Ch 11: Scripting with Lua

Quiz # 5
Discussion

Data-Driven Software Design

Outside Materials

Why Data-Driven S/W Design?

- Non-Programmers
- Change in the code with no compilation
- More flexibility and Extensibility

Function: Approach 1

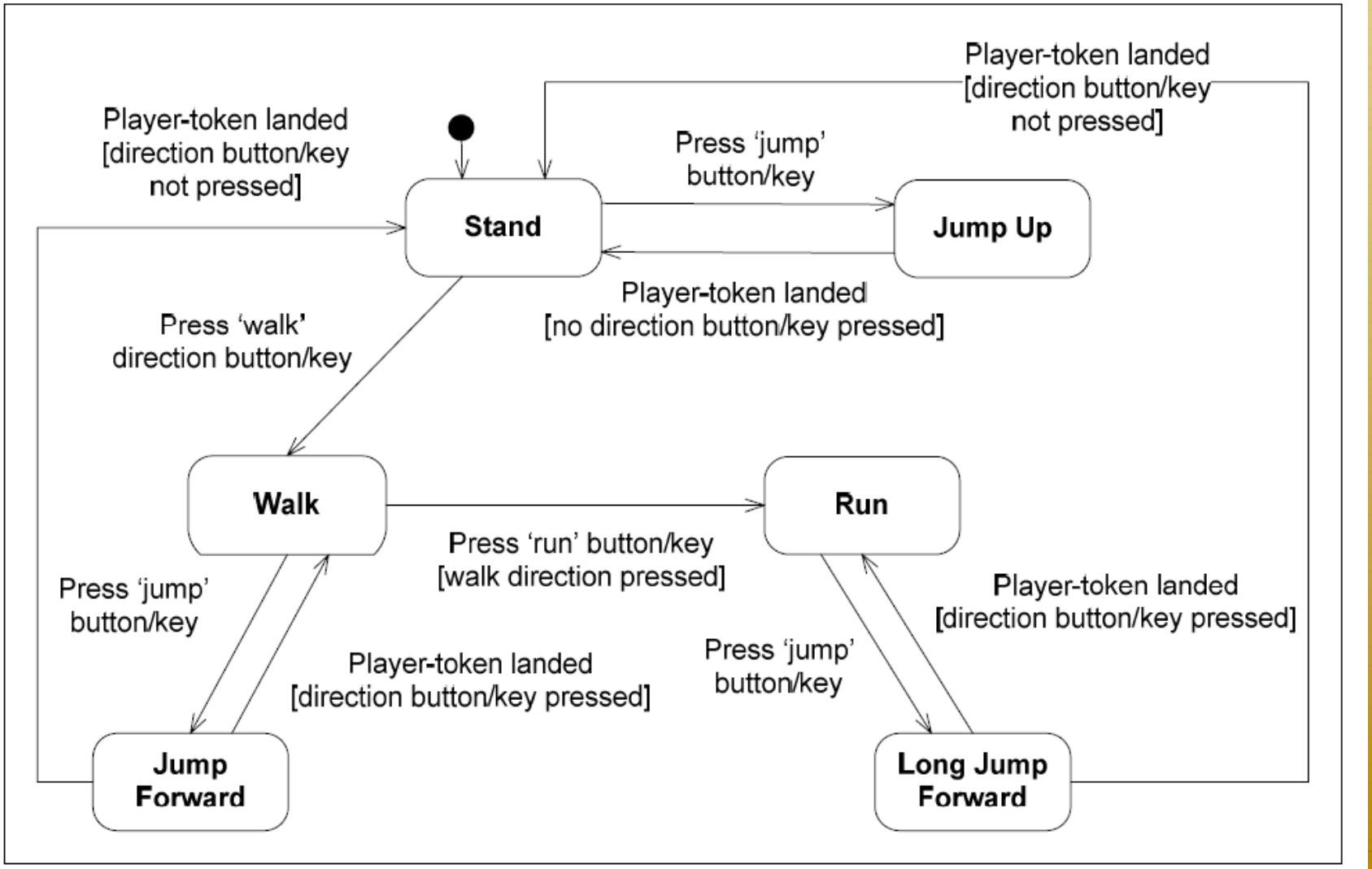
```
Action Func decision (state)
{
    if (state is X) then action = a
    if (state is Y) then action = b
    return action;
}
```

Function: Approach 2

```
Action Func decision (state)
{
    Lookup Table (State, action);
    return action;
}
//table here is defined by the user
```

Examples in Games

Game Design Example: user interface



Game Design Example: user interface

- What are the mappings in this interface?
- How do you abstract them?
- Do you think it is a good idea to abstract them? Why?

