluate-operator*elaborate*state*add-one-level-attributes
  evaluate-operator*elaborate*state*add-all-attributes-at-level-one
  evaluate-operator*elaborate*state*change-one-level-attribute-to-duplicate
  evaluate-operator*elaborate*state*change-all-attributes-at-level-one-to-duplicate
  evaluate-operator*elaborate*state*duplicate-id-for-attribute
  evaluate-operator*elaborate*state*duplicate-id-for-all-attributes
  evaluate-operator*elaborate*add-attribute-to-duplicate
  evaluate-operator*elaborate*add-attribute-to-duplicate*nln
  evaluate-operator*elaborate*add-duplicated-attribute-to-duplicate
  evaluate-operator*elaborate*state*add-duplicate-to-state
  evaluate-operator*elaborate*state*add-duplicates-for-all-attributes
  evaluate-operator*elaborate*operator*default-operator-copy-is-yes
  evaluate-operator*propose*look-ahead
  evaluate-operator*propose*look-ahead*reject-all-others
  evaluate-operator*elaborate*state*tried-tied-operator
  evaluate-operator*elaborate*state*remove*untried-tied-operator
  evaluate-operator*elaborate*state*look-ahead-operator*no-copy
  evaluate-operator*elaborate*state*desired
  evaluate-operator*propose*exceed-depth
  apply*init-current-evaluation-depth*max
  top-goal*halt*success 1 production ignored.

w 1
Trace level 1 enabled: Decision cycles, state creation and operator selection

For a full list of trace options, use 'trace' (no arguments)
Connected to language model

(Soar Debugger:7667): Gtk-CRITICAL **: 09:21:23.564: gtk_box_gadget_distribute: assertion 'size >= 0' failed in GtkScrollbar
(Soar Debugger:7667): Gtk-CRITICAL **: 09:21:23.650: gtk_box_gadget_distribute: assertion 'size >= 0' failed in GtkScrollbar
(Soar Debugger:7667): Gtk-CRITICAL **: 09:21:23.652: gtk_box_gadget_distribute: assertion 'size >= 0' failed in GtkScrollbar
Starting remote connection...
Relaying out windows

```



# Nuggets & Coal



## Nuggets

- Located in one place and working across different projects
- Showcasing different use cases
- Nice JSON ↔ Soar conversion
- Extendable template configuration
- Expands ease of LLM access from Soar (more use cases/projects coming!)



## Coal

- Missing some functionality developed previously (STARS, etc.)
- Agent cannot currently configure
- Add support for LangGraph
- Needs more help/examples/documentation for making your own templates
- Lacking other model support (non-OpenAI including local ones)





# Questions?