Algorithms and Networking for Computer Games

Chapter 1: Introduction

http://www.wiley.com/go/smed

Definition for 'play'

'[Play] is an activity which proceeds within certain limits of time and space, in a visible order, according to rules freely accepted, and outside the sphere of necessity or material utility. The play-mood is one of rapture and enthusiasm, and is sacred or festive in accordance with the occasion. A feeling of exaltation and tension accompanies the action, mirth and relaxation follow.'

— Johan Huizinga, *Homo Ludens*

Definition for 'game'

'a universal form of recreation generally including any activity engaged in for diversion or amusement and often establishing a situation that involves a contest or rivalry'

— *Encyclopædia Britannica*

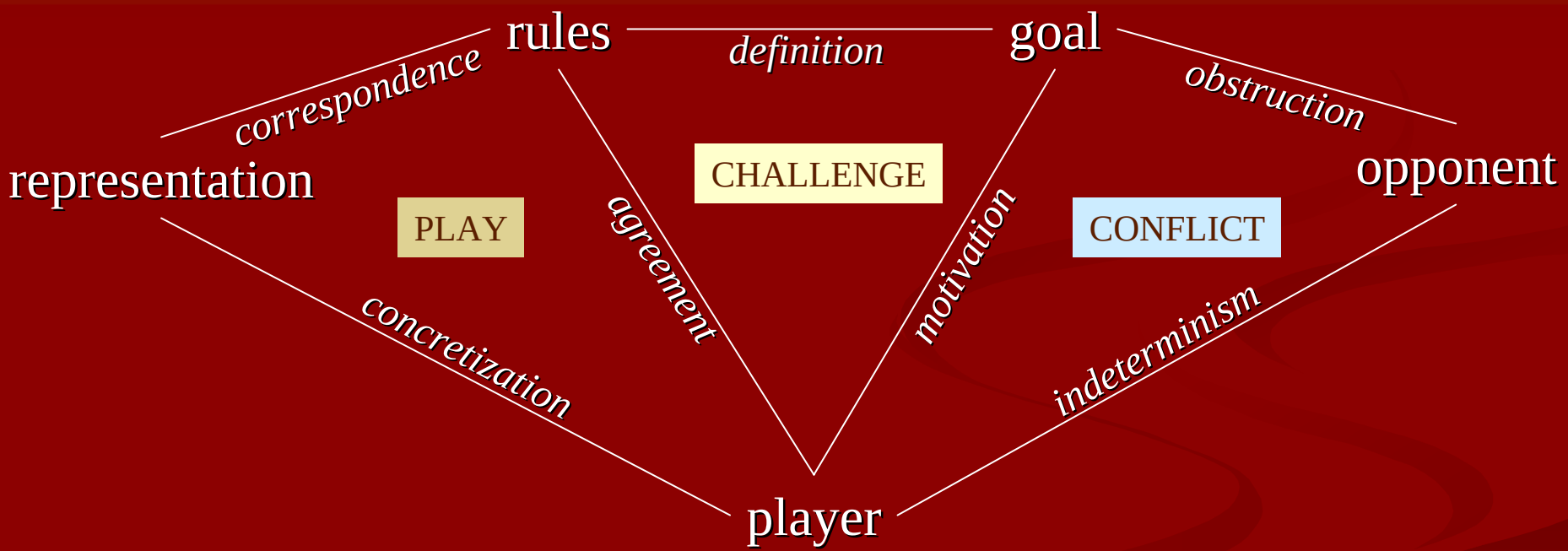
'Etymology: Middle English, from Old English *gamen;* akin to Old High German *gaman* amusement'

— *Merriam-Webster Dictionary*

Components of a game

- Players: willing to participate for enjoyment, diversion or amusement
- Rules: define limits of the game
- Goals: gives a sense of purpose
- Opponents: give arise to contest and rivarly
- Representation: concretizes the game

