



**TAKE
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UA - GAMES

Universally Accessible Games

ua-games.gr

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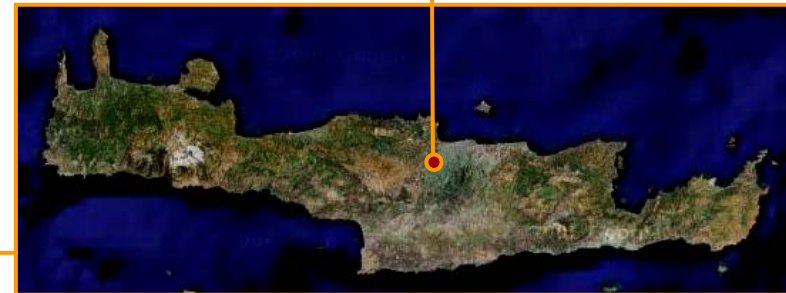
Foundation for Research & Technology - Hellas (FORTH)





UA - GAMES
Universally Accessible Games

- **Research activity @**
Human-Computer Interaction Laboratory
Institute of Computer Science (ICS)
Foundation for Research and Technology - Hellas (FORTH)





UA-Games Activity: What we do

- Research, design & develop
 - Universally Accessible Games
- Create new & test
 - Concepts
 - Interaction techniques
 - Methods
 - Software tools



Key Results

- **Method**
 - Unified Design for UA-Games
- **Concept**
 - The Theory of Parallel Game Universes
- **Games**
 - 2-fold role: proofs of concept + case studies
 1. UA-Chess
 2. Access Invaders
 3. Game Over!
 4. Terrestrial Invaders





Universally Accessible Games

- **Follow the principles of Design for All**
 - can adapt to different individual gamer characteristics
- **Can be concurrently played among people with different abilities**
 - ideally also while sharing the same computer
- **May be played**
 - on various hardware and software platforms
 - within alternative environments of use
 - utilizing the currently available device
 - while appropriately interoperating with assistive technology add-ons





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Why UA-Games?

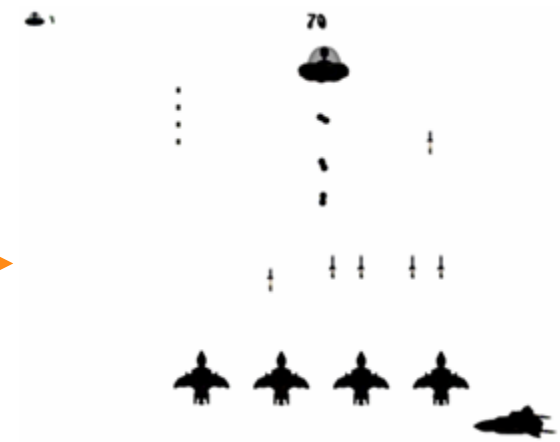
- The concept has been proposed to overcome the limitations of previous approaches to game accessibility
- Primarily emphasize game accessibility
 - but also put forward the objective of creating multiplayer games that are concurrently accessible to people with diverse abilities





What is a UA-Game?

- A game that can adapt its interface and content to best serve the requirements of a specific gamer under specific gaming conditions



