Content and Form: How one manipulates the other

DAY 3 / GROUP A:

AN EYE TRACKING STUDY

Andrea Kohlhase
Neu-Ulm University of Applied Sciences
Andrea.Kohlhase@hs-neu-ulm.de

Michael Kohlhase
Friedrich-Alexander-University Nürnberg-Erlangen
Michael.Kohlhase@fau.de

Content and Form:

mixing4Eyetracking.html (from E. Kreyszig, Ch. 1)

1 Mixing Problem

Background

Mixing problems occur quite frequently in chemical industry. We explain here how to solve the basic model involving a single tank (see the figure on the right). The tank contains 1000 gal of water in which initially 100 lb of salt is dissolved. Brine runs in at a rate of 10 gal/min, and each gallon contains 5 lb of dissolved salt. The mixture in the tank is kept uniform by stirring. Brine runs out at 10 gal/min.

Problem

Find the amount of salt in the tank at any time t.

Solution Step 1: Setting up a model

Let y(t) denote the amount of salt in the tank at time t. Its time rate of change is

$$y' = \text{salt inflow rate} - \text{salt outflow rate} \quad (1)$$

5 lb times 10 gal gives an inflow of 50 lb of salt. Now, the outflow is 10 gal of brine. This is 10/1000=0.01 (=1%) of the total brine content in the tank, hence 0.01 of the salt content y(t), that is, 0.01y(t). Thus, from (1) we obtain the following ODE as a model:

$$y' = 50 - 0.01y = -0.01(y - 5000) \quad (2)$$

Design Challenge mixing4Eyetracking.html

- Reflect upon the usability issues elicited by our eyetracking experiment with a similar document on Monday.
- How can we make working with the document more usable and maybe even enable a good user experience? Think about what interactions would be nice and supportive.
- Again: Think wild first, we will discuss your ideas later on with respect to feasibility!

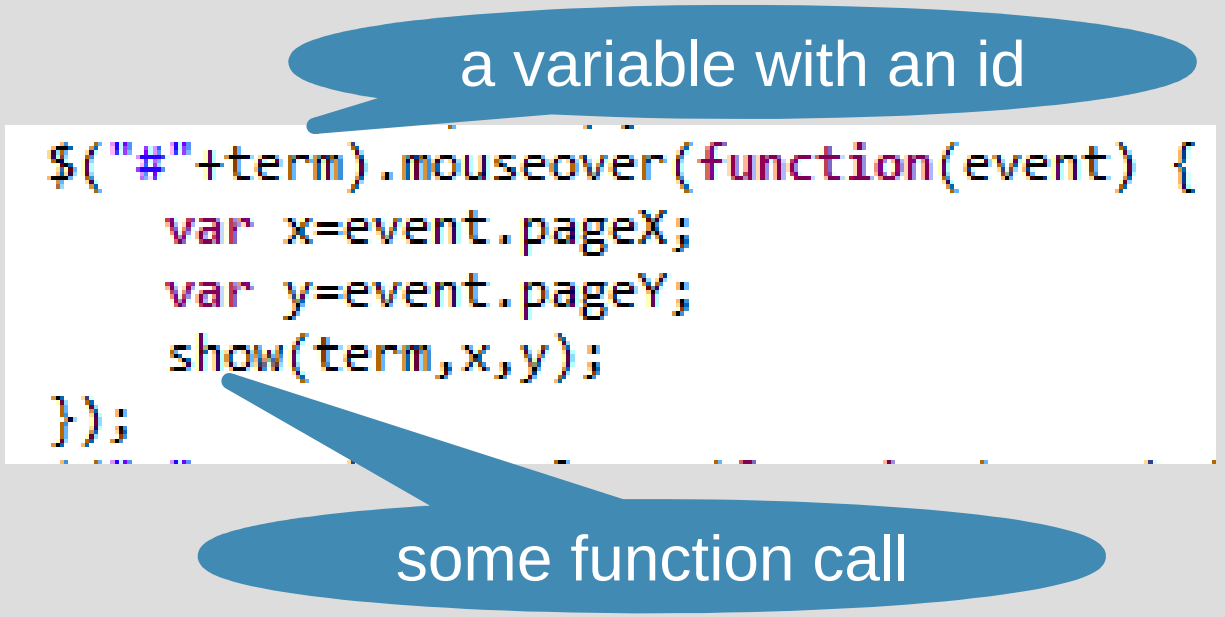
- Groups of 4 students
- 30min
- Present and explain your ideas, maybe with a paper prototype?

Task mixing4Eyetracking.html

- Implement one of the ideas found during the recent Design Challenge!
- More ideas are always welcome!
- We will look later on at some of your implementations to decide which we realize for our eyetracking test.

Events

- https://api.jquery.com/category/events/mouse-events/



A Definition Service


```
26          tank contains 1000 <span id="gal">gal</span> of water i
```

```
<div id="lexicon">
    <div for="brine">Brine is another word for salt water.</div>
    <div for="lb">This is a weight unit. 1 lb=500g</div>
    <div for="gal">This is a volumen unit. 1 gal=3785.41ml</div>
</div>
```

```
annotate('gal');
```

Event handling!