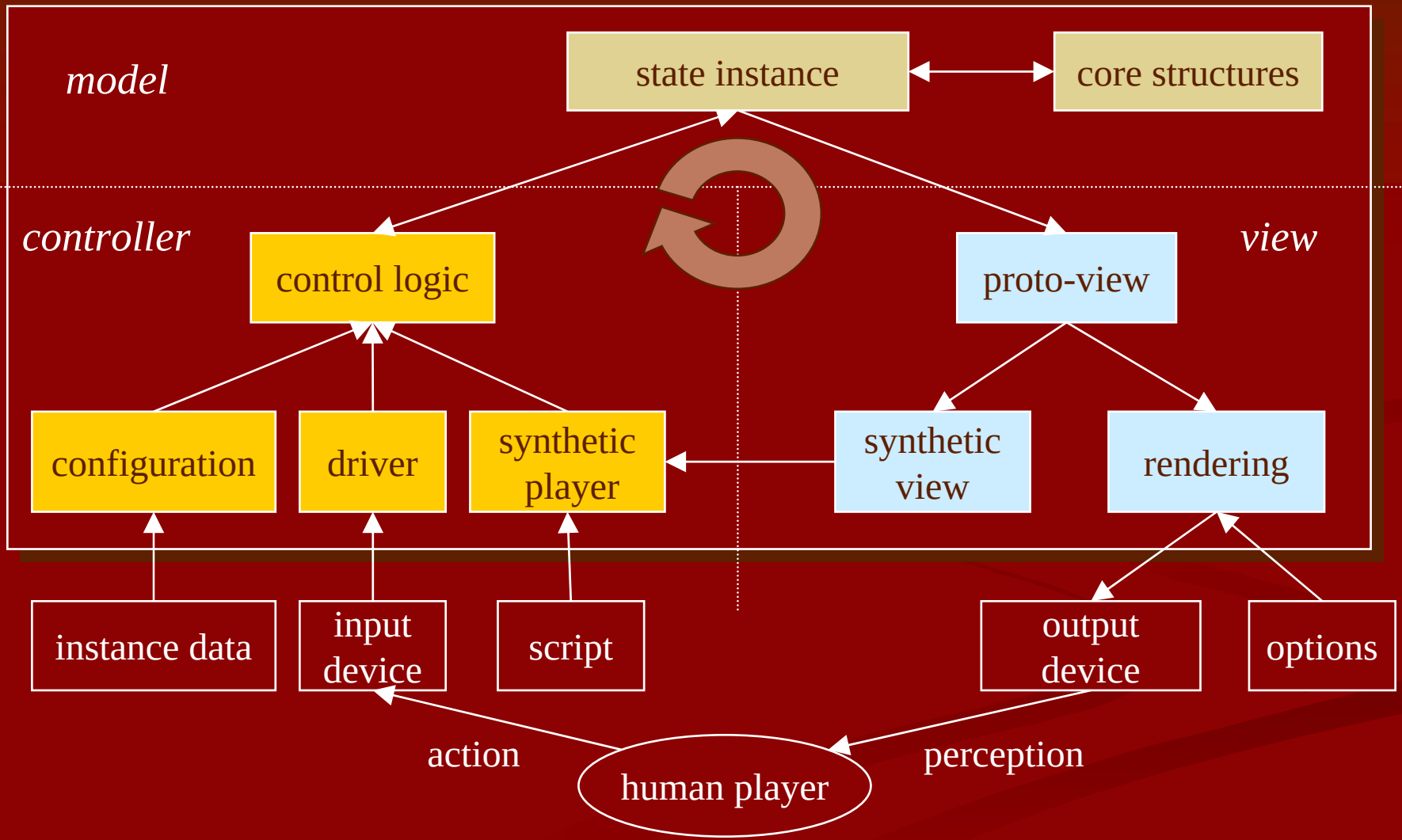
Components, relationships and aspects of a game



Definition for ‘computer game’

- a game that is carried out with the help of a computer program
- roles:
  - coordinating the game process
  - illustrating the situation
  - participating as a player
- → Model–View–Controller software architecture pattern

Model-View-Controller



Simulations vs. computer games

Synthetic players

- synthetic player = computer-generated actor in the game
  - displays human-like features
  - has a stance towards the human player
- games are anthropocentric!

