web engineering

introduction

team

prof. moira norrie

linda di geronimo

matthias geel

alfonso murolo

maria husmann

amir sarabadani tafreshi

www.globis.ethz.ch/courses

what is web engineering?

technologies, tools and methods to

support systematic approaches to the

development, deployment and

maintenance of high-quality web sites

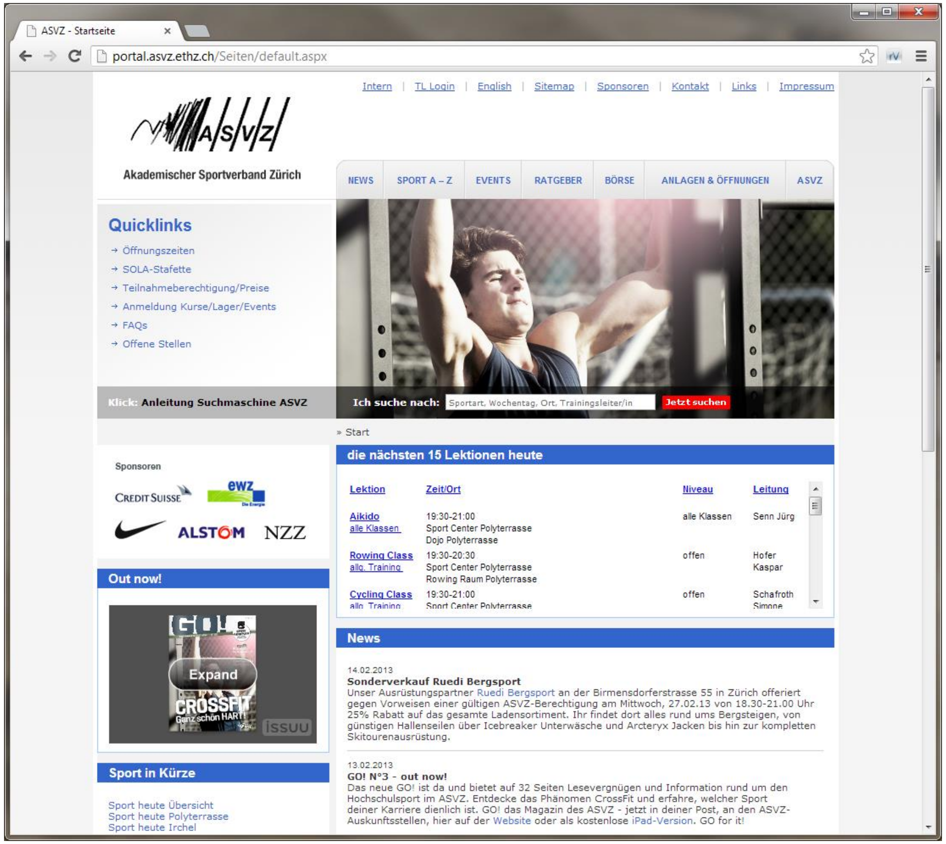
approaches to web site development

model-driven web engineering

programmatic approach

example-based approach

interface-driven approach



die nächsten 15 Lektionen heute

Lektion	Zeit/Ort	Niveau	Leitung
Aikido alle Klassen	19:30-21:00 Sport Center Polyterrasse Dojo Polyterrasse	alle Klassen	Senn Jürg
Rowing Class allg. Training	19:30-20:30 Sport Center Polyterrasse Rowing Raum Polyterrasse	offen	Hofer Kaspar
Cycling Class allg. Training	19:30-21:00 Sport Center Polyterrasse	offen	Schafroth Simone

News

14.02.2013

Sonderverkauf Ruedi Bergsport

Unser Ausrüstungspartner Ruedi Bergsport an der Birmensdorferstrasse 55 in Zürich offeriert gegen Vorweisen einer gültigen ASVZ-Berechtigung am Mittwoch, 27.02.13 von 18.30-21.00 Uhr 25% Rabatt auf das gesamte Ladensortiment. Ihr findet dort alles rund ums Bergsteigen, von günstigen Hallenseilen über Icebreaker Unterwäsche und Arcteryx Jacken bis hin zur kompletten Skitourenausrüstung.

