# **ICAPS 2024 Tutorial**: PLanning For Storytelling

**Audience**: Beginner  
**Length**: Half-day  
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**In-person Presenters**: Nisha Simon, Christian Muise, Rogelio E. Cardona-Rivera

**Website link**: https://planning4storytelling.github.io/icaps-tutorial-2024/

## Summary

In this tutorial we will demonstrate the role that planning, or planning-based representations, can play in narrative generation methods. The plan becomes the representation of the story and also that of the story world, and thus we use Planning to create logical, believable, and coherent stories (narratives) in a variety of domains. We will cover several techniques, including modern approaches that make use of Large Language Models (LLMs) and provide the opportunity for attendees to play with the technology themselves live.

## Format

The tutorial will focus on planning techniques for modelling story worlds and generating stories. The half-day tutorial will be divided into two equal parts, beginning with an introduction to the techniques, followed by a hands-on component where attendees can try to generate their own stores using the provided data and tools.

## SubTopics

### Subtopic 1 (Intro/Overview) : Plan as a representation of a story.

#### Presenter: Nisha Simon

A story can be conceptualized as the telling of a sequence of events that take place within some virtual world. It can therefore be well-modeled by a plan. The plan can represent (i) the sequence of events that actually happen in the story i.e. the `plot’, or it can represent (ii) the sequence of events are they are told to the audience i.e. the `narrative’. The `states’ that the plan traverses can encompass (i) the `physical’ state of the story world; (ii) the state of mind of the characters in the story world (their beliefs, motivations, plans, etc.); (iii) the state of the audience's knowledge/understanding of the world and events of the story; or any combination of these. Using Fully Observable Deterministic (FOD) planning and children’s stories, we can build narratives that take a character from the starting state to the goal state, within the given environment.

### Subtopic 2: Ways to model a Narrative - Plan Space Planning

#### Presenter: Rogelio E. Cardona-Rivera

Nodes in a graph are partial plans and edges are plan refinements. The underlying search space is directly shaped so that partial plans become solutions (or fail to do so). Plan-space narrative planning affords modeling story phenomena in terms of narrative-theoretic plan construction flaws and fixes.

\*Reference: Rogelio E. Cardona-Rivera and Arnav Jhala and Julie Porteous and R. Michael Young, The Story So Far on Narrative Planning, 34th International Conference on Automated Planning and Scheduling, 2024

### Subtopic 3: Ways to model a Narrative - HierArchical Planning

#### Presenter: Rogelio E. Cardona-Rivera

More expressive and complex than classical planning: STRIPS-style primitive actions are complemented with isomorphic more-abstract compound actions that require decomposition, or associated sub-plan. This is well-suited for representing a wide variety of story phenomena that depend on abstraction, across the narrative layers. In plot, for example, character intentions can be straightforwardly codified. Hierarchical story directors afford users significant

power to define narrative plan quality aligned to their authorial intent, across all narrative layers.

\*Reference: Rogelio E. Cardona-Rivera and Arnav Jhala and Julie Porteous and R. Michael Young, The Story So Far on Narrative Planning, 34th International Conference on Automated Planning and Scheduling, 2024

### Subtopic 4: Ways to model a Narrative - Heuristic Search

#### Presenter: Rogelio E. Cardona-Rivera

Using constraints in the narrative domain to encode narrative phenomena and guide story development. Using character intentions (e.g. Glaive) to calculate heuristic estimates. The narrative planning challenge is how best to encode narrative-theoretic phenomena, in order to leverage the efficient performance of such approaches.

\*Reference: Rogelio E. Cardona-Rivera and Arnav Jhala and Julie Porteous and R. Michael Young, The Story So Far on Narrative Planning, 34th International Conference on Automated Planning and Scheduling, 2024

### Subtopic 5: PLANNING FROM A FOCALIZED PERSPECTIVE - INTENTIONALITY.

#### Presenter: Nisha Simon, Contributor: Patrik Haslum

Theory of mind in Narrative generation. Creating a story often involves taking another’s perspective: The story author plans from the point of view of characters in the story, to ensure their actions are consistent with their beliefs and motivations. Because stories often center on characters’ interactions, characters sometimes plan from the point of view of other characters. Consequently, a key question in narrative planning is how to represent multiple view points within a plan.

### Subtopic 6: PLANNING FROM A CHARACTER’S POINT-OF-VIEW

#### Presenter: Nisha Simon

`Choose-Your-Own-Adventure’ (CYOA) stories are interactive narratives where the reader assumes a fictional persona and then takes action to influence the development of the unfolding story (for example, by choosing from various paths which to take in order to reach the end). `Choose-Your-Own-Adventure’ stories can, therefore, be thought of as a representation of an agent proceeding through a non-deterministic environment in order to achieve a certain goal. The agent is the story itself, and the non-determinism is driven by the reader.

The reader is not privy to the details of the generated plan. I.e., the reader is unaware of which paths are `better’ and which paths are `worse’ paths within the story. Instead, the reader selects their choices for each stage of the story through an interactive text-based game whose logic is based on a contingent plan. The reader’s input is merely an instruction to the system to follow a specific edge on the underlying directed graph. The entire plan representation itself already exists in totality and is not updated based on the reader’s choices. Thus, CYOA stories can be created using Fully Observable Non-Deterministic (FOND) Automated Planning.

\*Reference: Proceedings of The 37th Canadian Conference on Artificial Intelligence (Canadian AI 2024),“*To Choose Your Own Adventure, First Make a Plan*”, Nisha Simon and Christian Muise, June 2024, pp 1–6.

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