This is the defining phase …

A Definition Service

```
function annotate(term){
    $("#"+term).mouseover(function(event) {
        var x=event.pageX;
        var y=event.pageY;
        show(term,x,y);
    });
    $("#"+term).mouseleave(function(event) {
        hide(term);
    });
}
```

Now the event-handling …

```
<div id="lexicon">
    <div for="brine">Brine is another word for salt water.</div>
    <div for="lb">This is a weight unit. 1 lb=500g</div>
    <div for="gal">This is a volumen unit. 1 gal=3785.41ml</div>
</div>
```

```
<span id="gal">gal</span>
```

```
rn};
+"']").html();
    x=x+10;
    y=y-40;
    $("#"+term).after($('<div id="hoverText">'+def+'</div>'));
    $('#hoverText').css('position','absolute')
                   .css('left',x)
                   .css('top',y)
                   .css('background-color','blue')
                   .css('color','white')
                   .css('display','block');
}
function hide(term){
    $("#"+term).removeClass('hover');
    $('#hoverText').remove();
}
```

Eye Tracking: Measures

- Eye tracking is an observation method to learn
  - where a person is looking (at any given time)

    → Point-of-Gaze (Location)
  - in which order a person is looking

    → Order of fixations

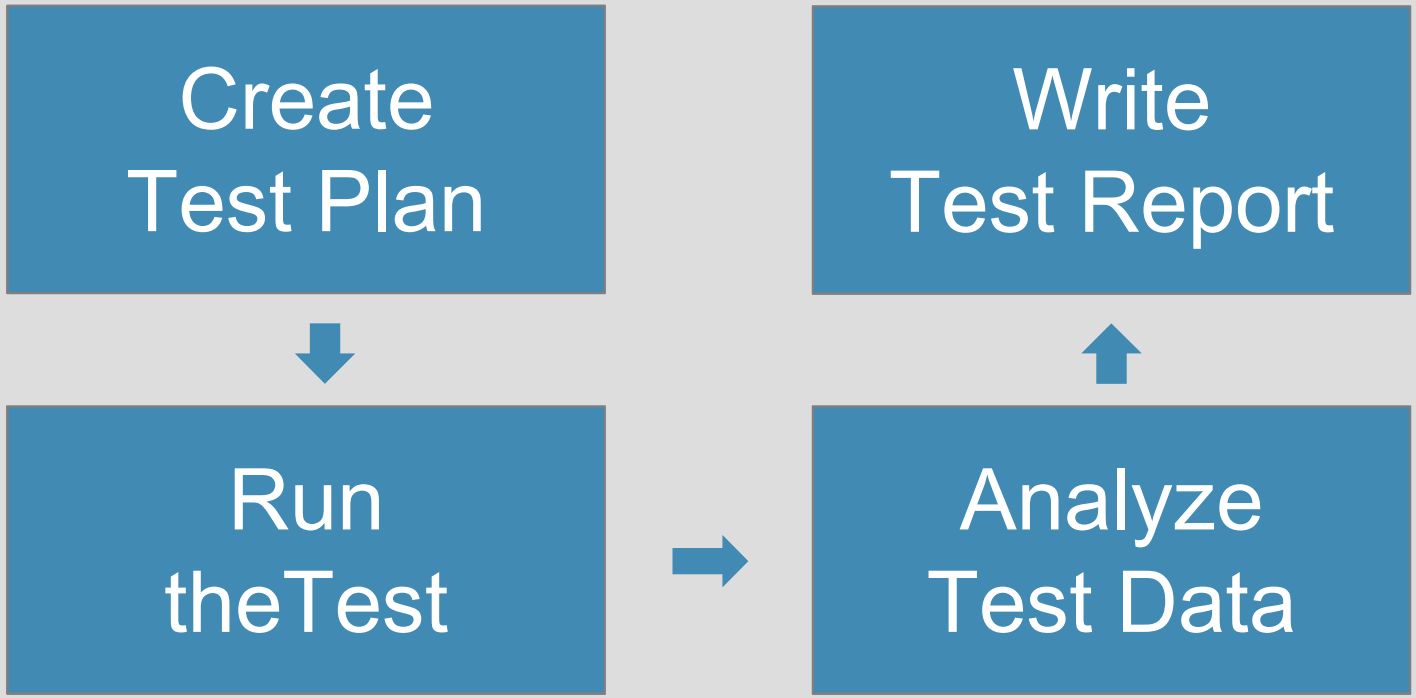
    → Efficiency of task solving (# of fixations)
  - how long a person is looking at one spot

    → Fixation

    → Duration of fixation

see [Poole&Ball: Eye Tracking in HCI and Usability Research: Current Status and Future Prospects]

Structure of a UX Test



UX Testing

Main principle:

User Advocacy

From		To
Our design	→	Their goals
Features & Ideas	→	Task validation
What we want	→	What they need
Our opinion	→	What they do (observed behavior)

Creating a Test Plan

- We start with a list of user stories for understanding our goals:
  1.
  2.
  3.

- User Story:

„As a <role> I want to <goal> to <utility>“, e.g.

„As a teacher
I want to invite students to meetings for them to confirm or reject
to organize my own time management“

UX Test Plan

12

Task Name	User Story (concrete goal)	Scenario (very concrete context)	Ideal Response (optimal handling)	Assets & Metrics