Game Design Example: Balance

- Manipulating numbers
- Introducing chance
- Manipulating rules
- Use trade-off matrix
- Encoding the game as another balanced game, e.g. Rock, Paper, Scissors

Game Design Example: Balance

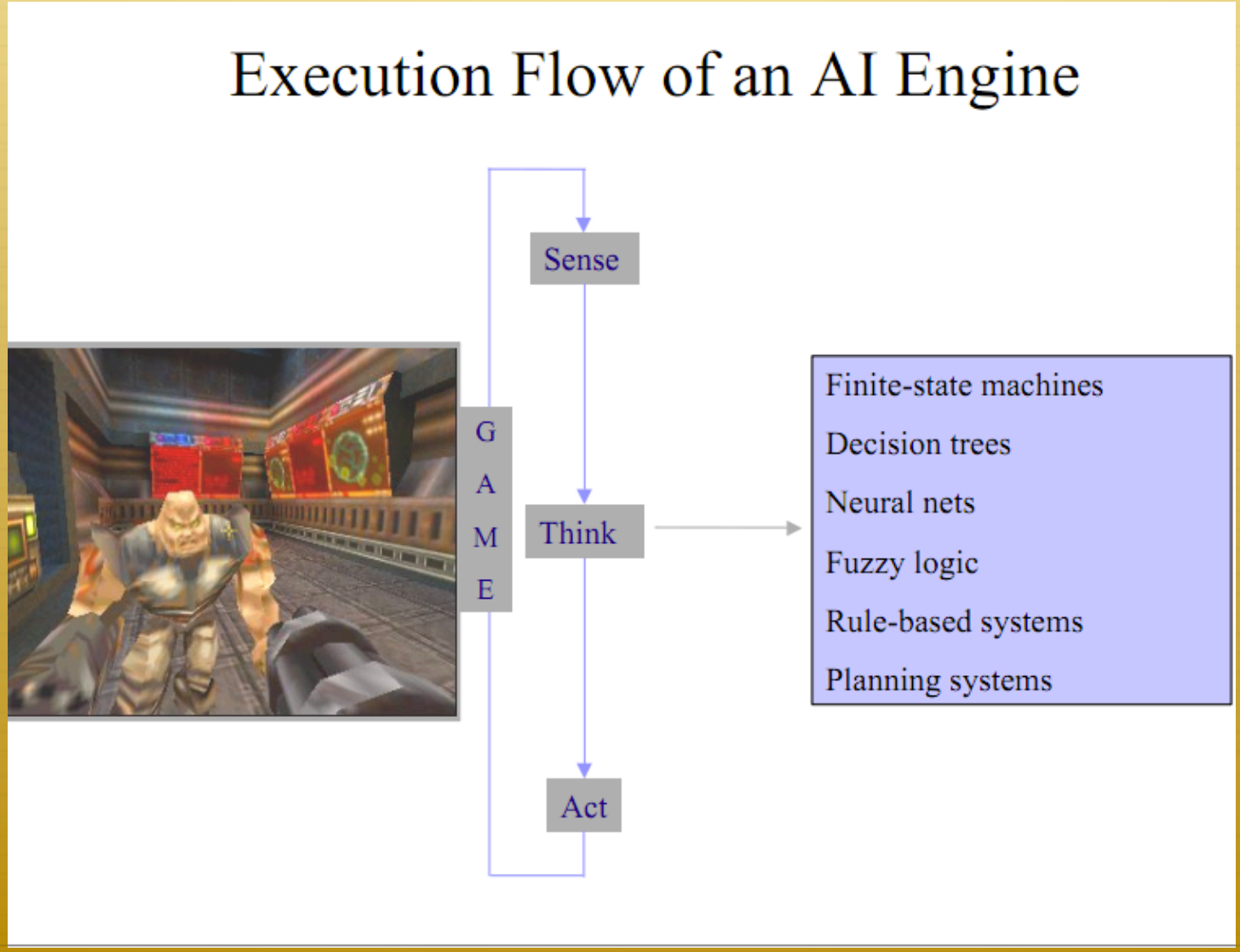
- Are strategies that gives you a win no matter what.
- E.g.

