

Development of a Procedural Storytelling Game with Dynamic Dialogues

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Objective

- Procedural Storytelling
- Dynamic Dialogs
- Text-based game (Interactive Fiction)
- Natural Language Input and Output
- IF Game Development Platform

- Graphical Adventures
- Parser Games
- Hyperlink-based Games
- Menu-based Games
- Choice-based Games
- Puzzles vs Narrative
- Domain-Specific Programming Languages (TADS, Inform)

The genre

YOU ARE STANDING AT THE END OF A ROAD BEFORE A SMALL BRICK BUILDING.
AROUND YOU IS A FOREST. A SMALL STREAM FLOWS OUT OF THE BUILDING AND
DOWN A GULLY.
>ENTER BUILDING
YOU ARE INSIDE A BUILDING, A WELL HOUSE FOR A LARGE SPRING.
THERE ARE SOME KEYS ON THE GROUND HERE.
THERE IS A SHINY BRASS LAMP NEARBY.
THERE IS FOOD HERE.
THERE IS A BOTTLE OF WATER HERE.
>GET LAMP
OK
>INVENTORY
YOU ARE CURRENTLY HOLDING THE FOLLOWING:
BRASS LANTERN
>QUIT
DO YOU REALLY WANT TO QUIT NOW?
>Y
OK

YOU SCORED 27 OUT OF A POSSIBLE 350, USING 4 TURNS.
YOU ARE OBVIOUSLY A RANK AMATEUR. BETTER LUCK NEXT TIME.
TO ACHIEVE THE NEXT HIGHER RATING, YOU NEED 9 MORE POINTS.

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The history

Advent

Infocom

Puzzle games

TADS & Inform

Competitions

Literary Complexity

Façade, Galatea

AI Dungeon

digital VT100

The platforms

TADS

Inform

Twine

Ren'Py

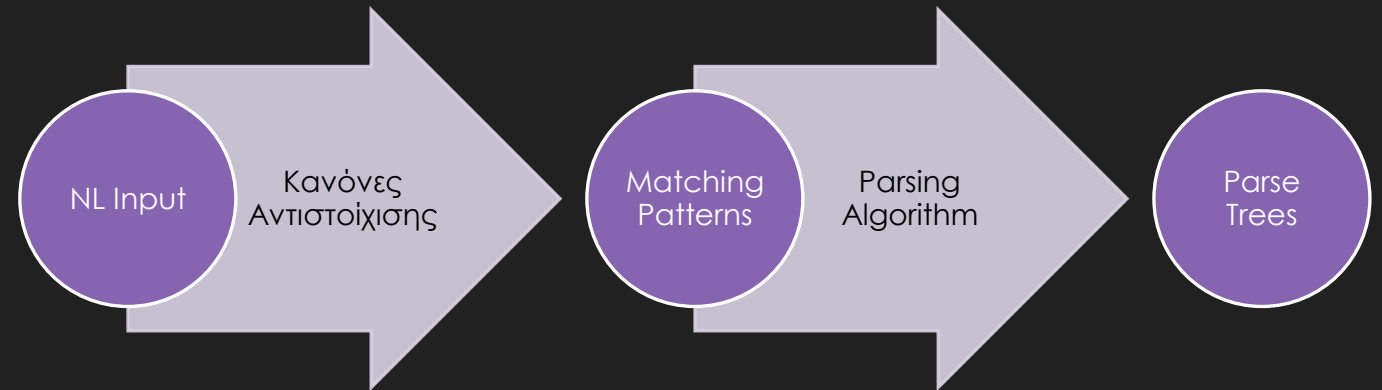
Quest

Squiffy

Theoretical Background

Parsers

- Context Free Grammars
- Semantic Parsing
 - Rule Based Approaches
 - Statistical Methods
 - Neural Networks



