2 Development Platforms for Multimedia Programming

2.1 Introduction to Python

2.2 Multimedia Frameworks for Python

2.3 Document-Based Platforms: SMIL, OpenLaszlo

2.4 Multimedia Scripting Languages: JavaFX, Processing

2.5 Authoring Tools: Flash 

Literature:

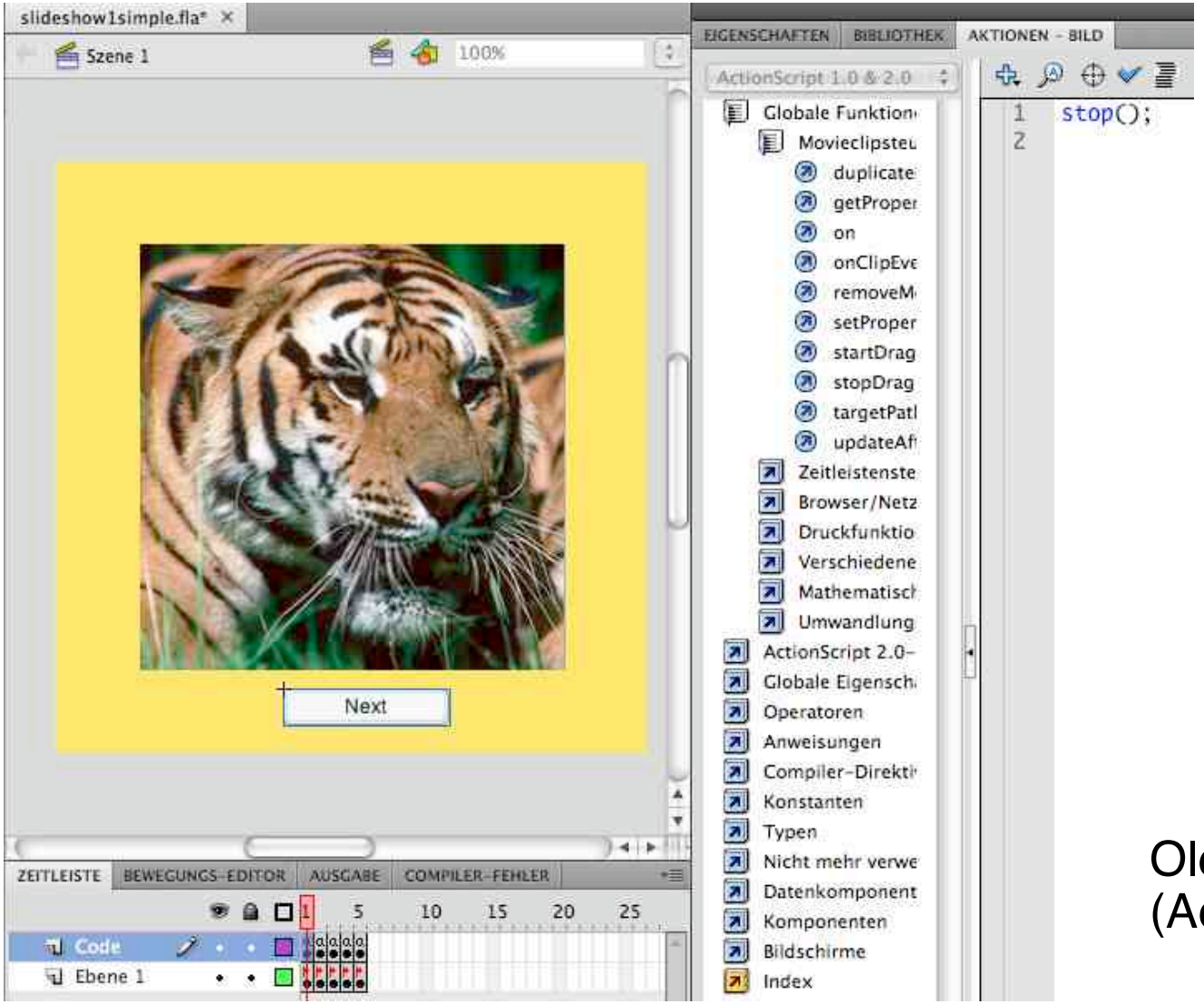
http://www.w3.org/TR/SMIL/

http://www.openlaszlo.org/

Example: Scripting in Flash

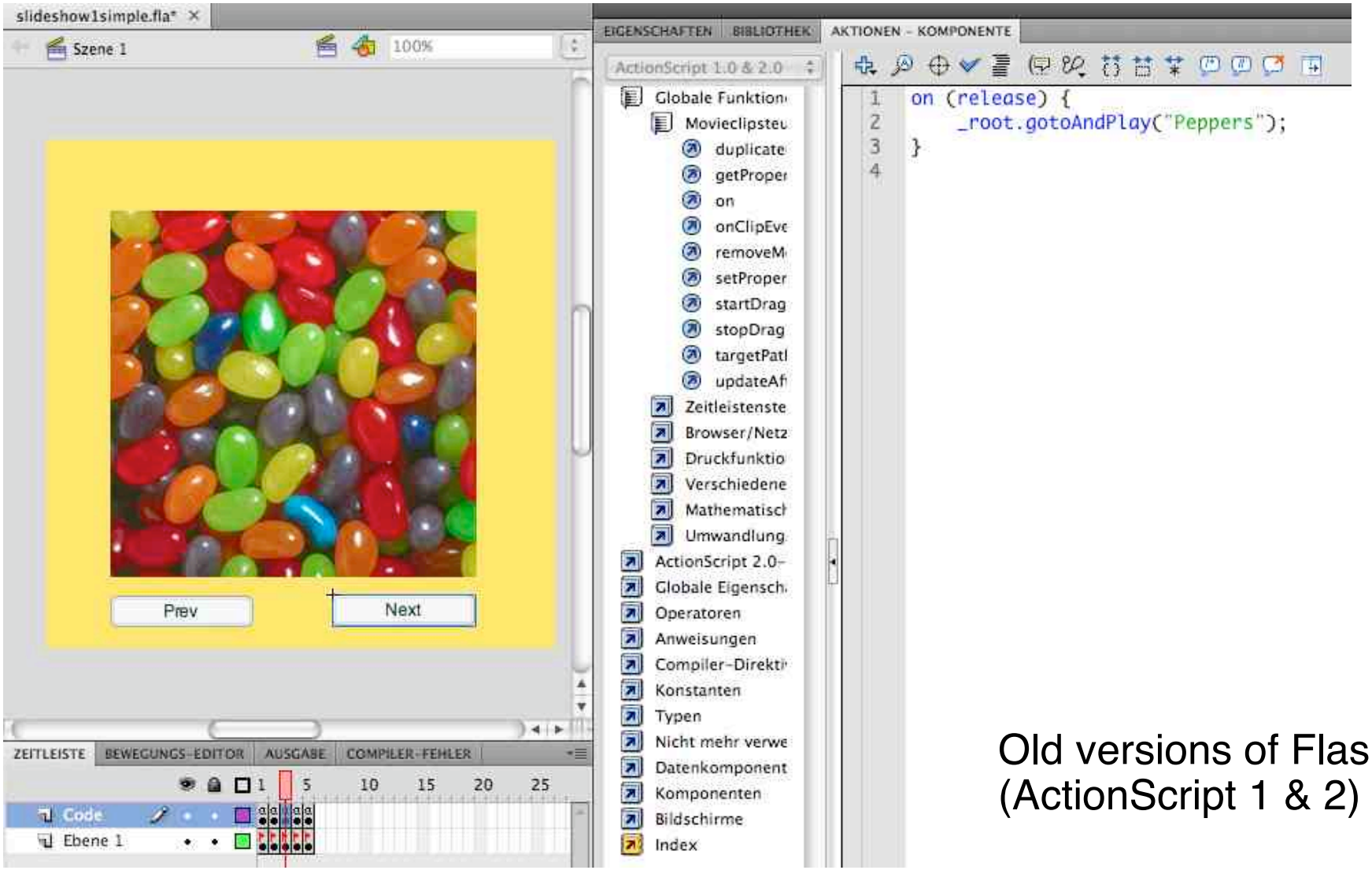
- Adobe Flash:
  - Graphical authoring system
  - Follows timeline & stage metaphors
  - Extensive graphical authoring of animations
- Scripting in Flash:
  - To be used when graphical authoring is not sufficient
  - E.g. in designing reaction to user input (keyboard, mouse)
- Older versions of Flash:
  - ActionScript 1 & 2 scripting languages
  - Not strictly object-oriented
- Recent versions of Flash (ActionScript 3.0 aka AS3):
  - Enforce object-orientation

Integrated Control-Flow Based Scripting



Old versions of Flash (ActionScript 1 & 2)