	Wife Birthday	Not Wife's Birthday
Buy Flowers	10	20
Don't Buy Flowers	-100	0

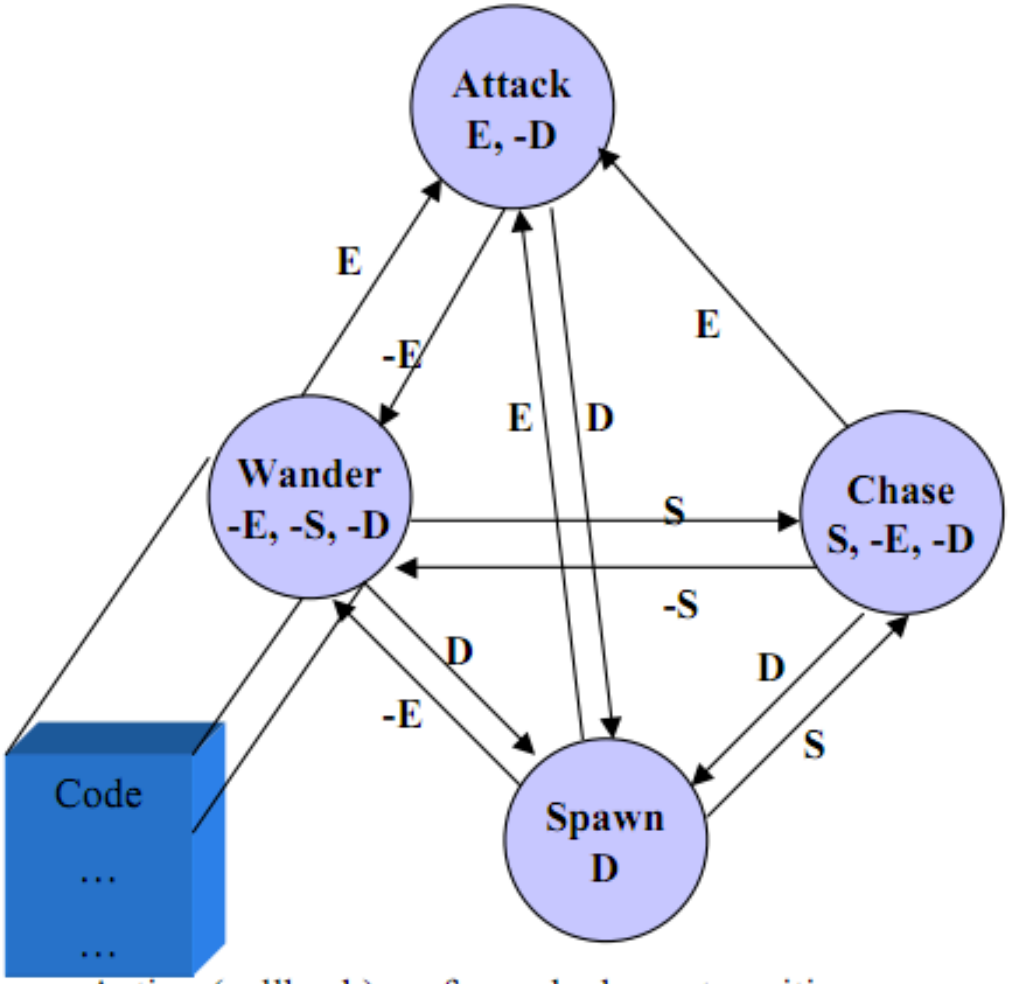
Game Design Example: Balance

- What are the mappings in this?
- How do you abstract them?
- Do you think it is a good idea to abstract them? Why?