Procedural Generation

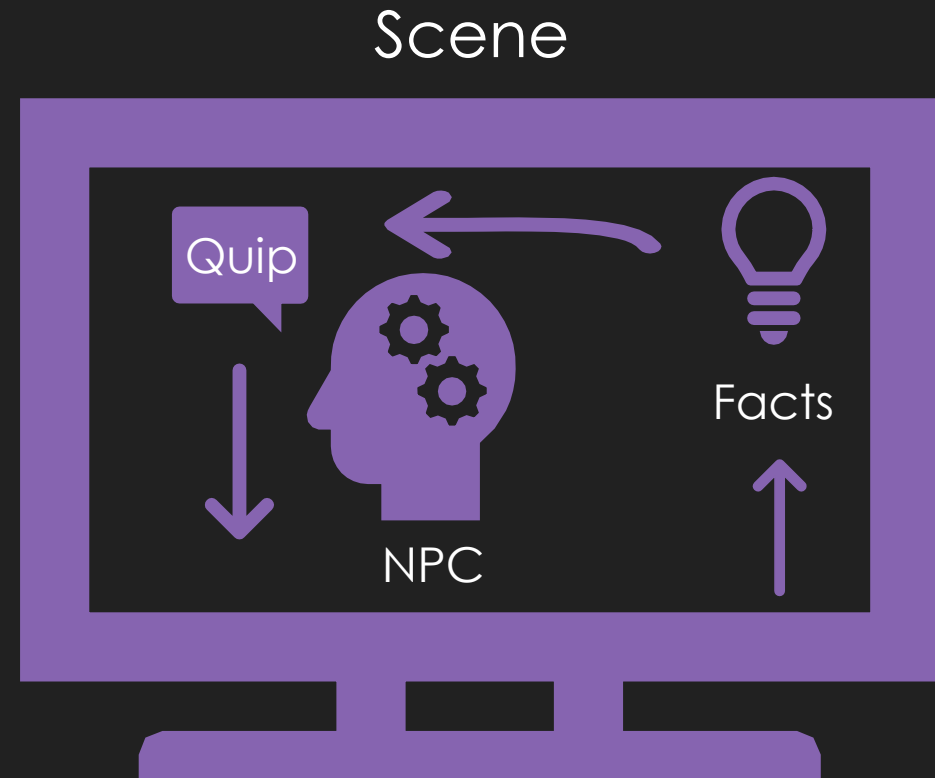
- Content Generation:
 - Pseudo random number generators
 - Parametric Methods
 - Generative Grammars
 - Spatial Methods
 - Simulations
 - Genetic Algorithms

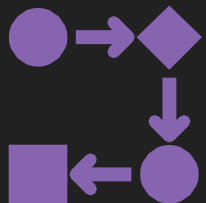
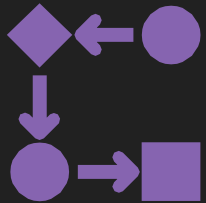
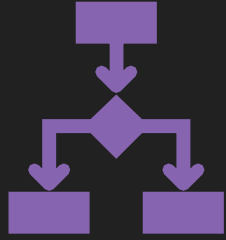
Narrative Generation

- Mark-Up & Templates
- Tags
- Generative Grammars
- Augmented CF Grammars
- Graph Grammars
- Agent Interactions
- Plot Mining
- GPT-2 & 3

Dynamic Dialogs

- Διεπαφή
 - NL Input and “Cheap” AI
 - Yes/No Conversations
 - Talk To
 - Menu-based
 - Ask/Tell





