10 INPUT "What is your name: ", US$
20 PRINT "Hello "; US$
30 INPUT "How many stars do you want: ", N
40 S$ = ""
50 FOR I = 1 TO N
60 S$ = S$ + "*
70 NEXT I
80 PRINT S$
90 INPUT "Do you want more stars? ", AS$
100 IF LEN(AS$) = 0 THEN GOTO 90
110 AS$ = LEFT$(AS$, 1)
120 IF AS$ = "Y" OR AS$ = "y" THEN GOTO 30
130 PRINT "Goodbye "; US$
140 END
How were games like Zork made?

- Infocom team created a virtual machine called the “Z-Machine”
- Created versions of the Z-machine for many different platforms
- Wrote code to run on that
- Essentially created a game engine for text-based interactive fiction
- **Inform** was designed by Graham Nelson to generate code for these Z-machines
What is an authoring system?

• A special purpose authoring environment (from game engines to interactive animation software) that can make some tasks much easier (and others impossible).

• For example
  – Infocom’s Z-machine and custom language to make writing interactive fiction easier and very portable
Different levels of authoring systems

• General IDEs like Eclipse
  – Eclipse assists you in writing in Java, integrated code editor with syntax highlighting, type checking, debugging, text completion shortcuts, etc.
  – Doesn’t write your Java code for you

• Special-purpose IDEs like Inform 7
  – Gives you a coding environment specifically tailored for writing interactive fiction
  – Makes writing/running your code and interacting with your story straightforward
  – Doesn’t write your Inform story for you

• Special-purpose systems that take on the creative burden themselves
  – Computational creativity
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Authorial and interpretive affordances

• Terms used by Michael Mateas when discussing Expressive AI

• Need to talk about general affordances first
Affordances

Donald Norman: “When used in this sense, the term *affordance* refers to the perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used.”
“The door at my work is infuriating” – someone on Reddit
Authorial and interpretive *affordances*

- **Authorial affordances**
  - The ‘hooks’ than an architecture provides for an artist to inscribe their authorial intention in the machine
  - Using Inform 7 to author IF works
    * An authorial affordance would be the ability to use hundreds of existing actions and phrases, as well as the ability to create your own

- **Interpretive affordances**
  - The hooks the system makes available to an audience to aid in the interpretation of the system, its actions, and its possibilities
  - “Intentional affordances support the goals an audience can form with respect to the work. The audience should be able to take an action and understand how the work is responding to this action.”
Author goals and plans in Universe

• Universe is an example of an author modeling story system
  – Generates extended (non-ending) plots for melodramatic fiction (soap operas)

• Author goals and plot fragments
  – Author goals and plans may make no sense from character viewpoint

• Associated with each plot fragment
  – Author goal it can achieve
  – Characters
  – Constraints
  – Ordered list of subgoals (steps)
Example character in Universe

Name: Liz Chandler
Marriages:
   Don Craig [1980]
   Tony Dimera
Stereotypes: Actor, Knockout, Socialite, Party-goer
Trait modifiers: (Sex F) (Age young-adult) (Wealth 3) (Promiscuity -3) (Intelligence 3)
Description:
   Wealth 8    Promiscuity 3    Competence NIL
   Niceness 0    Self-Conf 6    Guile 7
   Naiveté 7    Moodiness 6    Phys-Att 7
   Intelligence 7 Age young-adult Sex F
Goals: (Find-Happiness Become-Famous Meet-Famous-People)
Example plot fragment

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))
Universe algorithm

• Loop:
  – Pick a goal with no missing preconditions
  – Pick a plot fragment for that goal, achieving extra goals, if possible
  – Execute the plan, including adding new goals to the goal graph and producing story output

• Notice, Universe simultaneously pursues multiple goals
  – Tries to eventually satisfy all story goals
  – Tries to opportunistically satisfy several story goals with a single plot fragment
  – Plot fragments can add new goals
Recursively solving author goals

Plan (plot-fragment) library

<table>
<thead>
<tr>
<th>Goal: (churn ?him ?her)</th>
<th>Plan: forced-marriage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal: (churn ?him ?her)</td>
<td>Plan: lovers-fight</td>
</tr>
<tr>
<td>Goal: (together ?per1 ?per2)</td>
<td>Plan: seduction</td>
</tr>
<tr>
<td>Goal: (together ?per1 ?per2)</td>
<td>Plan: drunken-sneak-in</td>
</tr>
</tbody>
</table>