Game Design Example: AI



Example FSM



Action (callback) performed when a transition occurs

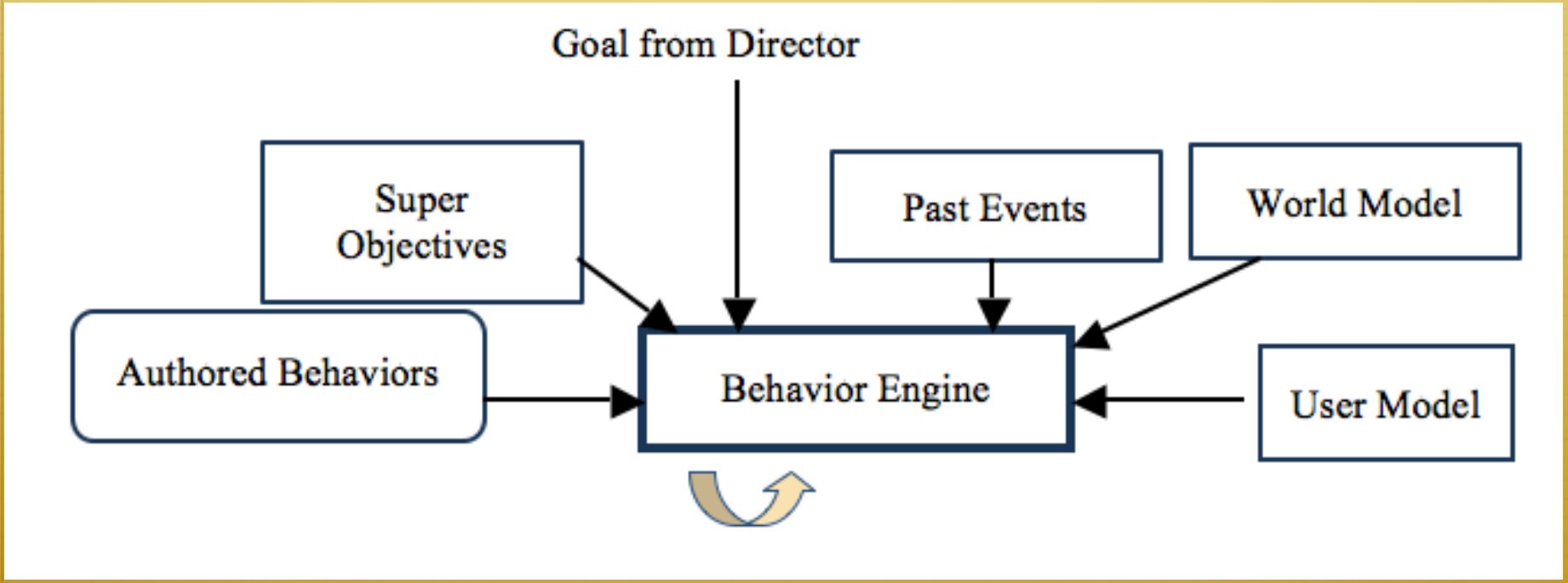
Events:

E=Enemy Seen

S=Sound Heard

D=Die

Mirage: Agent Model



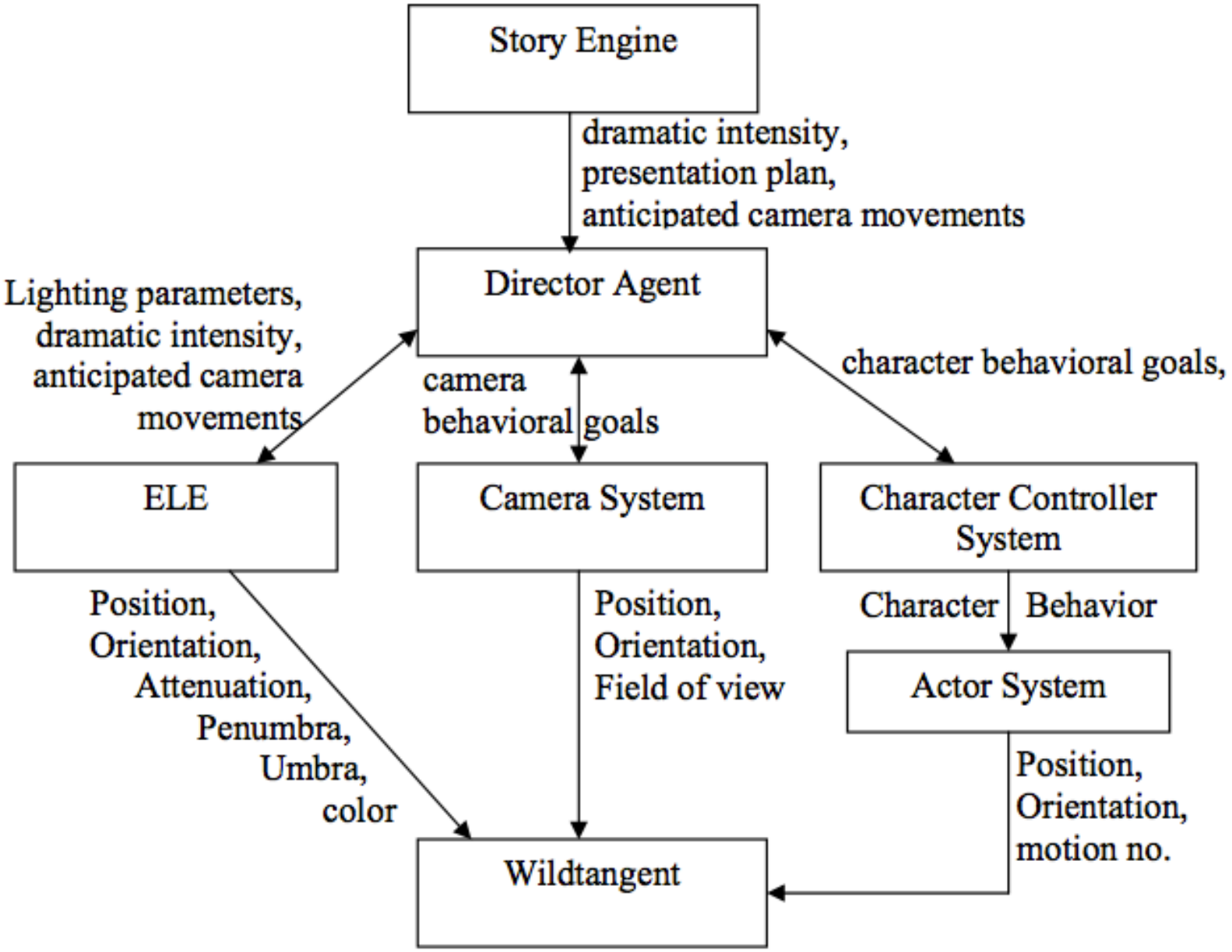


Figure 6.1 Interactive Narrative Architecture

Action Selection – Behavior Beats

Trigger: a goal that triggers the character behavior

Preconditions: defines the context that enables this behavior

Postconditions: defines the actions or side effects of the behavior

Sub-goals: define the sub-problems that need to be solved for the behavior to succeed:

- collection of character goals that need to be solved in sequence or parallel
- collection of character goals that need to be solved in sequence or parallel
- a combination of both