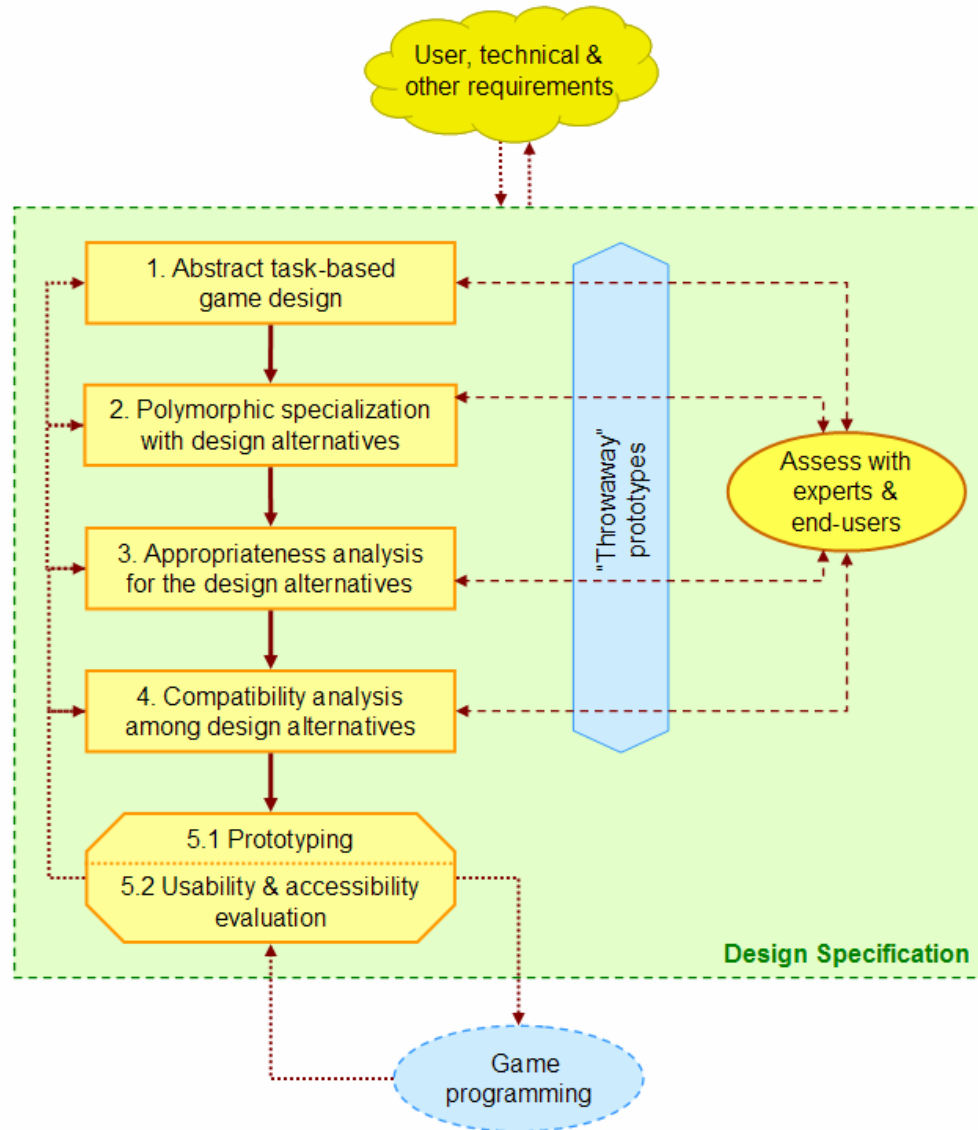


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Designing UA-Games

- 1. Design the interactive game space at an abstract level**
 - in a representation-independent way
 - eliminating all references to the physical-level of interaction
 - 2. Appropriately capture the lower-level design details**
 - incrementally specializing towards the physical level of interaction by addressing particular user characteristics
- **The direct involvement of several representative end-users (gamers) with diverse characteristics, as well as domain experts (usability, accessibility, gaming, etc.) is required**
 - **Unified Design method**
 - Can represent an open set of alternative physical designs under a common abstract design umbrella

Unified Design Method



Grammenos, D. and Savidis, A. (2006). **Unified Design of Universally Accessible Games (Say What?)**
Gamasutra Feature article, December 7, 2006

http://www.gamasutra.com/features/20061207/grammenos_01.shtml





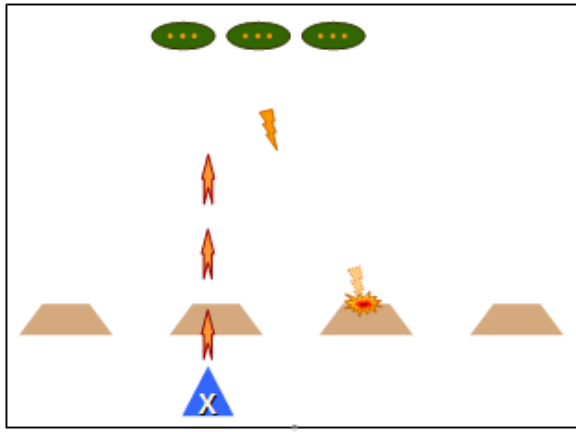
The Theory of Parallel Game Universes

- Aims to provide a way for creating multiplayer games where people with diverse abilities can play cooperatively or even against each other
- Basic idea
 - Allow each player to play in a different “game universe” and then somehow project each universe to the other(s)
- Game Universe
 - An instance of the game after it has been adapted to best suit the requirements and needs of a particular gamer playing under particular conditions

