

# An Approach Facilitating Game Development Using Behavior Design Patterns

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## Introduction

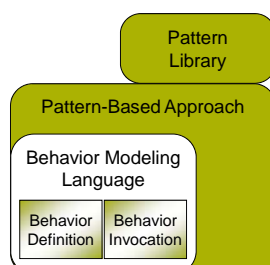
- **Complex** nature of game development is exploding
- Need for improved development process
- Behavior modeling traditionally done through scripting
  - Scripting languages not tailored for games
  - No abstraction mechanisms for behavior

→ **CoDePA** to facilitate behavior modeling

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## Background & Goals

- Graphical Behavior Modeling Language
  - High-level modeling concepts: **Behavior, Actor, Event, Condition, ...**
  - Action-oriented approach



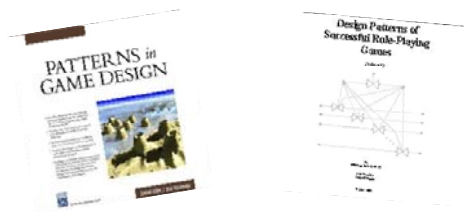
- **Goals of CoDePA**

- Introduce a pattern-based approach into the game development process
- Provide the necessary artifacts supporting this approach

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## Motives

- Current practice in specifying behavior
  - Search for existing scripts close to what they want
  - Modify it to fit their needs
  - Errors (non correct scripts or wrong behavior)
- In games behaviors are often recurring
  - Algorithms, code structures are general knowledge



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## Generative Behavior Patterns

- **Design Patterns**
    - Allow capturing existing expertise
    - Promote reuse
  - **Generative Design Patterns**
    - Enable automatic code generation
- **Visual Generative Design Patterns**
- Express them using our graphical notation

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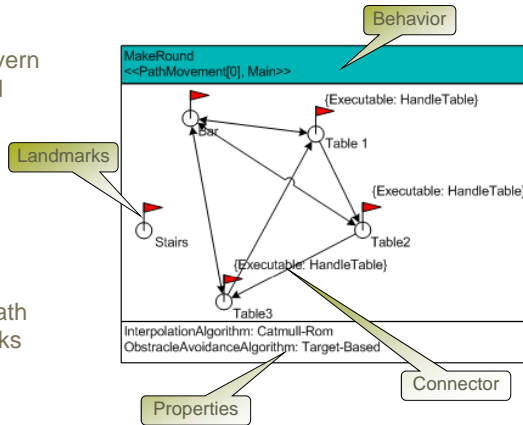
# Generative Behavior Patterns

- Example

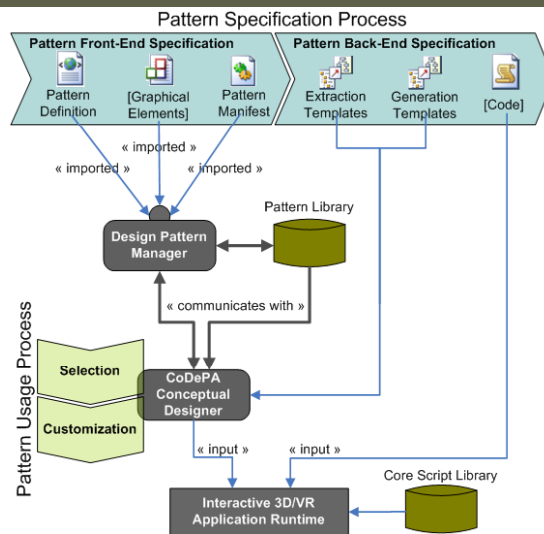
Scenario: Waitress in a virtual tavern does her round taking orders and serving the customers.



General Solution: Object moves in a predefined path passing several landmarks



# CoDePA: Architecture



## CoDePA: Using Behavior Patterns

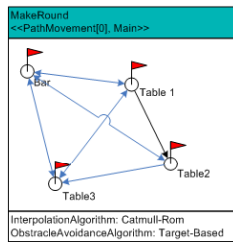
- Example (continued)



Object move in a predefined path e.g. Path of a Waitress

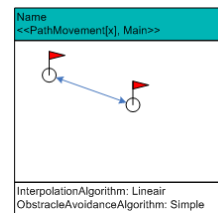


Select:  
Path Movement



Customize:

- Specify name and existing algorithms to use
- Specify the path by means of landmarks



Generate Scripting Code

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## CoDePA: Building Behavior Patterns

### 1. Pattern Front-End

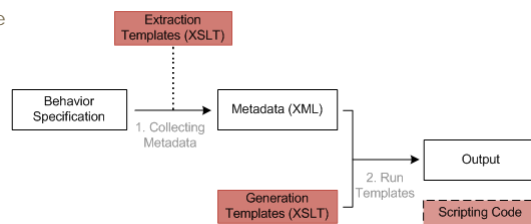
- Used by the behavior designer
- **Pattern Manifest**
  - Metadata
- **Graphical Elements**
  - Collection of shapes required for the pattern
  - Predefined shapes available (smoother integration with current BML)
- **Pattern Definition**
  - Express (in a graphical way) how the generic pattern is composed
  - Indicates the possible kinds of customization

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## CoDePA: Building Behavior Patterns

### 2. Pattern Back-End

- Hidden from the behavior designer
- Transformation Templates
  - Collecting metadata and enable generation of scripting code
- Scripting Code
  - Actual implementation of the behavior
  - Used by the generated code



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## Conclusions & Future Work

- Conclusions
  - No systematic approach for modeling behavior in Computer Games
  - Conceptual Pattern-Oriented approach
    - Integration of **Generative Behavior Patterns** into a graphical notation
- Future Work
  - **Evaluation** of the approach
  - Integration of concepts from Software Variability
  - **Extension** of the pattern library

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## Questions?



Thank you for your attention! Any Questions?

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