Integrated Object-Based Scripting

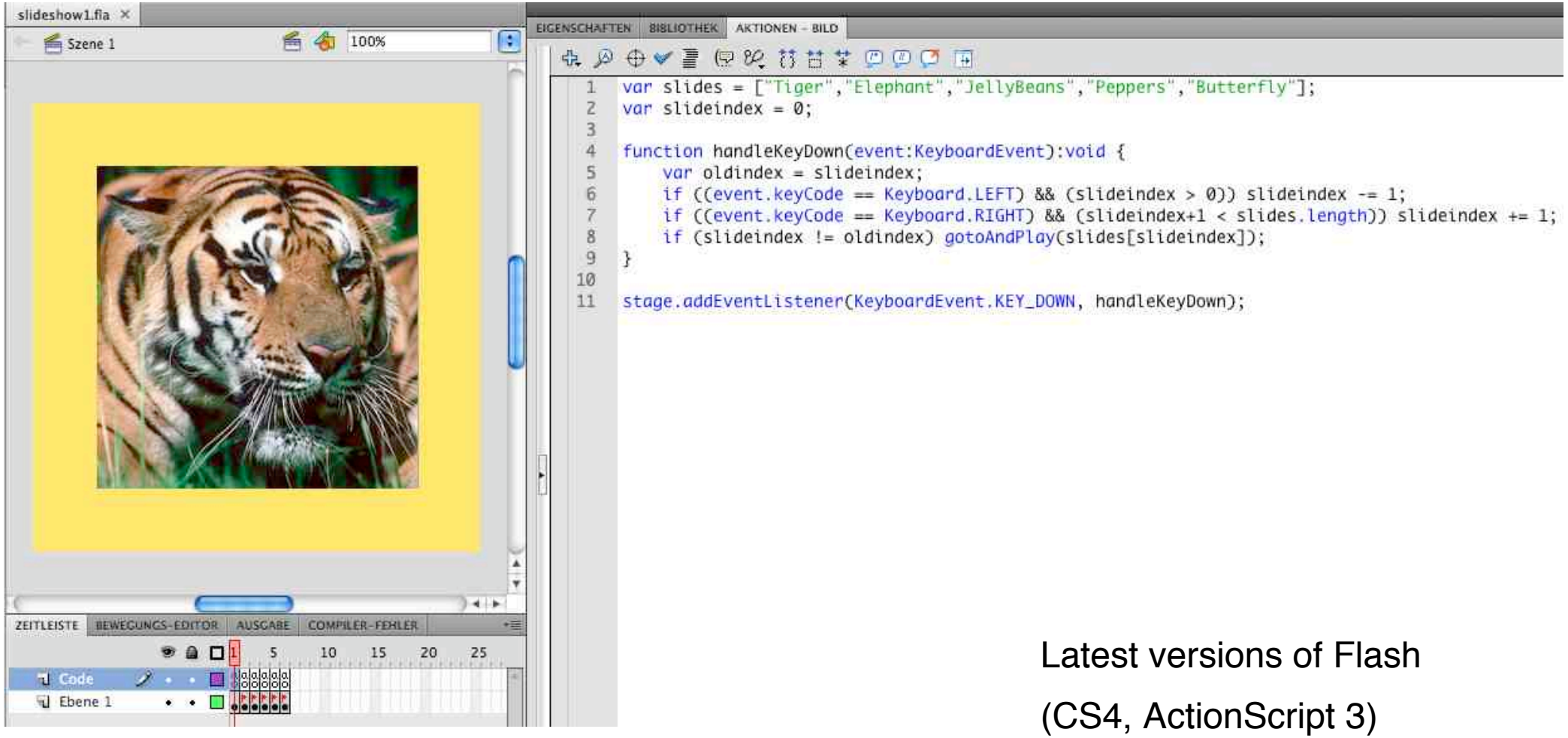


Old versions of Flash (ActionScript 1 & 2)

Generic Design

- Simplistic integrated scripting often leads to solutions which are difficult to maintain
  - Core logic not visible clearly
  - Example: Code refers to identifiers of key frames (“Peppers”)
- Generic designs:
  - Try to avoid code duplications
  - Lead to more abstract programs (“programmer style”)
  - There are degrees of genericity!
- Modern versions of Flash enforce more generic programming styles
  - But make it even more difficult for non-programmers…

More Generic Design (Integrated Object-Based)



Latest versions of Flash

(CS4, ActionScript 3)

Object-Orientation: Reusable Highlighting Color Block in AS3

```
class ColorBlock extends MovieClip {

  private var myColor:Color;
  public var myOnRgb:Number;

  public function onLoad() {
      myColor = new Color(this);
  }

  public function onRollOver() {

      myColor.setRGB(myOnRgb);
  }

  public function onRollOut() {

      myColor.setRGB(0xffffff);
  }
}
```

Used built-in technology:

`Color` object controls the color of the movie clip.

Constructor assigns a new color object to the movie clip.

`setRGB` function actually changes the color.