IF Game Design

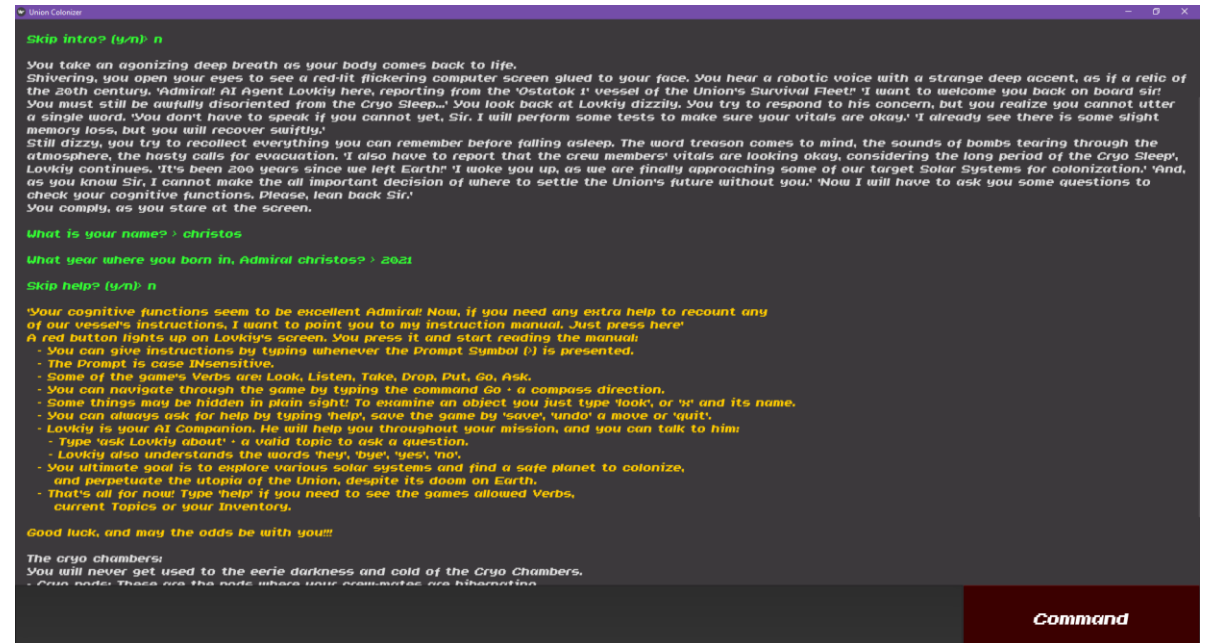
- Man-made and procedural content
- “Opening up” the plot
- Incorporating Knowledge
- Player Experience:
 - Plot Cohesion
 - Player Stories

Designing and Developing the Game

Union Colonizer

Game Plot: Union Colonizer

- Plot and Player Objectives
- Dialogs
- GUI



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Union Colonizer

Skip intro? (y/n): n

You take an agonizing deep breath as your body comes back to life. Shivering, you open your eyes to see a red-lit flickering computer screen glued to your face. You hear a robotic voice with a strange deep accent, as if a relic of the 20th century. 'Admiral! AI Agent Lovkiy here, reporting from the 'Ostatok 1' vessel of the Union's Survival Fleet.' 'I want to welcome you back on board sir! You must still be awfully disoriented from the Cryo Sleep.' You look back at Lovkiy dizzily. You try to respond to his concern, but you realize you cannot utter a single word. 'You don't have to speak if you cannot yet, Sir. I will perform some tests to make sure your vitals are okay.' 'I already see there is some slight memory loss, but you will recover swiftly.' Still dizzy, you try to recollect everything you can remember before falling asleep. The word treason comes to mind, the sounds of bombs tearing through the atmosphere, the hasty calls for evacuation. 'I also have to report that the crew members' vitals are looking okay, considering the long period of the Cryo Sleep', Lovkiy continues. 'It's been 200 years since we left Earth! I woke you up, as we are finally approaching some of our target Solar Systems for colonization.' 'And, as you know Sir, I cannot make the all important decision of where to settle the Union's future without you.' 'Now I will have to ask you some questions to check your cognitive functions. Please, lean back Sir.' You comply, as you stare at the screen.

What is your name? > christos

What year where you born in, Admiral christos? > 2021

Skip help? (y/n): n

Your cognitive functions seem to be excellent Admiral! Now, if you need any extra help to recount any of our vessel's instructions, I want to point you to my instruction manual. Just press here! A red button lights up on Lovkiy's screen. You press it and start reading the manual:
- You can give instructions by typing whenever the Prompt Symbol (!) is presented.
- The Prompt is case INsensitive.
- Some of the game's Verbs are: Look, Listen, Take, Drop, Put, Go, Ask.
- You can navigate through the game by typing the command Go + a compass direction.
- Some things may be hidden in plain sight! To examine an object you just type 'look', or 'x' and its name.
- You can always ask for help by typing 'help', save the game by 'save', 'undo' a move or 'quit'.
- Lovkiy is your AI Companion. He will help you throughout your mission, and you can talk to him!
- Type 'ask Lovkiy about' + a valid topic to ask a question.
- Lovkiy also understands the words 'yes', 'bye', 'yes', 'no'.
- Your ultimate goal is to explore various solar systems and find a safe planet to colonize, and perpetuate the utopia of the Union, despite its doom on Earth.
- That's all for now! Type 'help' if you need to see the games allowed Verbs, current Topics or your Inventory.