Agent Behavior – Simple Behavior

Trigger: a goal that triggers the character action

Preconditions: defines the context that enables this action

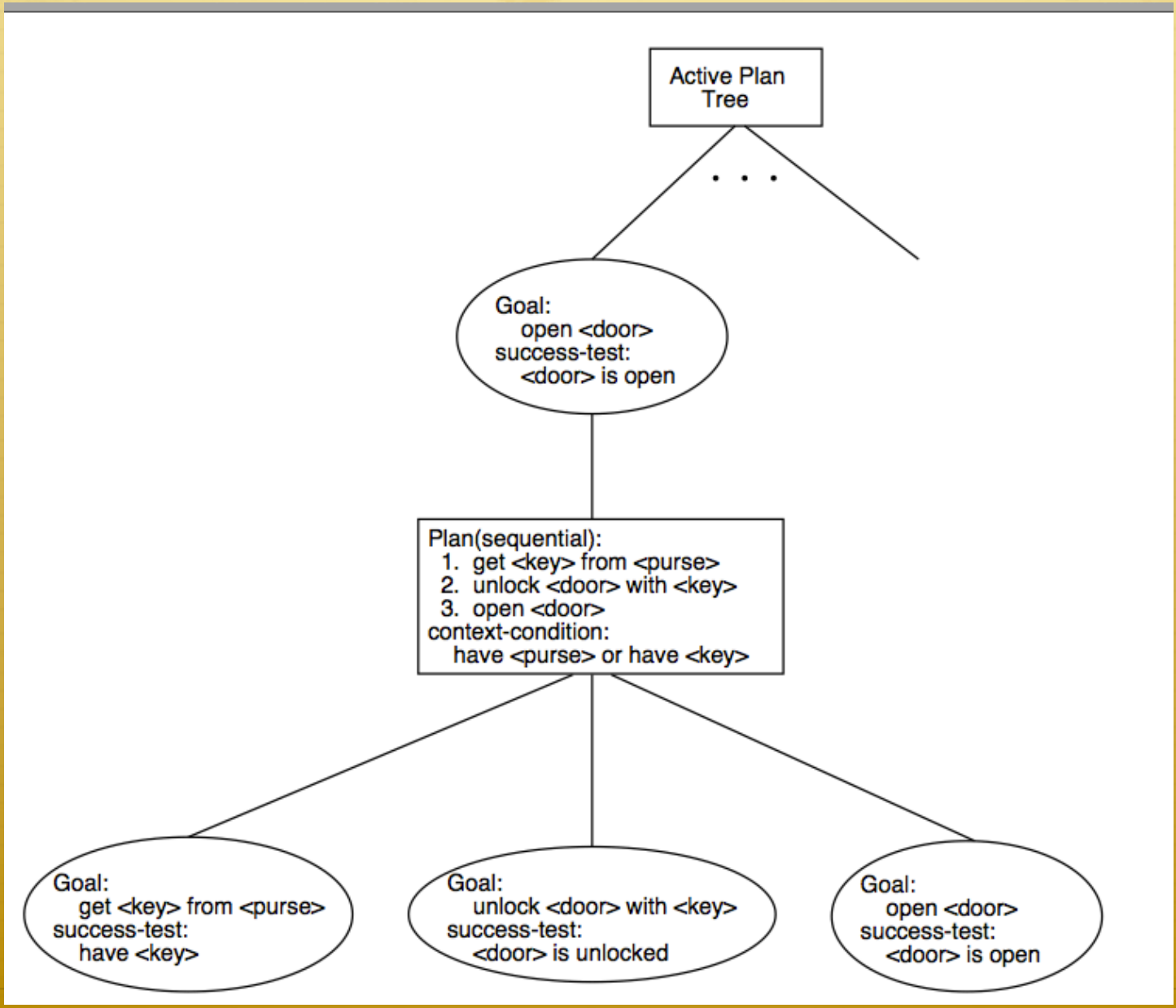
Postconditions: defines the actions or side effects of the action

Action: represented as Action + Adverb describes how the agent performs the action, encoding the sub-text

Behavior Selection – Reactive Planning

1. choose behavior plan given user stereotype, character goal, failed behaviors
2. for each time tick
   - monitor user action assessing current behavior
     - if failure limit reached, fail behavior and go to step 1
     - Update user model

Algorithm


Active Plan Tree
Goal:
open <door>
success-test:
<door> is open
Plan(sequential):
1. get <key> from <purse>
2. unlock <door> with <key>
3. open <door>
context-condition:
have <purse> or have <key>
Goal:
get <key> from <purse>
success-test:
have <key>
Goal:
unlock <door> with <key>
success-test:
<door> is unlocked
Goal:
open <door>
success-test:
<door> is open

How would you enable this?