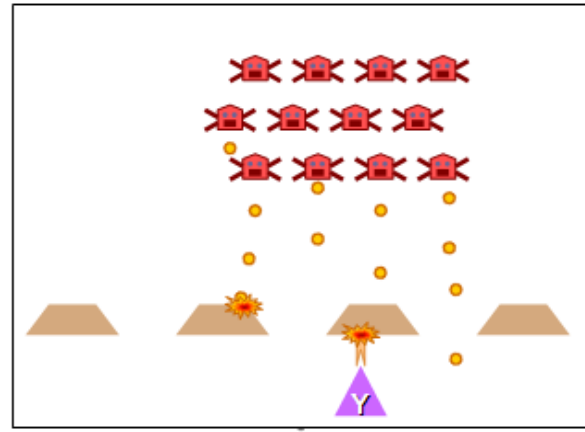


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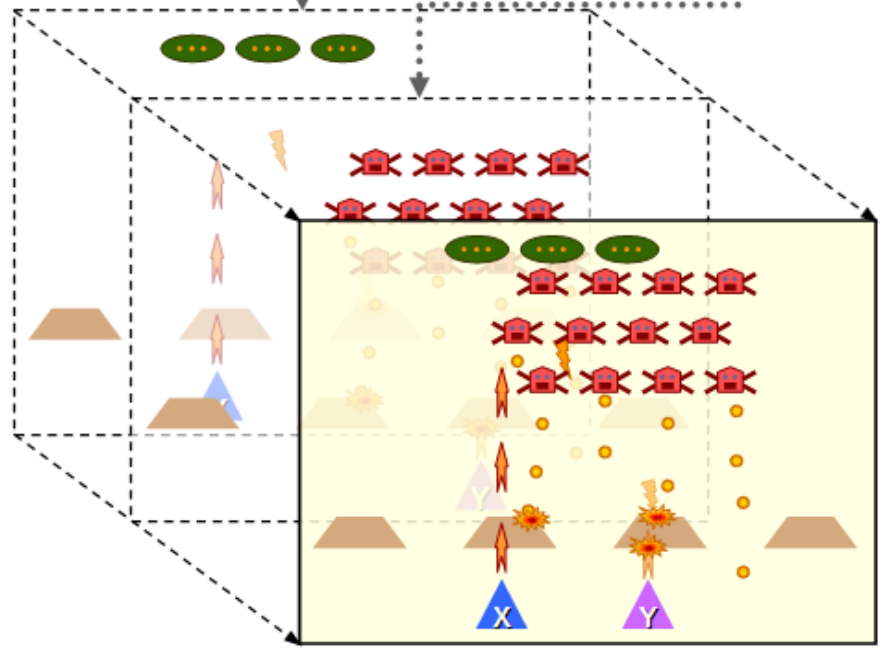
PGUs – Example 1



Single player game (X)



Single player game (Y)

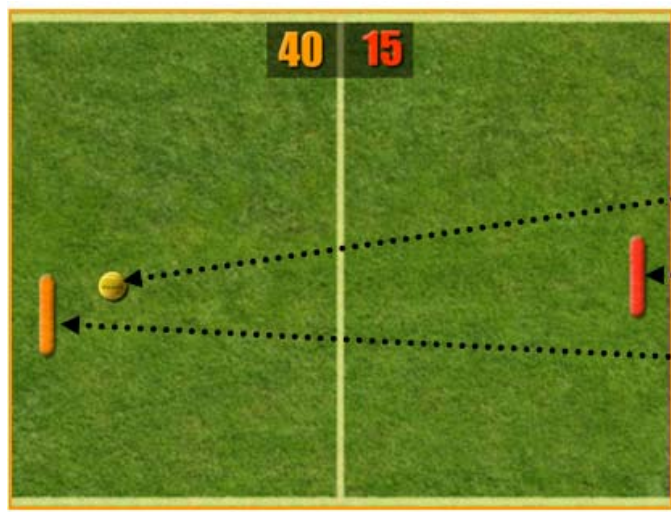


Multiplayer game ($X \cap Y$)



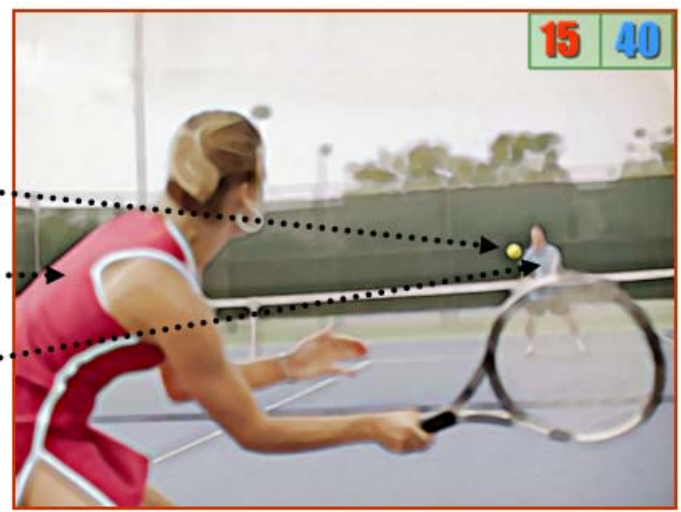
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PGUs – Example 2