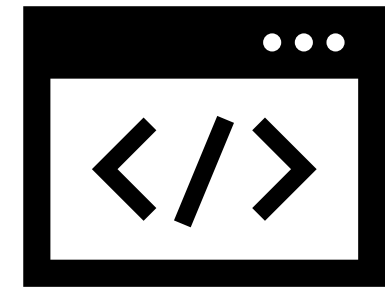
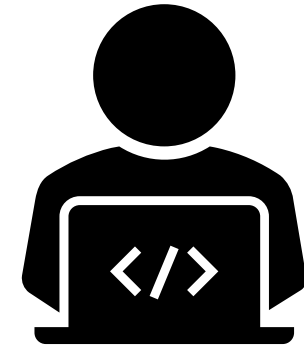
Good luck, and may the odds be with you!!!

The cryo chambers:
You will never get used to the eerie darkness and cold of the Cryo Chambers.
- Cryo Pods: These are the pods where your crewmates are hibernation.

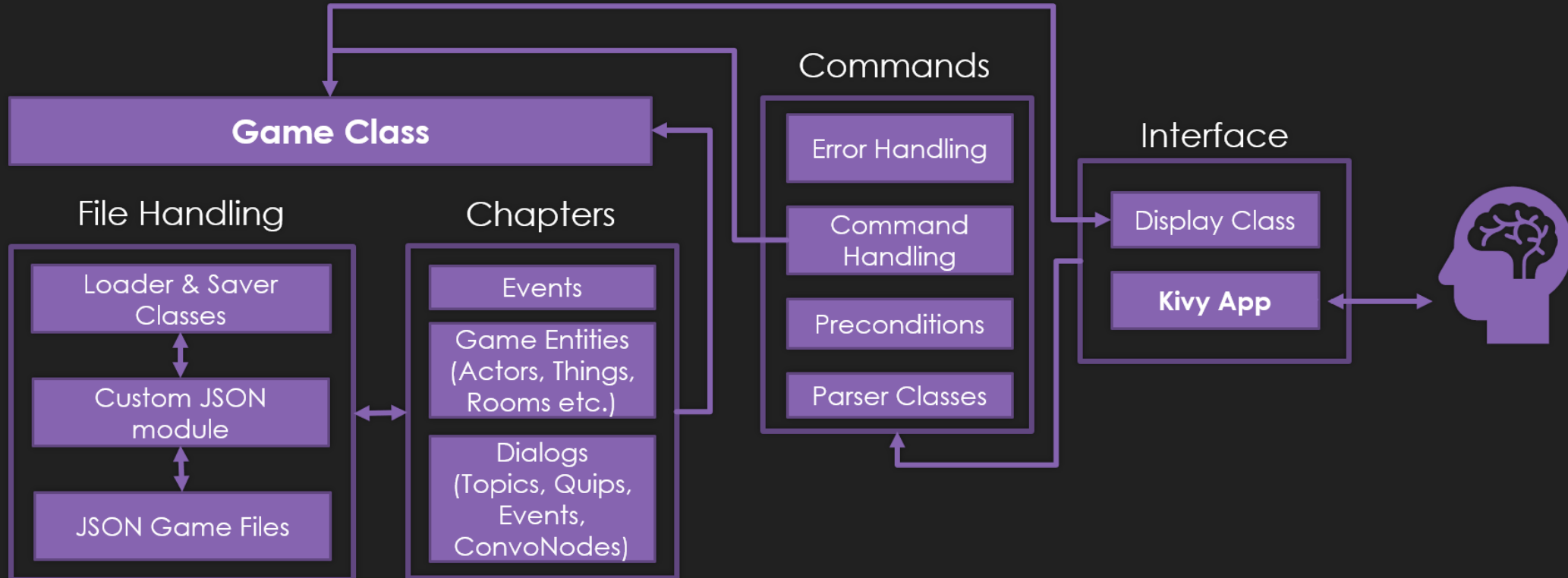
Command
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Tools

