

Progressing Intention Progression

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Intention Progression

- a key problem for intelligent agents is *what to do next*
- an agent typically has multiple goals to achieve and multiple ways of achieving each goal
- at any given point the agent must decide which goal to work on, and how to achieve the goal
- more precisely, *which intention to progress*

Central to BDI & AI

- the *intention progression problem* (IPP) is central to Belief-Desire-Intention agents
- also related to many areas of AI, including planning (especially HTN planning), scheduling, reasoning about actions, etc.
- research on intention progression has a long history, but suffers from *fragmentation* and a *lack of common terminology, data formats and tools*

An Intention Progression Competition

Why a competition?

- competitions are increasingly being used to incentivise research in AI & CS, e.g., RoboCup, IPC, TAC, etc.
- competitions serve at least four purposes:
 1. provide common terminology, data formats & problem instances
 2. allow scientific comparison of approaches
 3. foster good software engineering and robustness of approaches
 4. raise the profile of an area

Defining intention progression

- to compare different approaches to the IPP, we need to specify:
 - sets of intentions (and perhaps how they change over time)
 - the environment in which intentions are to be progressed (and perhaps how it changes)
 - what it means to progress a set of intentions ‘well’

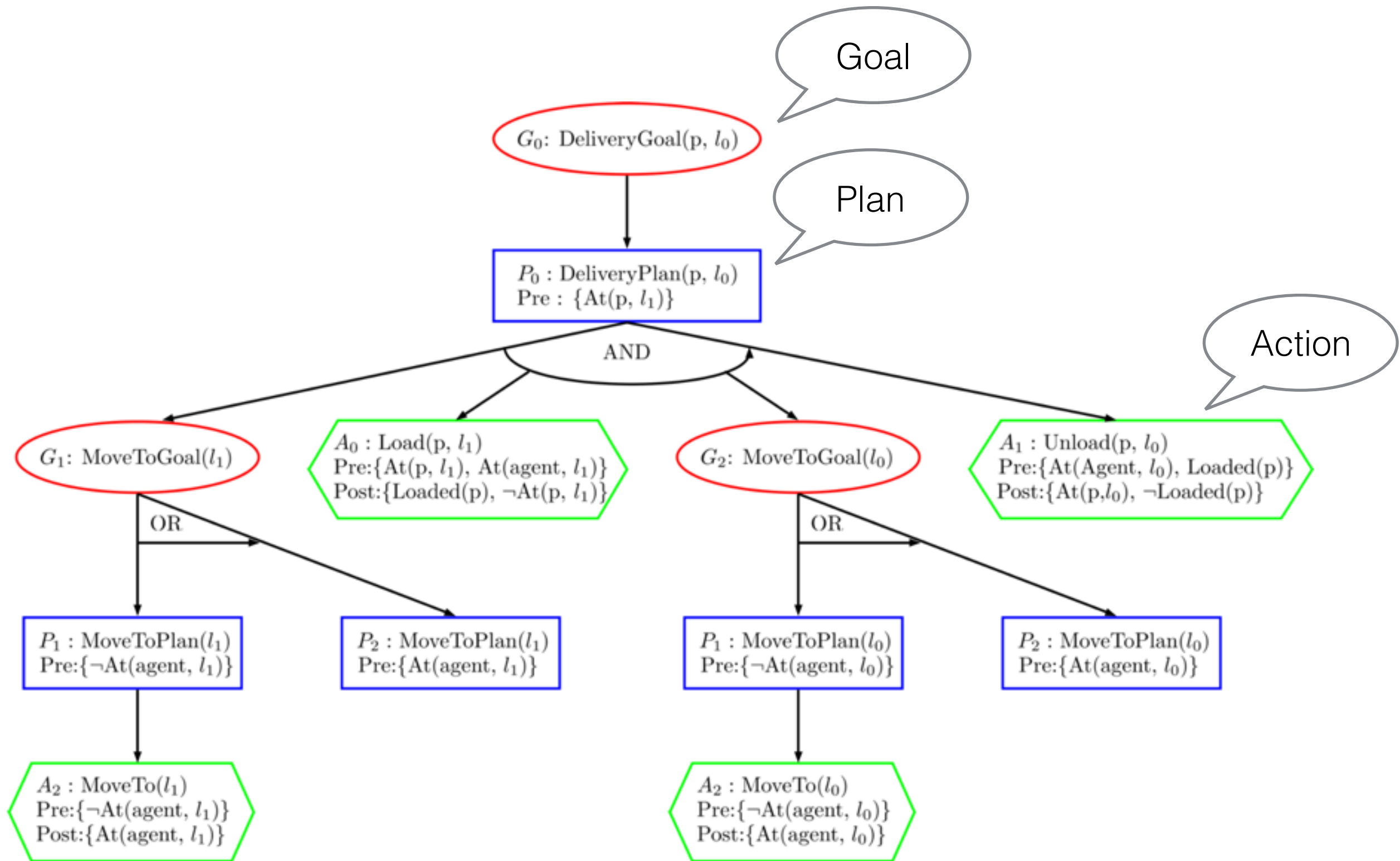
Goal-Plan Trees

- a BDI agent program consists of a set of pre-defined plans that are used to achieve the agent's goals
- each plan consists of steps that are either basic actions or sub-goals
- each sub-goal is in turn achieved by another plan
- this relationship is naturally represented as a tree structure called a goal-plan tree (GPT)

Goal

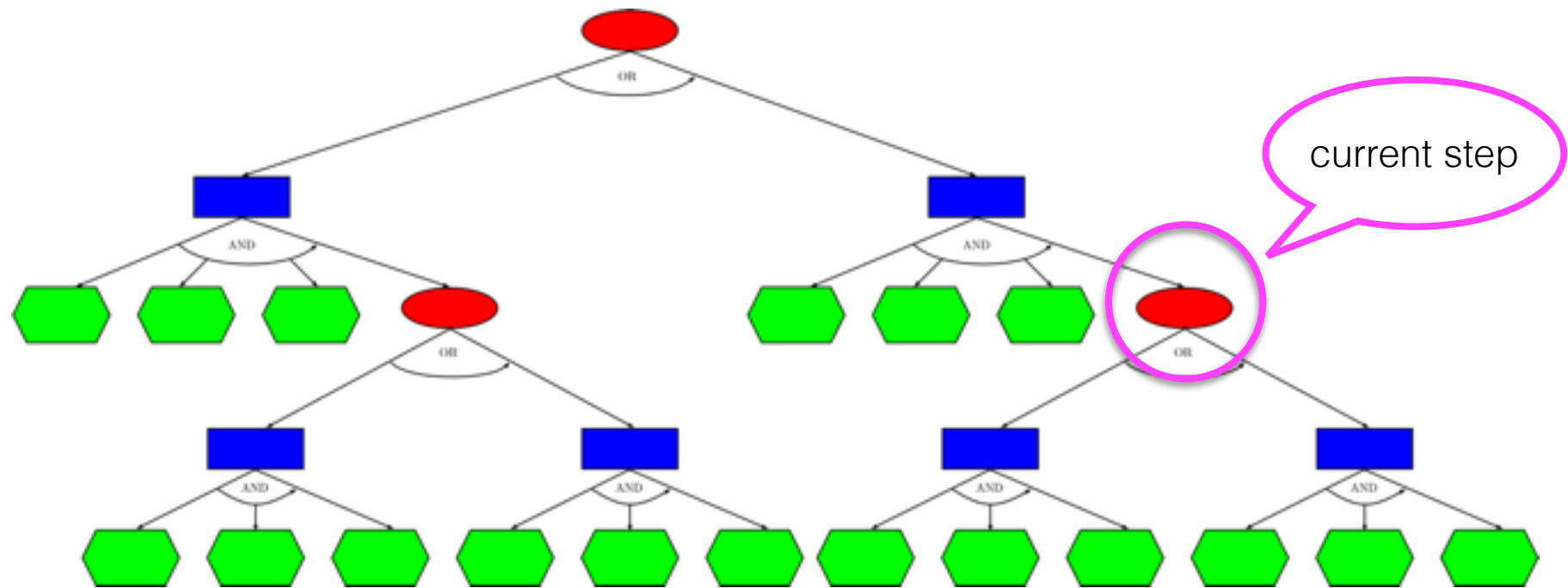
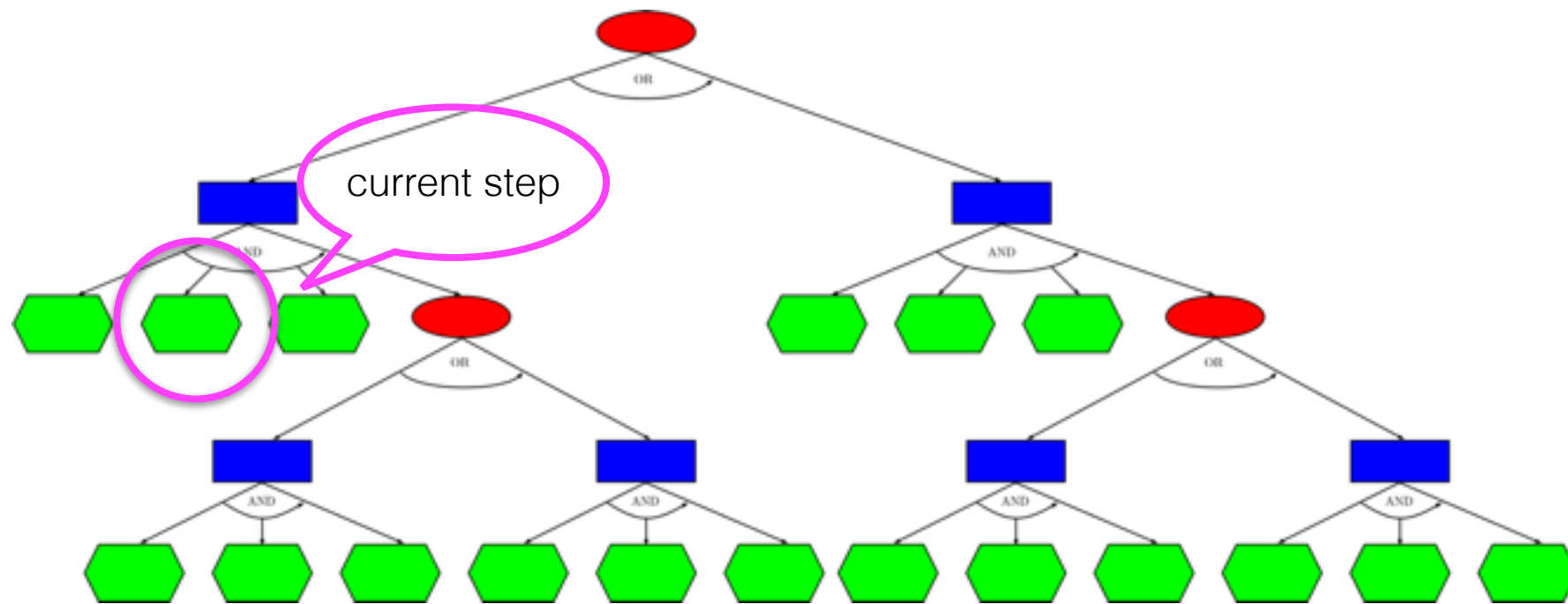
Plan