Enabling Data-Driven Approaches

- Use tables and dynamic constructed lists
- Use scripting language (Lua)
- Use XML

Serialization

"*Serialization* is the process of converting a set of object instances that contain references to each other into a linear stream of bytes, which can then be sent through a socket, stored to a file, or simply manipulated as a stream of data"

-O'Rielly's book

Formatters in .NET

- Binary Formatter

  using System.Runtime.Serialization.Formatters;

- SOAP Formatter

  using System.Runtime.Serialization;

- XML formatter

  using System.Xml.Serialization;

Streams

- MemoryStream

  using System.IO;

- BufferedStream

  using System.IO;

- FileStream

  using System.IO;

Serialization in .NET (XML)

The Class Definition:

```
[Serializable]
public class player
{    private int score;
     public int Score
     {
       get    {    return score;  }
       set    {    score = value; }
     }
}
```

The Class Definition:

```
[XmlRoot("Players")]
public class player
{    [XmlElement ("Score")]
     private int score;
     public int Score
     {
       get    {    return score;  }
       set    {    score = value; }
     }
}
```

Serialization in .NET (XML)

```
FileStream mys =

File.Create ("Mydata.xml");

XmlSerializer x =

new XmlSerializer

(typeof (player), "Player");

x.Serialize (mys, p);

mys.Close ();
```

The Class Definition:

```
[XmlRoot("Players")]
public class player
{    [XmlElement ("Score")]
     private int score;
     public int Score
     {
       get    {    return score;  }
       set    {    score = value; }
     }
}
```

Serialization in .NET (XML)

```
XmlSerializer x = new XmlSerializer
    (typeof (player), "Player");

FileStream myStream =
    File.OpenRead(name);

player p = (player) x.Deserialize
    (myStream);

myStream.Close ();
```

The Class Definition:

```
[XmlRoot("Players")]
public class player
{   [XmlElement ("Score")]
    private int score;
    public int Score
    {
      get   {   return score;  }
      set   {   score = value; }
    }
}
```

```xml
<?xml version="1.0" encoding="utf-8" ?>

<Group>
  <Games>
    <Game>
      <Title>"Dragon Age" </Title>
      <Genre>"RPG"</Genre>
      <ReleaseDate>2011-10-11T00:00:00</ReleaseDate>
    </Game>
    <Game>
      <Title> "Assassins Creed" </Title>
      <Genre> "ActionAdventure" </Genre>
      <ReleaseDate>2011-11-15T00:00:00</ReleaseDate>
    </Game>
  </Games>
</Group>
```

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Xml.Serialization;
using System.IO;

namespace SerializationExercise
{
    class Program
    {

        static void Main(string[] args)
        {
            Group test;
            //List<Game> games;
            XmlSerializer mySerializer = new XmlSerializer(typeof(Group));
            FileStream myFileStream = new FileStream("../../Games.xml", FileMode.Open);
            test = (Group)mySerializer.Deserialize(myFileStream);

            for (int i = 0; i < test.Games.Count; i++ )
                Console.WriteLine("game title is " + test.Games[i].Title);

            Console.ReadLine();

        }
    }
```

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Xml.Serialization;
using System.Text;

namespace SerializationExercise
{
    [Serializable]
    public class Game
    {
        [XmlElement("Title")]
        public string Title
        { get; set; }

        [XmlElement("Genre")]
        public string Genre
        { get; set; }

        [XmlElement("ReleaseDate")]
        public DateTime ReleaseDate
        { get; set; }
    }
}
```

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Xml.Serialization;
using System.Text;

namespace SerializationExercise
{
    [XmlRoot("Group")]
    public class Group
    {
        //Game[] games;
        [XmlArray("Games")]
        [XmlArrayItem("Game")]
        public List<Game> Games
        { get; set; }
    }
}
```

Class Assignment

- Take the class assignment you did in the last class, for the script for the camera
- Use an XML representation to script transitions for the camera
- Serialize this into a class
- Then use it to move the camera around

Assignment 3

- Let's take a look