Pursue goal, e.g. (churn neil liz)

- Find all applicable plans
- Evaluate constraints
- Pick from satisfied plans

Pursue subgoals, e.g. (together * neil)

- Find all applicable plans
- Evaluate constraints
- Pick from satisfied plans

Pursue subgoals – if atomic, add output to story

Add daphne seduces neil
Authoring affordances

• Universe supports authoring chunks of story (plot fragments) organized around desired story effects (author goals)

• During generation, decision points appear in these places:
  – Selection among different plot fragments (preconditions) that accomplish the same goals
  – Binding of values in the world (characters, story state) for use in plot fragments
  – Parameterized atomic actions

• This is much more generative than choose your own adventure, in which every path (including every character and concrete character action) is pre-specified
The influence of the Universe system

• One of the early authoring systems
• Its use of goal planning and plot fragments has inspired many new authoring systems
  – Mateas’s work at GA Tech and UCSC
  – Michael Young at NC State
Lebowitz on his Universe system (2007)


• “I’ve got to admit to being surprised that anyone has run into UNIVERSE after all this time. It was a pretty small piece of work but one that was fun and I rather liked. We could have done a lot more with it these days — we were quite limited by computing power.”

• “The way I would have liked to take the project would be to combine the work with what I’d done on Machine Learning and have it build its own DB. Imagine reading the soap plot summaries on say TVGuide.com and automatically process them into fragments that could be reused (and real soaps certainly do reuse plot lines all the time). Ought to work.”
Dinner with the Quinns

The first course is ready laid out on the table, with salmon at one end and a dish of turbot at the other, together with a dish of macaroni, muffin pudding, and larded sweetbreads.

Elizabeth is at the Quinn dinner table, with their other guests.

The meal has only just begun, but a curious sort of unease hangs over the room; a sense of apprehension whose source she cannot identify.

New objective: Make an impression on your dining companions

Brown (to Mr Quinn): This will interest you, I know! I have begun work on a new poetic composition. It is to be an epic, and it concerns a young man who is entitled to a fortune, but who is generally believed to be a bastard, due to the lies of his father.
Versu: an engine for telling interactive stories about people

Versu is a simulationist interactive drama. It looks at first glance like a choose-your-own-adventure: the player is presented with text and static images, and chooses from a menu of options. But despite the conventional exterior, it is very different under the surface. The game world is modeled as a bunch of independent social practices, running concurrently, each of which provides affordances to the various actors in the scene. The actors choose which action to perform based on their own individual beliefs and desires.
Really new (1 day old) authoring systems by Stephen Lavelle
Really new (1 day old) authoring systems by Stephen Lavelle

• Flickgame
  – Game engine for making hypertext games w/o text, with clickable color patches instead
  – Twine + MSPaint

• Tinychoice
  – Make really minimalist hypertext games
  – Twine minus the GUI and probably other features
You stand between a field of sheep and a field of cows.
Go to the cows --> cowfield
Go to the sheep --> sheepfield

=COWFIELD=
Cows are rolling about.
Roll with the cows. --> cowfield2
Get out of this weird place --> start

=COWFIELD2=
You roll around for a bit, but you don't feel that you really fit in here.

=SHEEPFIELD=
Sheep are jumping up and down
Jump with the sheep. up and down. --> sheepfield2
Get out of this crazy place --> start

=SHEEPFIELD2=
You jump up and down, just like the sheep, but however hard and long you try they still look at you differently.
how to

example game

editor
C: copy current image
V: paste current image
Z: undo
+/-: increase/decrease brush size

player
F: go fullscreen

source code
github
made by increate [DONATE]
Next Time

AI systems that are creative on their own
Demo of how to release your Inform 7 project
Midterm: Due Wednesday May 13

• Due at beginning of class on Wednesday, May 13
• Midterm is available online as .doc and .txt

• Print out your midterm and bring it to class
  – Please type up your answers (no hand-written answers)

• Open-book, open-note, open-Internet
• Closed-classmate
  – This is an independent midterm
  – Please don’t discuss it with your classmates