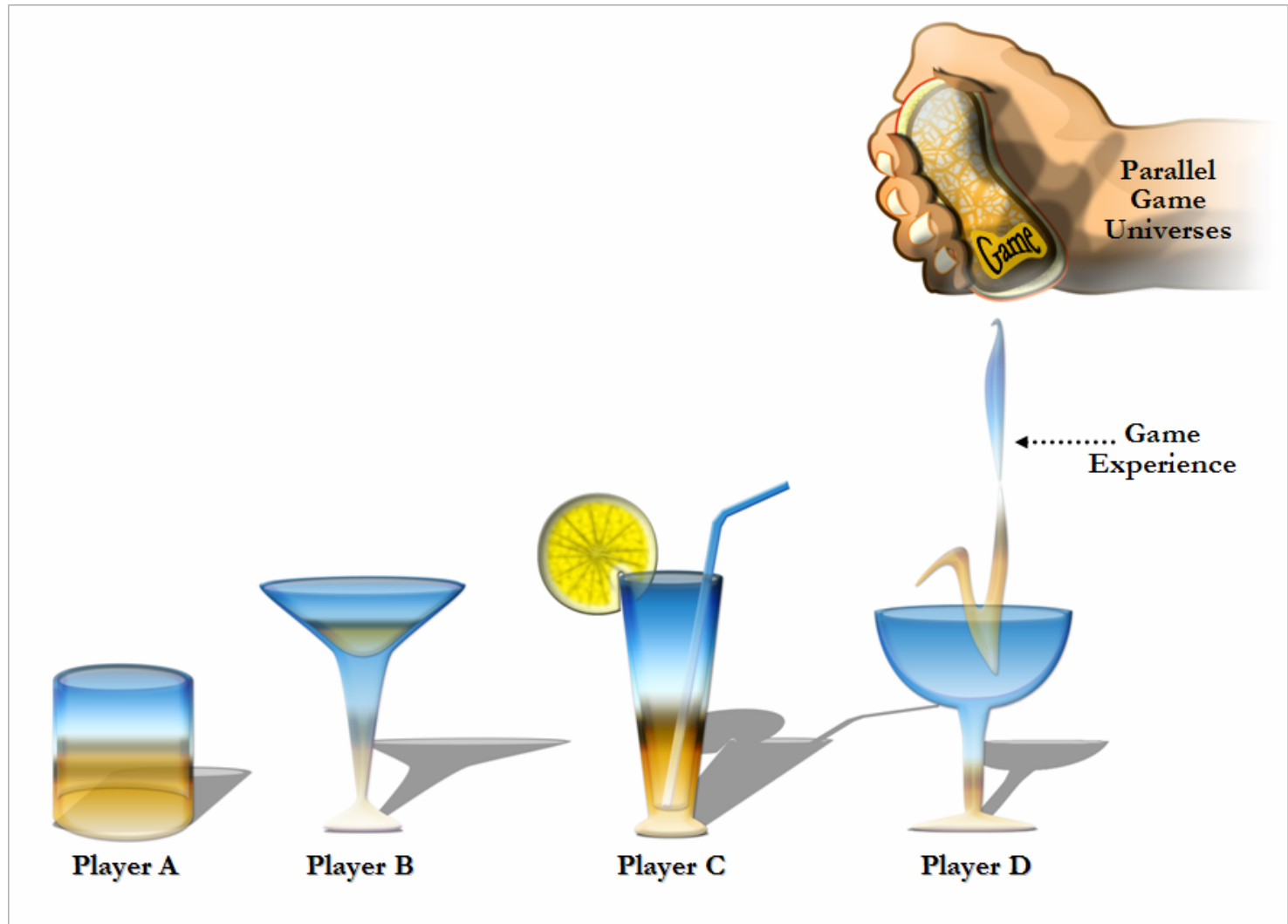
Player's A game universe

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