Humanness

- human traits and characteristics
  - fear and panic (*Half-Life*, *Halo*)
- computer game comprising only synthetic players
  - semi-autonomous actors (*The Sims*)
  - fully autonomous actors (*Core War*, *AOE2*)
- stance towards the human player
  - enemy
  - ally
  - neural

Enemy

- provides challenge
  - opponent
- must demonstrate intelligent (or at least purposeful) behaviour
- cheating
  - quick-and-dirty methods
  - when the human player cannot observe enemy's actions

Ally

- augmenting the user interface
  - hints and guides
- aiding the human player
  - reconnaissance officer
  - teammate, wingman
- should observe the human point of view
  - provide information in an accessible format
  - consistency of actions

Neutral

- commentator
  - highlighting events and providing background information
- camera director
  - choosing camera views, angles and cuts
- referee
  - judging the rule violations
- should observe the context and conventions

Multiplaying

- multiple human players sharing the same game
- methods:
  - divide the screen
  - divide the playtime
  - networking

Games and story-telling

- traditional, linear story-telling
  - events remain from time to time (almost) unchangeable
  - books, theatre, cinema
  - participant (reader, watcher) is passive
- interactive story-telling
  - events change and adapt to the choices the participant makes
  - computer games
  - participant (player) is active

Characteristic features of story-telling 1(2)

- *contingency*: to what extent the time and space of the story depend on the real time and space?
- *narrative representation*: how the story is presented?
- *presence*: how far the watcher/participant shares the time and space of the story?
- *interactivity*: how much the watcher/participant takes part in the story process?

Aylett & Louchart: "Towards a Narrative Theory of Virtual Reality", *Virtual Reality* 7(1):2–9, 2003.

Characteristic features of story-telling 2(2)

	Cinema	Theatre	Literature	Games
Contingency	little	moderate	little	strong
Narrative representation	visual	visual	mental	visual
Presence	non-physical	physical	non-physical	non-physical, immersive
Interactivity	no	no/yes	no	yes

A story is always told to human beings

- story-telling is not about actions but reasons for actions
  - humans use a story (i.e., a narrative) to understand intentional behaviour
  - how can we model and generate this?
- story-telling is about humans
  - humans humanize the characters' behaviour and understand the story through themselves
  - how can we model and generate this?

Levels of interaction 1(2)

- plot
  - varies according to the decisions the player makes
    - linear: the player advances via fixed plot-points
    - branching: the player chooses the continuation in a plot-point
    - parallel paths: the player can make choices between fixed plot-points
    - threaded: the player can choose among parallel and interconnected plots

http://www.igda.org/writing/InteractiveStorytelling.htm

Levels of interaction 2(2)

- characters
  - player's choices are reflected in the words and deeds of the character
- theme
  - player's choices are reflected in the theme of the story

Challenges for story-telling 1(2)

- themes
  - good plot and round characters are not enough to create a good narrative
  - there must be a theme behind it (e.g., betrayal, revenge, love)
- controlling the story
  - interactive drama can flatten and lose its interest
  - something has to make sure that the events stay dramatically compelling

Bringsjord: "Is It Possible to Build Dramatically Compelling Interactive Digital Entertainment", *Game Studies* 1(1), 2001.

Challenges for story-telling 2(2)

- strong, autonomous characters
  - characters must be personalities
  - stories are often remembered by personal characters
- personalization
  - if we want to the character to act intelligently towards the player, it must understand her
  - based on its own beliefs deduce other characters' and human's beliefs.

Other game design considerations

- customization
- tutorial
- profiles
- modification
- replaying

→ parameterization!