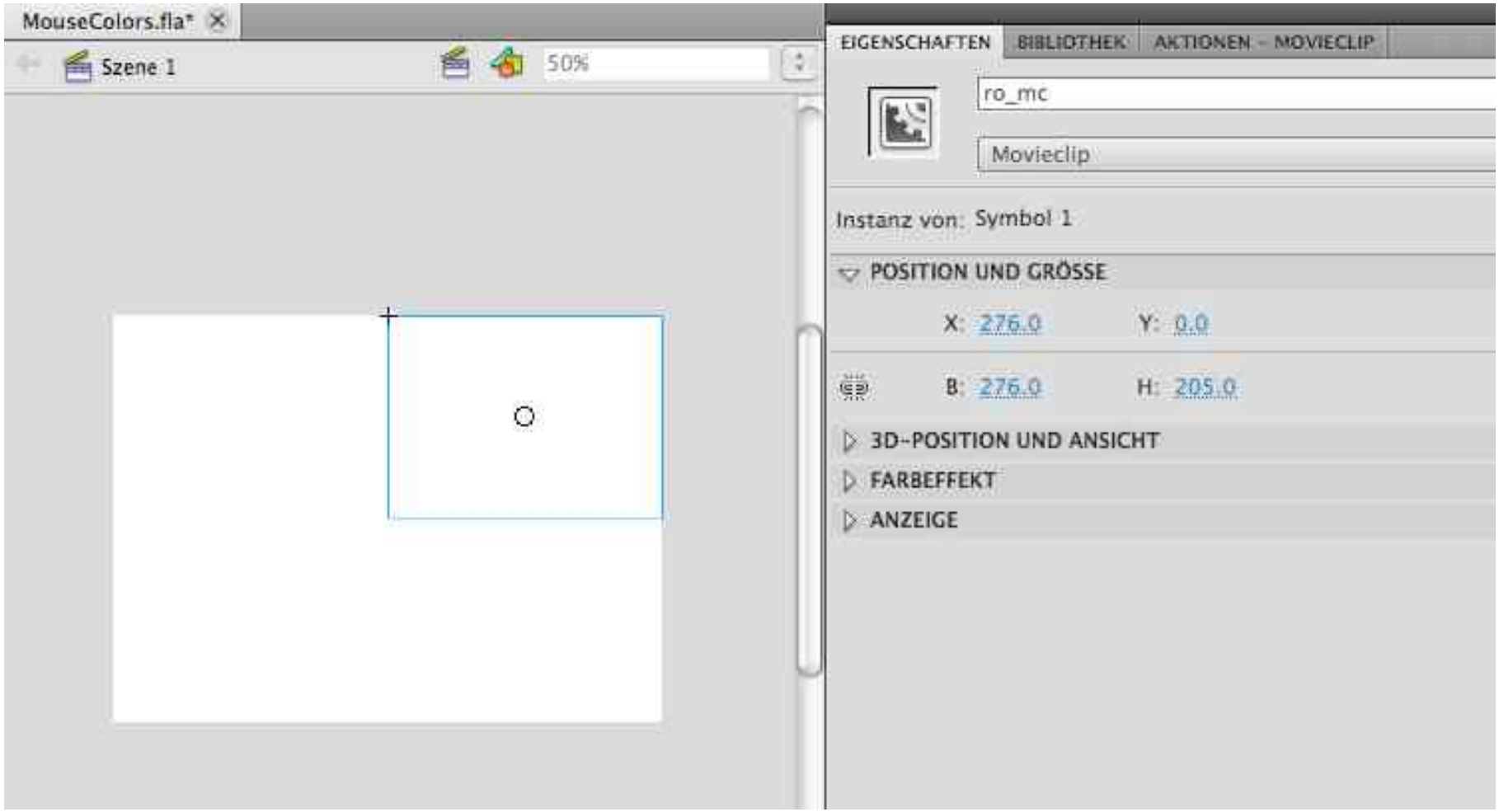
Creating Instances of the Reusable Symbol

- There is *one* symbol with several instances (example: lo_mc, ro_mc, lu_mc, ru_mc)
- The symbol defines the graphical shape with irrelevant color.
- The instances define their respective “on” color.
- In the graphical authoring tool, the symbol instances are located on the stage.

- Initialisation code:

```
lo_mc.myOnRgb = 0xff0000; //red
ro_mc.myOnRgb = 0x0000ff; //blue
lu_mc.myOnRgb = 0x00ff00; //green
ru_mc.myOnRgb = 0xffff00; //yellow
```

Graphical Authoring with Object-Oriented Symbols



Connecting Symbol (Movieclip) and Class