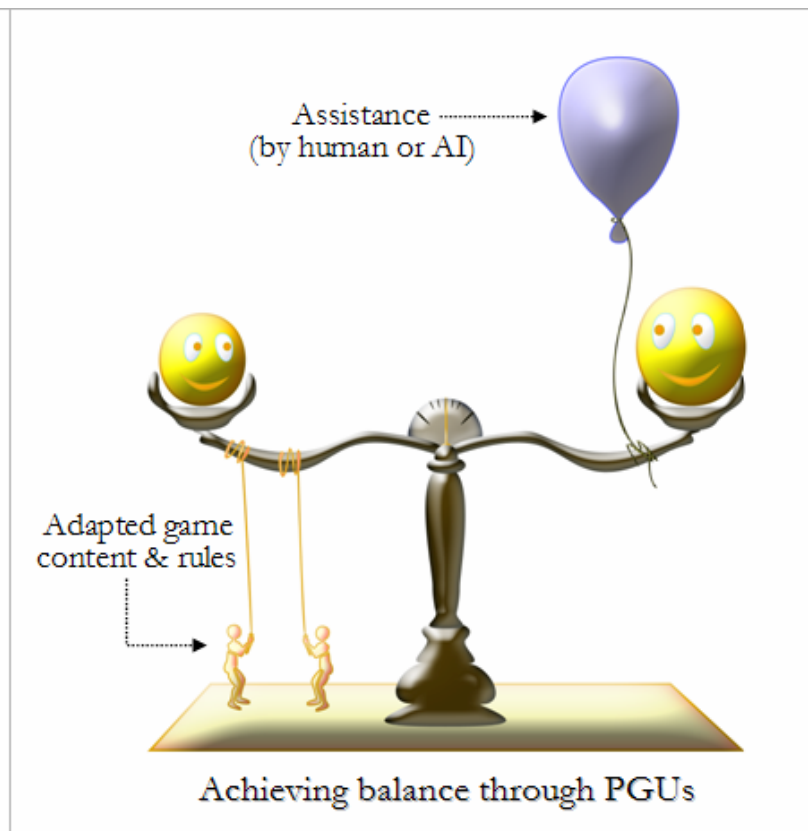
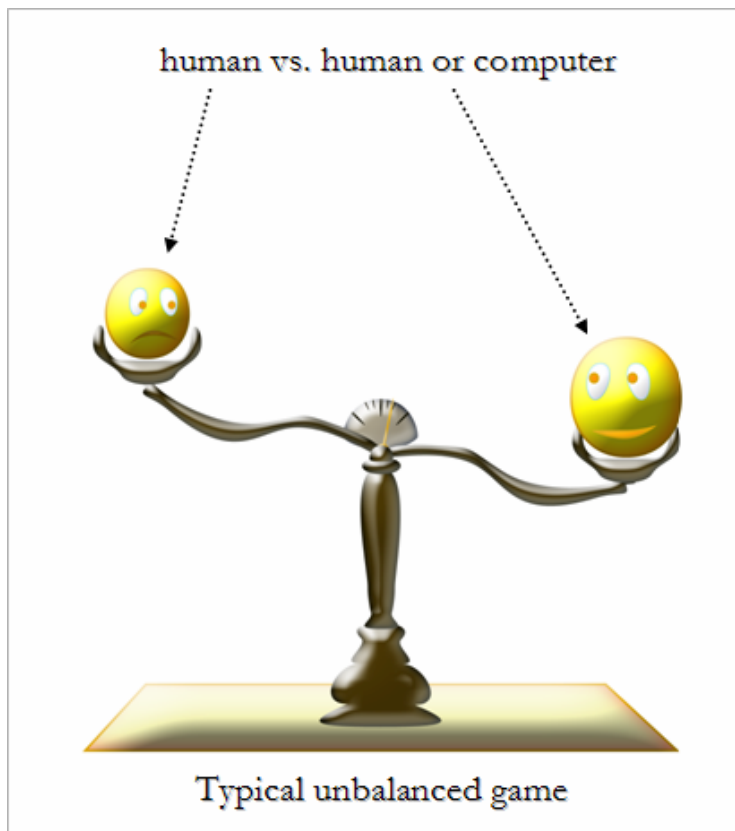