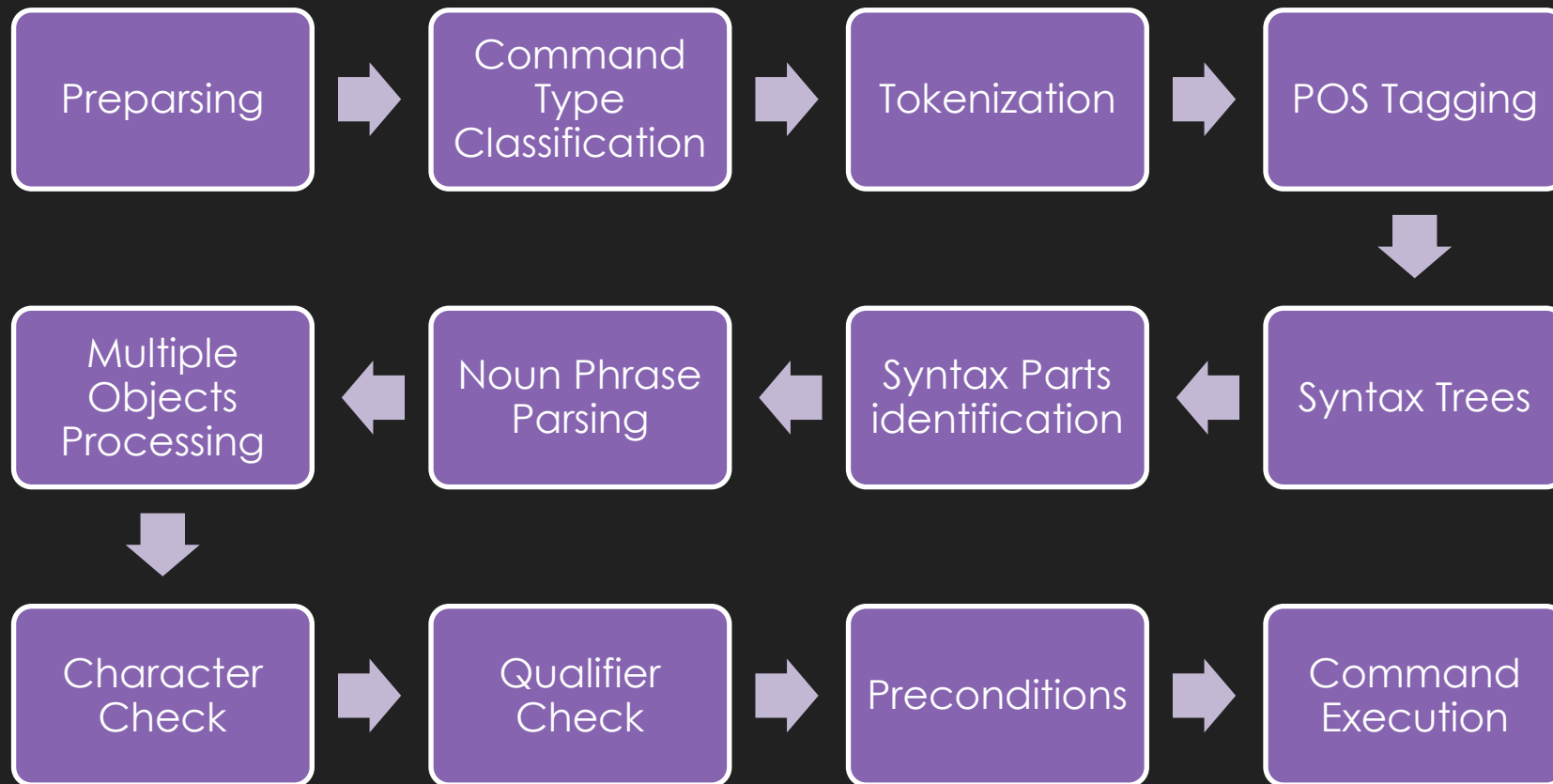
- Python vs Γλώσσες Ειδικού Σκοπού
- Object Oriented Programming
- Threading
- JSON File Format
- Numpy random
- NLTK
- GUI – kivy Module



