Wide Ruled: An Author Goal-Based Interactive Story Generator

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Wide Ruled

- Text-based interactive story generator with GUI
- Modified *UNIVERSE*-style story model (Michael Lebowitz)
  - Hierarchical story structure
  - Originally designed for soap opera style serial storylines (never ending!)

![Image of story generator GUI](image)
Wide Ruled is a “structured editor” - you have access to all features of the story generator, but you can’t write “wrong” code

Plot fragment: forced-marriage
Constraints: (has-husband ?her) (has-parent ?husband)
 (trait-value ?parent ‘niceness) -5)
 (female adult ?her) (male adult ?him)
Goals: (churn ?him ?her) {prevent them from being happy}
Subgoals: (do-threaten ?parent ?her “forget it”)
 (dump-lover ?her ?him)
 (worry-about ?him)
 (together * ?him)
 (eliminate ?parent)
 (do-divorce ?husband ?her)
 (or (churn ?him ?her)
     (together ?her ?him))
Story Components

Wide Ruled stories are made of:

- **Objects** (“What” of the story)
  - **Characters, Environments** – attributes and relationships
  - **Plot Points** – major episodic story information

- **Structure that acts on these objects** (“How” of the story)
  - **Author Goals** – What to do in the story
  - **Plot Fragments** – Ways of achieving the goals
What

Characters

- John Smith
- Jerry Fontana
- Cindy Rollins
- Gene Franks
- Rachel Delores
- Dick Tracy
- Sherlock Holmes

Environments

- The Docks
- The Alleyway
- The City Park
- The Shady Bar
- The Abandoned Shack

Plot Point Types

- Crime Info
- Murderer
- Murder Solved

Goals and Plot Fragments

- Do Murder Mystery
  - Do Story
  - No more alive victims
- Do the Crime (Text Victim)
  - Random Murderer
  - Murderer is Enemy
- Attack the Victim (Text Victim)
  - Gunshot
  - Stabbing
- Find a Detective (Text Detective)
  - Detective sleeping
  - Detective drunk
- Investigate
  - Find crime scene evidence
  - Interview friend
  - Interview coworker
  - Find clue at murderer
  - Put together clues and
- Solve the Crime
  - Solve with celebration
  - Solve with smugness
- Capture the Murderer
# How

<table>
<thead>
<tr>
<th>Characters</th>
<th>Environments</th>
<th>Plot Point Types</th>
<th>Goals and Plot Fragments</th>
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<tr>
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<tr>
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<td>Attack the Victim (Text</td>
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<td>Capture the Murderer</td>
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[Image of the interface with the terms and options for characters, environments, plot points, and goals and plot fragments.]
Characters and Environments

- Object with two lists:
  - Traits (number, text, true/false)
  - Relationships (with strengths)

- Relationships connect objects of same type:
  - Character-to-character
  - Environment-to-environment
Plot Points

- Plot Points are objects containing important story information:
  - Murder mystery: the murderer, the victim, the detective

- Plot Points are **temporary**, and can only be created, edited, or deleted **during story generation**

- You specify what they can contain before story generation

- ...but you fill them with information within Plot Fragments
Author Goals

- Reflect story structure, high level intent of author
- Can involve multiple characters, environments (or none)
- **Murder mystery example:**
  - “Murder Victim”, “Investigate”, “Capture criminal”

Plot Fragments

- Different ways to achieve a **single** Author Goal
  - A precondition
  - List of story actions to be completed in order
  - Can activate another author goal within it (**subgoal**)
- **Example fragments for “Investigate”:**
  - “Interview family”, “Run DNA tests”, “Gather suspects”
Murder Mystery Story Sample Goal

Do the Crime

Random Murderer
  - Attack the Victim
    - Gunshot
    - Stabbing

Murderer is Enemy
  - Attack the Victim
    - Gunshot
    - Stabbing
How do we make a single story?

1. Start with initial Author Goal, selected by author
2. Generator looks at every Plot Fragment for that Author goal
3. Generator selects one plot fragment with valid precondition
4. Generator picks one Plot Fragment for that initial Author Goal, and then executes every story action in order
   - If a story action is a subgoal action go to step 2

A plot fragment can only be selected if it’s entire precondition is satisfied
Author Goals and Plot Fragments - Review

- **Author Goals**
  - Reflect story structure, high level intent of author

- **Plot Fragments**
  - Are different ways to achieve a single Author Goal
  - Contain:
    - Precondition
    - Ordered list of story actions
      - print text, calculate, edit character/environment/plot point, create/delete plot point, and **subgoal**
Author Goal Editor

- Author goals can have parameters that pass information to plot fragments
Plot Fragments