Player's B game universe

Key Properties - Individualization



Key Properties - Balance





UA-Games vs. Serious Games

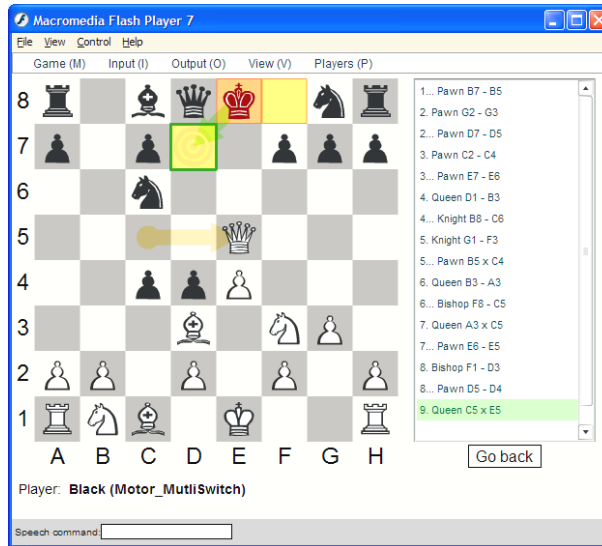
- Serious Games are games that, in a broader sense, “educate”
- 3 key qualities of education are:
 - Individualization
 - of both content & delivery method
 - Learner-centered design
 - Equality
 - All learners have the right to access the same educational content
 - in terms of both quality & quantity
 - Social setting
 - That’s where education works best
- ➔ Which are the very same qualities that UA-Games strive for in computer games

Game Developers Conference 07

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The Games....





UA-Chess

- Can be played through a Web browser
- Alternative I/O modalities & interaction techniques
- Customizable player profiles
- Fully accessible through:
 - the mouse
 - the keyboard
 - 1-3 switches
 - speech recognition
- Built-in screen reader





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UA-Chess DfA Award

- Nominated for the final jury decision of the European Design for All Awards set by the European Commission in the category “AT/Culture, Leisure and Sport”





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Access Invaders

- **Accessible remake of the classic Space Invaders game**
- **Highly customizable**
 - Creation & use of unlimited user profiles
- **Each game parameter can be adapted based on the player's profile and the current game level**
- **Multi-player games**
 - Unlimited number of concurrent players
 - Each player can be using a different profile





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Experimental input techniques

- **Musical input**
 - e.g., whistling

- **Vision-based gesture recognition**
 - In cooperation with the Computational Vision and Robotics Laboratory of ICS-FORTH



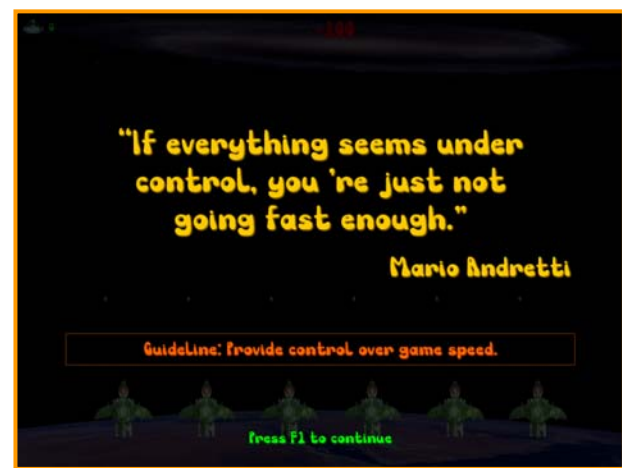


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Game Over!

Because no one can save the Universe...

- The World's First Universally Inaccessible Game!
- An educational tool for disseminating, understanding and consolidating game accessibility guidelines
- Aims to provide game developers a first-hand (frustrating) experience of how it feels interacting with a game that is not accessible due to the fact that important accessibility design rules were not considered or applied.
- Contains 21 levels, each of which violates a fundamental game accessibility guideline





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Terrestrial Invaders

- Packed with accessibility features that can be switched on and off, both off-line and on-the-fly:
 - Adjustable game speed
 - Adjustable size of all game graphics
 - Adjustable FX, music and speech volume
 - 2D sound for localizing objects on a 2D plane
 - Spatially localised captions using text and / or graphics for visualizing all game sounds
 - Reading aloud and automatic scanning of the game menus
 - 2 high contrast modes
 - 2 alternative types of audio descriptions that verbalise the relative position of game elements
 - The option of using simple shapes to render all graphic elements



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Terrestrial Invaders

- Can be played using diverse alternative controls and interaction techniques, such as:
 - Multiple keyboard keys
 - or switches
 - A single key
 - i.e., one-switch game
 - The mouse
 - By typing keywords
 - e.g., “left” to go left, etc.
 - By blowing into a microphone





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