Basic Structure



The Command Handling Pipeline



Entities

- Entity Class
 - Things
 - Rooms
 - Actors
 - Special Objects



Events

- Event Class
- Conditions
- Game Queries
- Game State Changes

Dialogs



Dialogs as
Events



Topics



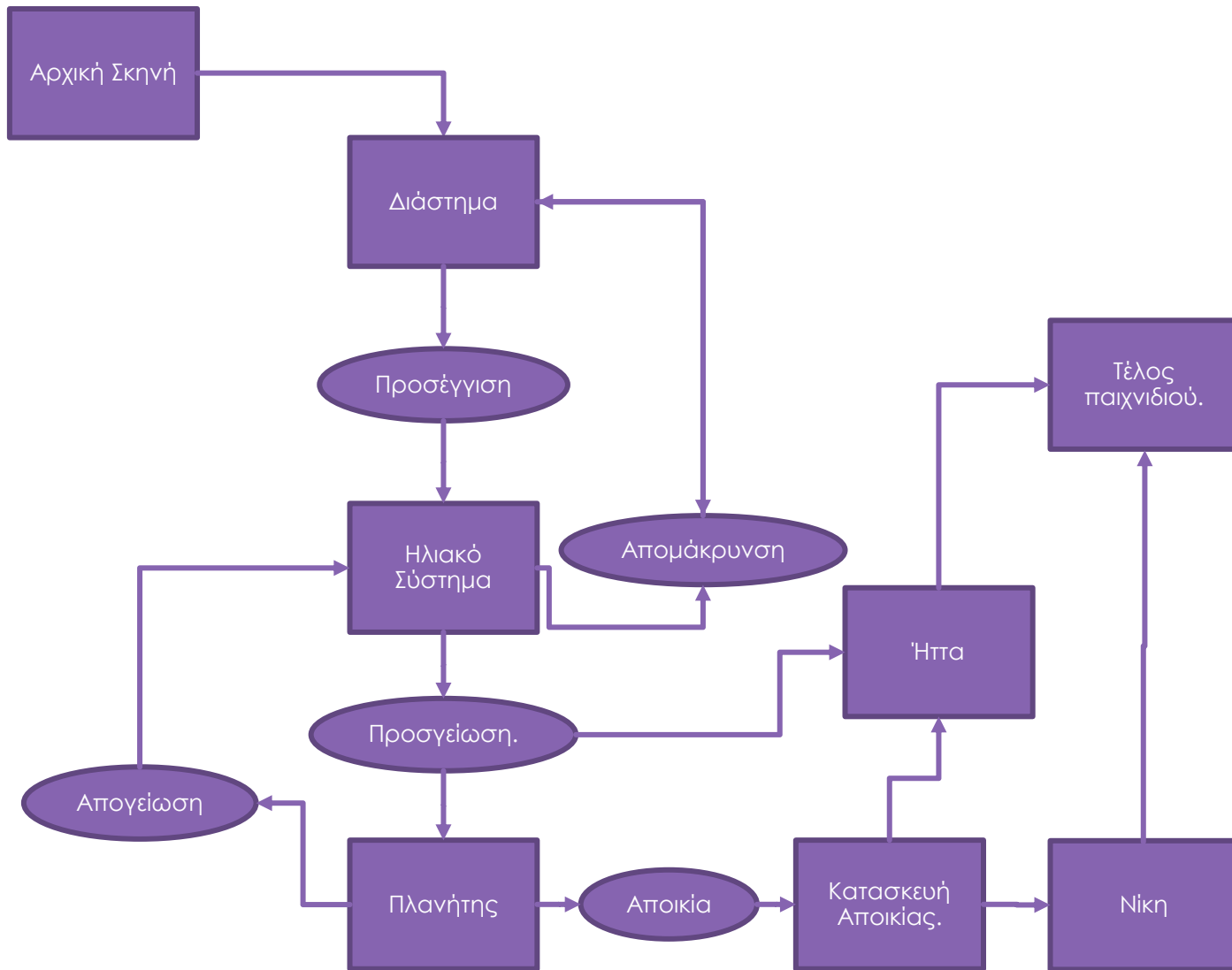
Dialog Events



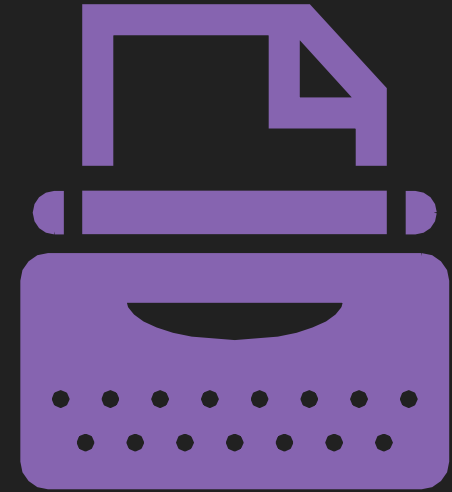
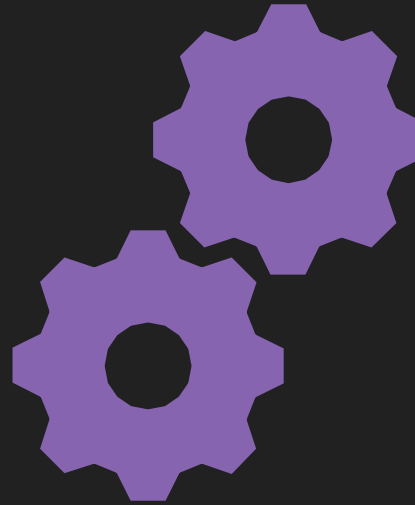
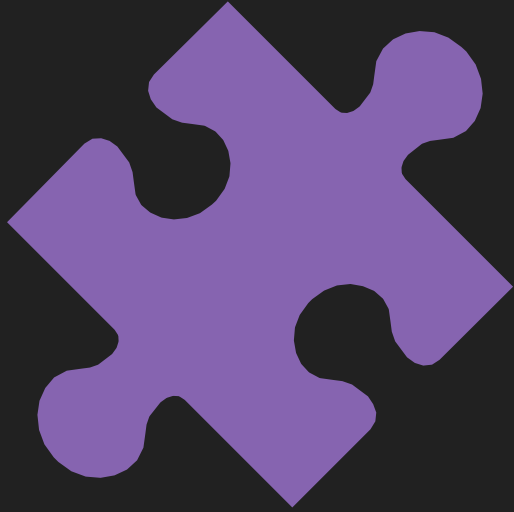
Quips



Conversation
Trees



Chapters



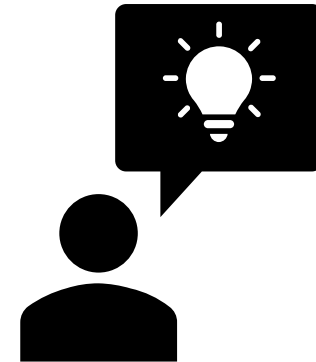