Action



GPTs & intentions

- GPTs are a natural *abstract* representation of the execution of an agent's intentions
- capture the choices available to an agent:
 - which step of which intention to execute next, and how
- provide a framework for recording information relevant to intention progression:
 - e.g., pre- and postconditions of actions and plans, resource usage, durations, etc.



which intention should we progress next?

Environment & utility

- environment may be static or dynamic; basic actions may be deterministic or nondeterministic
- environment may produce new top-level goals at run time
- a ‘good’ progression may be an interleaving that achieves the largest number of goals, largest number of highest priority goals, largest number of goals by their deadline ...

What next?

Call for Participation

- all the ideas so far are preliminary
- we need people from the community (especially the EMAS community) to:
- help in formulating the precise rules of the competition
- help in organising/running the competition itself
- enter the competition :-)

Provisional timeline

June 2017 Expressions of interest

July 2017 Formation of steering committee & organisers

September 2017 Draft competition rules published for comment

October 2017 Competition rules finalised; first CfP

January 2018 Collection of test cases completed

April 2018 Competition platform available

June 2018 Final code submission

July 2018 Competition results announced at AAMAS 2018

More information

- website: intentionprogression.org
- email: intentionprogression@googlegroups.com
- ‘Blue Skies’ paper presentation, Session 3D:
Planning, Thursday 11:20 –13:00, Ballroom 4
- Poster Session D, Thursday 16:10 – 17:10, Sao
Paulo 1&2