

topics:

- character design
- deterministic behaviors

references:

- notes from:
  - *The Art of Game Design: A Book of Lenses*, by Jesse Schell. Morgan Kaufmann, 2008, chapter 18.
  - *AI for Game Developers*, by David M. Bourg and Glenn Seemann. O'Reilly Media, 2004, chapter 11.

character design

- broadly speaking, there are two types of *characters* in games:
  - *avatars*, which are the characters controlled by human players; these represent the human player in the game
  - *non-player characters*, or *NPCs*, which are all the other characters in the game (that are not controlled by the human player)
- when designing characters (of either type), there are 9 “tips” that Schell outlines in chapter 18 of his book, *The Art of Game Design*:
  1. *list characters’ functions*  
before you start worrying about which characters to put in a game and what they should look like and how they should behave as individuals, start by making a list of all the **functionalities** that you want any characters to fulfill in the game. then you can assign particular functions to particular characters later in the design process.

2. *define and use character traits*

you need to decide what traits particular characters should have, and you also need to decide how to convey those traits through your game. you obviously can use art—how they look—but you can also use sound—their voice, etc.—and how they behave to convey the traits. make sure that you define traits that you can convey within the context of the game.

3. *use the “interpersonal circumflex”*

this is a chart that has orthogonal two axes: *friendly* versus *hostile* and *dominant* versus *submissive*. you should place your characters within each of the possible quadrants (friendly and dominant, friendly and submissive, hostile and dominant, hostile and submissive). you may not have characters in every quadrant, but each character you define should consistently belong in one quadrant (unless the character goes through major personality transformation during the course of the game...)

4. *make a character web*

draw a *graph* where you label each node in the graph with the name of one of the characters in your game. then connect all the nodes with edges, and label the edges with the relationships between the two characters on the nodes at the start and end of the edge. in this way, you can define relationships like “sibling”, “lover”, “enemy”, “archrival”, etc.

5. *use status*

“status” as in social status or class. take advantage of the hierarchical relationships that might exist between a boss and a low-level employee. use those relationships to define behaviors that the boss would exhibit (e.g., riding in the back of a limousine) and behaviors that the low-level employee would exhibit (e.g., driving the limo).

6. *use the power of voice*

many games use voice actors to have the characters in the games speak. different voices (language, tone, accent) can convey different personality and behavioral traits, such as stuttering for an insecure character or yelling for an angry character.

7. *use the power of face*

your characters can have faces with features that help convey their personality traits. a wide-open mouth and raised eyebrows can indicate shock or surprise. teary eyes and a frown can indicate sadness.

8. *powerful stories transform characters*

characters can evolve throughout the course of a game, especially a game with a complex storyline. for example, in a cinderella game, she might be a ragged servant in the beginning, but at the end, she's a beautiful princess!

9. *avoid the "uncanny valley"*

the uncanny valley is a phenomenon that was discovered by a Japanese roboticist named Masahiro Mori. he conducted experiments with human subjects that measured the empathy the humans felt toward a range of objects, including: a rock, a teddy bear, a puppy, a humanoid robot, and a human. it was expected, in the order given above, that the level of empathy would gradually increase as human subjects were asked about a rock versus a teddy bear, and so on, peaking at being asked about other humans. the empathy level did increase as expected, except when it came to the humanoid robot, in which case, the empathy level dropped significantly—this is the "uncanny valley". the severe drop in level of empathy that humans tend to feel towards artificial objects (physical robots and virtual agents) which attempt to closely resemble humans in appearance. the same phenomenon is attributed to animated movies and video games.

### deterministic behaviors

- *deterministic* behaviors are also referred to as *rule-based* behaviors
- these are behaviors that are fully specified ahead of time—i.e., before game play.
- they are characterized by being defined as a series **IF-THEN** rules.
- for example:

```
IF ( princess sees obstacle ahead )  
THEN princess moves away from obstacle
```

```
IF ( princess sees frog ahead )  
THEN princess moves toward frog
```

```
IF ( princess is next to frog )  
THEN princess kisses frog
```

```
IF ( princess kisses frog )  
THEN frog turns into prince
```

- there are basically two components of games that use rule-based behaviors:

1. *rules memory*

this is the set (database) of **IF-THEN** rules that define the behavior of the game environment and all the NPCs in the game. it represents the information that the game designer wants to put in to the game.

2. *working memory*

this is the set of facts assumed and assertions made during game play. it represents the state of the game at run-time.

- *inference* is the process by which characters use the rules memory.

- there are basically two types of inference:

- *forward chaining*

- this is when the character evaluates the **IF** part of each rule in the rule set, stopping when it finds a rule that is true; in which case, the rule *triggers* or *fires*.

- *backward chaining*

- this is when the character looks at the **THEN** parts of rules to figure out what must be true in order to match the character's goals. then the character knows which **IF** rules have to be triggered in order for the **THEN** conditions to come true.

- using our example rule set on a previous slide, if the goal of the game is for the frog to turn into a prince, then the princess has to kiss the frog; in order to kiss the frog, the princess has to be next to the frog; in order to be next to the frog, the princess has to move toward the frog, etc.

to do

- read chapter 18 from *The Art of Game Design*