Procedural Generation

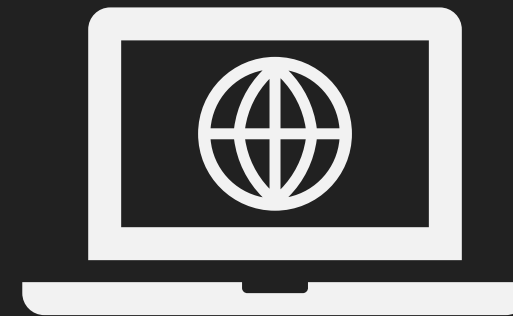
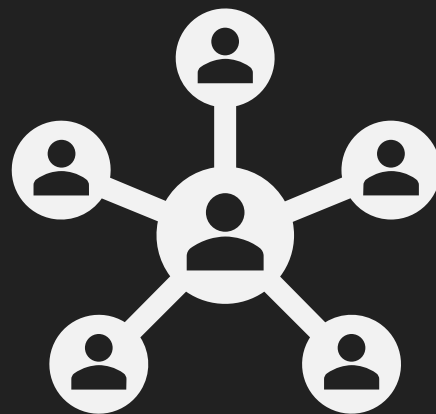
- Solar Systems
- Planets
- Descriptions
- Names
- Rooms
- Threats

Future Improvements

Beta Testing & Future Improvements

- More content
 - Objects
 - Procedural Generation
 - Descriptions
 - Plot
- Error Descriptions
- Dialogs
- Knowledge graph
- Mark-Up Strings
- Performance
 - Memory
 - Speed
- Authoring Tools
- Debugging Tools





Thank you! Any Questions?