- The Plot Fragment editor

**Author Goal**
*Do the Crime*

**Parameters**

**Precondition**
- There exists a Character, where Trait "Name" != Victim
- There exists an Environment, where Trait "Potential M" and Trait "Description" is saved as variable "crimeScene"
- "Nearby Location" target name is saved as variable "hide"

**Story Actions**
- Display Text: "The time: <crimeTime>, the place: <crimeScene>
Pursue Subgoal "Attack the Victim (Victim Name)"
Display Text: "<murderName> appears out of the dark inevitable eyes of the police."
Create new Crime Info Plot Point, saved as variable "c"
Edit saved Crime Info Plot Point "crimeInformation": s
Create new Murderer Plot Point, saved as variable "m"
Edit saved Murderer Plot Point "murderInformation": s

**Change Goal**

**New**

**Edit**

**Copy**

**Delete**

**OK**
Preconditions

- A Plot Fragment is chosen if its **Precondition** is satisfied
- Each constraint statements matches against
  - Characters
  - Environments
  - Plot Points
- Precondition is a list of constraint statements that must **ALL** be true (each statement has at least one char./environ./plot point that is compatible with the constraints)
Preconditions and Story Actions

- **Preconditions capture** a subset of characters, environments, and plot points with specific attributes and relationships (character with a certain age, or environment with a certain weather, etc)
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- **Preconditions capture** a subset of characters, environments, and plot points with specific attributes and relationships (character with a certain age, or environment with a certain weather, etc)
There exists a Character, where Trait "Name" == Victim Name, and Relationship "Enemy" target name is saved as variable "enemyName" and Relationship "Enemy" strength > 5.
Story actions do things with those things, for example:

- Create a plot point and put things into it
- Change the age/name/relationships of a character
- Calculate a new number variable: \( \text{varY} = \text{varX} + 1 \)
- Print out text (how the story is made!)
- Activate another author goal
Story Actions

- Ordered list

```
Display Text: "The time: <crimeTime>, the place: <crimeSceneDescription>.
Pursue Subgoal "Attack the Victim (Victim Name)"
Display Text: "<enemyName> appears out of the darkness as the evil murderer, and escapes into the distance inevitable eyes of the police."
Create new Crime Info Plot Point, saved as variable "crimeInformation"
Edit saved Crime Info Plot Point "crimeInformation": set trait "Victim Name" to saved variable "Victim Name"
Edit saved Crime Info Plot Point "crimeInformation": set trait "Crime Scene Name" to saved variable "crimeScene"
Create new Murderer Plot Point, saved as variable "murderInfo"
Edit saved Murderer Plot Point "murderInfo": set trait "Murderer Name" to saved variable "enemyName"
Edit saved Murderer Plot Point "murderInfo": set trait "Murder Hideout Name" to saved variable "hideoutName"
```
Variable Binding

- Variables are pieces of saved and named data that can be used in various places in a plot fragment.
- They come from goal parameters, the precondition, and some actions (calculation, create new plot point).

Variables can be used from Left to Right, top to Bottom (they must be created before using them).
Variable Binding – Precondition

- Precondition Statements can save traits, relationship target names, and relationship strength values to variables for later use
  - Save trait: There exists an Environment, where Trait “Description” is saved as variable “crimeSceneDescription”
  - Save entire object: There exists a Character, saved as “victim”.

- Create a variable and then use it again for comparison
  - Example: Match two characters with different names, and one is younger than the other. Two precondition statements, in order:
    - 1. There exists a Character, where Trait name is saved as variable “nameVar”, and Trait Age is saved as variable ‘friendAge’
    - 2. There exists a Character, where Trait name != nameVar, and Trait Age < friendAge
Variable Binding – Precondition

Edit Character Precondition Statement
This Character must exist

Edit Environment Precondition Statement
This Environment must exist

Constraint Details:
Type of attribute to match
Description
Value saved as: crimeSceneDescription
Use Saved Variable
Must always be true

Save Character
Save Only
Save Environment

Name
Bob
Use Saved Variable
Must always be true
Variable Binding

Author Goal
Attack the Victim

Precondition
There exists a Character, saved as "victim", where The

Story Actions
Display Text: "<victim name> turns around suddenly as a bang erupts and our victim falls flat to the ground, cc
Edit saved Character "victim": set trait "Alive" to False
Making the story appear

- **Displaying Text** - printed text that can contain captured information (variables) from the rest of the plot fragment

<victim name> turns around suddenly at the sound of the click. Just as <victim name> notices the gleam of a barrel, a lound bang erupts and our victim falls flat to the ground, coughing and sputtering up the last bit of an ending life.
Making the story appear

