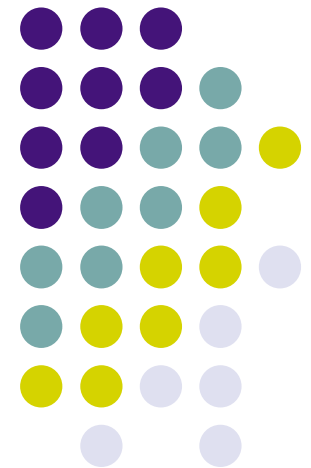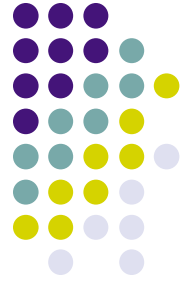# Expect the Unexpected

AI in Games and Narrative

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Scripted Behavior

- Most of the dynamic behavior in today's (NPC) games as well as interactive narratives is scripted.

- What does that mean?
  - The systems have "reflexes"
  - For a given set of stimuli a system will have a predescribed set of reactions

- Consequences:
  - Rote behavioral patterns
  - Difficult to adapt to new situations; new sets of stimuli
  - Users will get "bored" because they can guess the underlying scripted behavioral patterns[1]
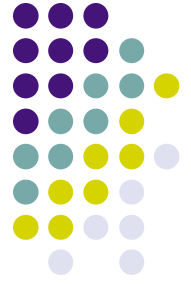
[1]*A Theory of Fun*, R. Koster, Paraglyph Press, 2005

Creativity
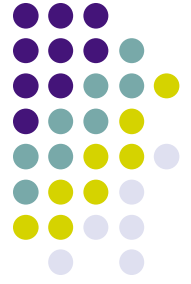
- **Creativity** is a mental process involving the generation of new ideas or concepts, or new associations between existing ideas or concepts.

- The products of creative thought usually have both *originality* and *appropriateness*.

Wikipedia (2006)

Creative Systems

- If we modify the definition of "Creativity" slightly:

  - ***Creativity*** *is a* ~~*mental*~~ *process involving the generation of new ideas or concepts, or new associations between existing ideas or concepts.*

- Then creativity can be viewed as the defining property of *any kind* of procedure that can generate novel behavior *etc* beyond predescribed reflexes.[2]

- By incorporating a creative procedure into a game or interactive narrative we can avoid repetitive behavioral patterns.

[2] Of course the second part of the definition still needs to hold: *originality* and *appropriateness.*
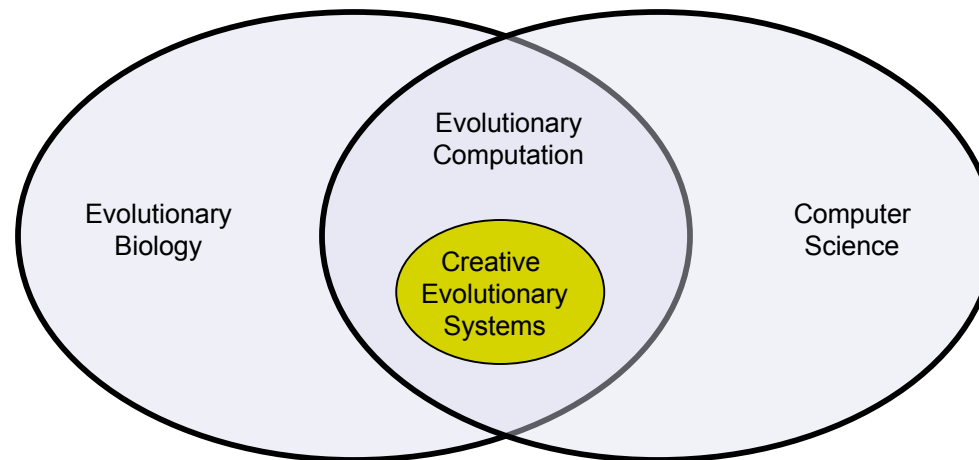
Creative Evolutionary Systems
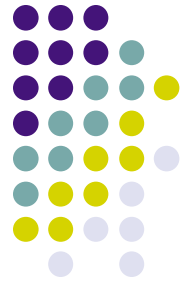
- This new definition of creativity allows us to investigate artificial systems that generate new ideas and concepts.

- Nature has one prime example for generating novelty - *Evolution*

- We can mimic natural evolution with computation - *Evolutionary Computation*

Creative Evolutionary Systems, P. Bentley and D. Corne (eds.), Morgan Kaufman, 2002.

Creative Evolutionary Systems

Evolutionary computation sits at the intersection of evolutionary biology and computer science

Evolutionary
Computation

Evolutionary
Biology

Computer
Science

Creative
Evolutionary
Systems

Creative Evolutionary Systems
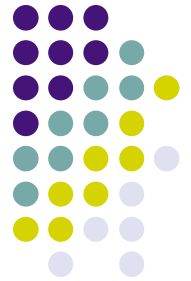
```
Procedure Evolve Idea
    Initialize pool of ideas
    Extract "best idea" from pool
    Display "best idea"
    While critique available do
        Randomly mix-and-match the ideas in the pool
        Create a new pool of ideas using selection
        Extract "best idea" from pool
        Display "best idea"
    End while
    Return "best idea"
End procedure
```
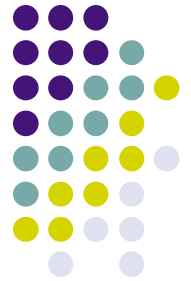
Creative Evolutionary Systems

- Because of the built-in randomness, creative evolutionary systems easily adapt to changing circumstances.

- It is interesting to note that these systems rely on critique in order to develop new ideas.

- Critique can come in different forms, e.g.
  - Examination of strategies evolved in game playing (successful strategies garner positive critiques and vice versa)
  - User feedback in interactive narrative - the user might critique different generated narrative fragments as successful or not so successful
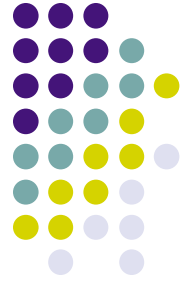
Finally…

- To keep things interesting in interactive environments we need to look beyond scripting or "reflexes"

- We need procedures that model creativity
  - Where the key aspects are new ideas that are original and appropriate.