Representing AI problems expressed in PDDL to Unified Modeling Language diagrams

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Background:

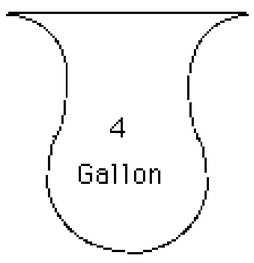
- The Planning Domain Definition Language (PDDL) is an attempt to standardize Artificial Intelligence Planning (AI) languages.
- There are various PDDL versions such as RDDL APPL MA-PDDL etc . MA-PDDL supports multi agents features.
- UML: This is a programming language that is used for object-oriented software development.
- UML includes the following diagrams: Class diagram, Component diagram, Sequence diagram, Activity diagram etc.

Goal of Our Work:

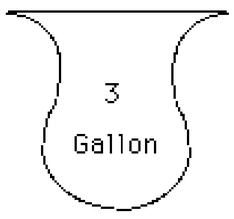
- Our goal is to convert problems from PDDL representation to Unified Modeling Language (UML) representation so that planning task can be visualized in the software engineering perspective.
- Implementing a software to perform the task.

Pouring Water Between Jugs Problem:

Jug pouring problem is a well known problem to us pouring water from one jug to another and maintaining capacitive property.



x = 0,1,2,3,4



y = 0,1,2,3

State Representation - S(x y)

x,y =
integer gallons of water in 4 and 3 gal. containers, respectively.

Start State: (S 0 0)
Goal State: (S 2 y)

PDDL representation:

```
(define (domain jug-pouring)
  (:requirements :typing :fluents)
  (:types jug)
  (:functors
        (amount ?j -jug)
        (capacity ?j -jug)
          - (fluent number))
(:action empty
        :parameters (?jug1 ?jug2 - jug)
        :precondition (fluent-test
                (>= (- (capacity ?jug2) (amount ?jug2))
                          (amount ?jug1)))
        :effect (and (change (amount ?jug1) 0)
                     (change (amount ?jug2)
                           (+ (amount ?jug1) (amount ?jug2)))))
```

Expected Outcome:

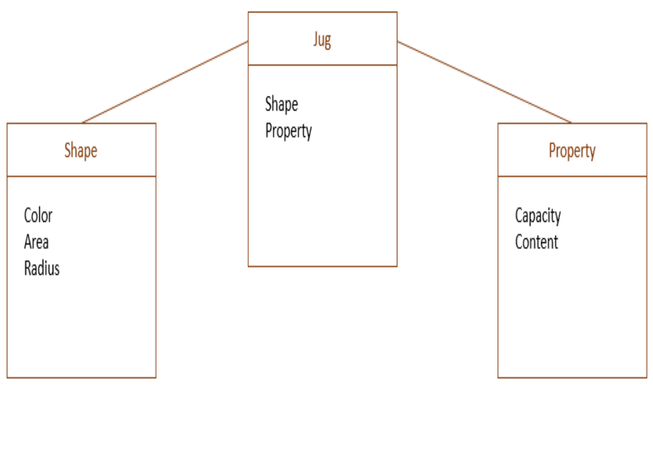


Fig : UML form given PDDL of Jug Pouring Problem

Conclusion and Future Work

- We have studied various problem domains and analyzed how planar inputs need to be correlated with other formats of software engineering.
- We will implement a software to express PDDL representation to corresponding UML formats.

References:

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