- The time: 4 am, the place: the large, open city park in the middle of the city. Rachel Delores turns around suddenly at the sound of the click. Just as Rachel notices the gleam of a barrel, a loud bang erupts and our victim falls flat to the ground, coughing and sputtering up the last bit of an ending life. Jerry Fontana appears out of the darkness as the evil murderer, and escapes into the distance to seek shelter from the inevitable eyes of the police. Cut to a quiet single bedroom apartment. The shrill ring of a phone awakens Sherlock Holmes from a deep and relentless slumber ...
Making the story appear

- The time: 9 pm, the place: a dark rain-drenched alley off 15th street. Kim Bates turns around suddenly at the sound of the click. Just as Kim notices the gleam of a barrel, a loud bang erupts and our victim falls flat to the ground, coughing and sputtering up the last bit of an ending life. Fred Gordon appears out of the darkness as the evil murderer, and escapes into the distance to seek shelter from the inevitable eyes of the police. Cut to a quiet single bedroom apartment. The shrill ring of a phone awakens Dick Tracy from a deep and relentless slumber ...
Plot Fragments

Random Murderer

Author Goal
Do the Crime

Parameters
Name | Type
--- | ---
Victim Name | Text

Precondition
There exists a Character, where Trait "Name" != Victim
There exists an Environment, where Trait "Potential M" and Trait "Description" is saved as variable "crimeScen"
"Nearby Location" target name is saved as variable "hid"

Story Actions
Display Text: "The time: <crimeTime>, the place: <cr>
Pursue Subgoal "Attack the Victim (Victim Name)"
Display Text: "<murderName> appears out of the dark
inevitable eyes of the police."
Create new Crime Info Plot Point, saved as variable "crim"
Edit saved Crime Info Plot Point "crimeInformation": s
Create new Murderer Plot Point, saved as variable "murder"
Edit saved Murderer Plot Point "murderInformation": s

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Reading

- A single story is generated on the fly, to a text box, every time you click “Generate Story”

- It is slowed down, so readers can interact with it (next slide)
Interactivity

- Interactive Actions
  - Third person, Asynchronous
  - Author-specified **goals** which reader can activate at any time
  - Reader can interrupt the story at any time and perform meaningful, author-designed actions
  - Murder mystery examples: “Kill the detective”, “Change the murderer”, etc
What are “Interactive Actions”? 
Just regular author goals with plot fragments, that the author allows to be activated during the reading of the story.

These goals are executed completely before continuing with the previous story:
- Any changes to the story world are kept.
- All subgoals are activated (this could create very long “interruptions” of the story).
......He accepts his fate quickly, picks up the phone, and gathers the details about his new case. Once the call is finished, he jumps in the car, and heads to the crime scene. The facts: the victim is Rachel Delores, a 51-year old woman from Lyndhurst, New Jersey, found dead earlier today.

Cut to the dark hideout of our ruthless killer. Before sleeping for the night, Jerry Fontana stares coldly into a bathroom mirror and removes a thin latex mask. Underneath the disguise appears the face of John Smith, the true villain in this story.

Sherlock Holmes decides to interview John Smith, a friend of Rachel, for any clues as to why our victim was murdered. He finds that Rachel and John had a recent argument over money ...
Notes

- Tutorial posted online – Step by step instructions
- Documentation, sample story online, with these slides
- Wide Ruled is Windows XP, Vista, 7 only
  - Installation instructions posted online
  - Uses .NET 3.5
  - Works with Parallels, VMWare Fusion on OS X
- Email with installation, documentation info will be sent out (my email: jskorups@soe.ucsc.edu)
Story Canvas

- Visual, Storyboard-based authoring
- Same UNIVERSE-like story model, new graphical interface
Story Canvas

- Editing Plot Fragments

Precondition

The time: 8 pm, the place: a secluded beach at sunset. <name> and <name> meet each other...

Actions

Subgoal: Select Annoying Friend

Parameter A
Parameter B
Parameter C

Goal 1

Fragment 1
Fragment 2
Fragment 3

Subgoal: Introduce Conflict

Parameter A
Parameter B

Goal 2

Fragment 4
Fragment 5
Story Canvas

- Reading generated stories

The time: 8 pm, the place: a secluded beach at sunset. Julie and Mark meet each other...

- Nice sunset eh?
- My name is Mark, yours?

I think I'll go to the beach.

Ugh!

Hey Julie!

Who's that creep?

Later that night...

Where have you been?!
Story Canvas

- Currently in progress
- Interested students can make their Wide Ruled stories in Story Canvas
- Help us research!