13.02.2013

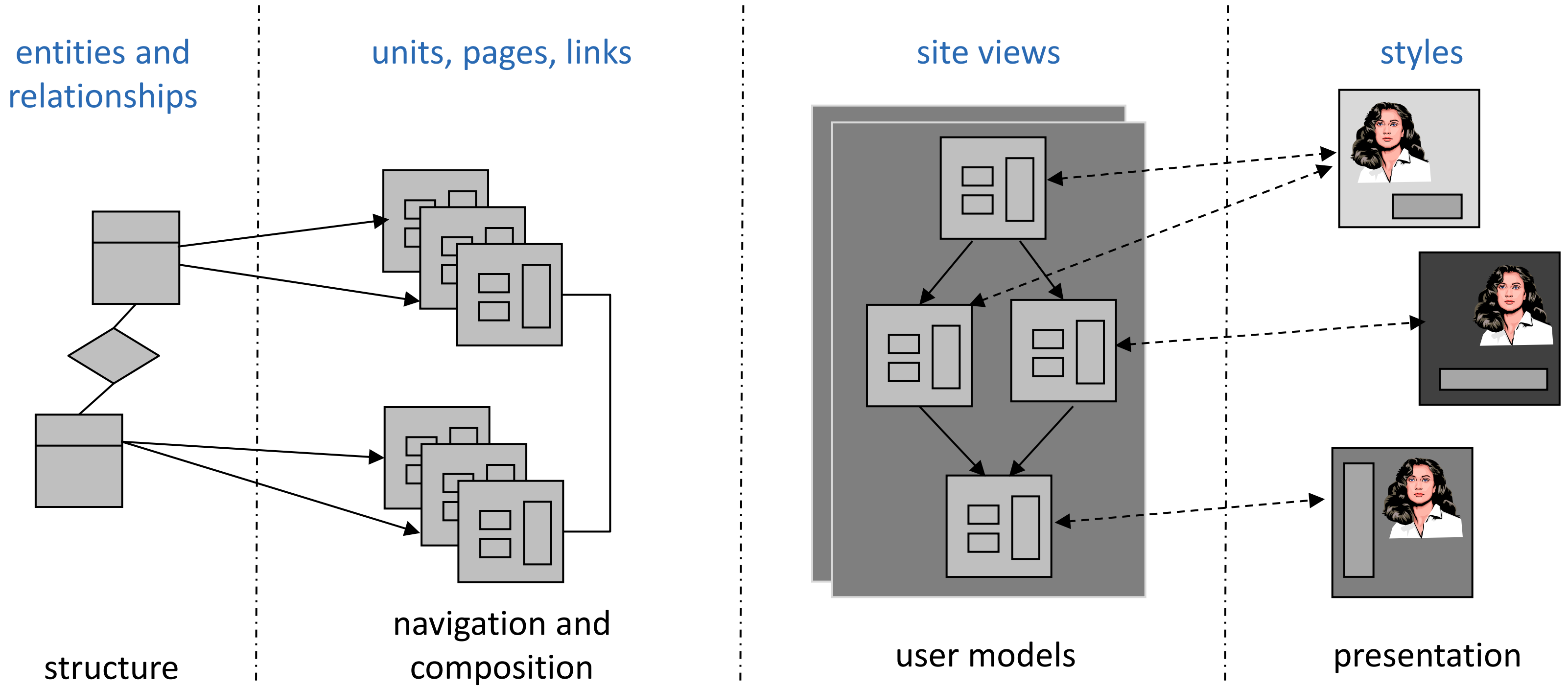
GO! N°3 - out now!

Das neue GO! ist da und bietet auf 32 Seiten Lesevergnügen und Information rund um den Hochschulsport im ASVZ. Entdecke das Phänomen CrossFit und erfahre, welcher Sport deiner Karriere dienlich ist. GO! das Magazin des ASVZ - jetzt in deiner Post, an den ASVZ-Auskunftsstellen, hier auf der Website oder als kostenlose iPad-Version. GO for it!

model-driven web engineering

model all aspects of a web site and
generate the site from the models

site = structure + composition + navigation + presentation



entities and relationships

units, pages, links

site views

styles

structure

navigation and composition

user models

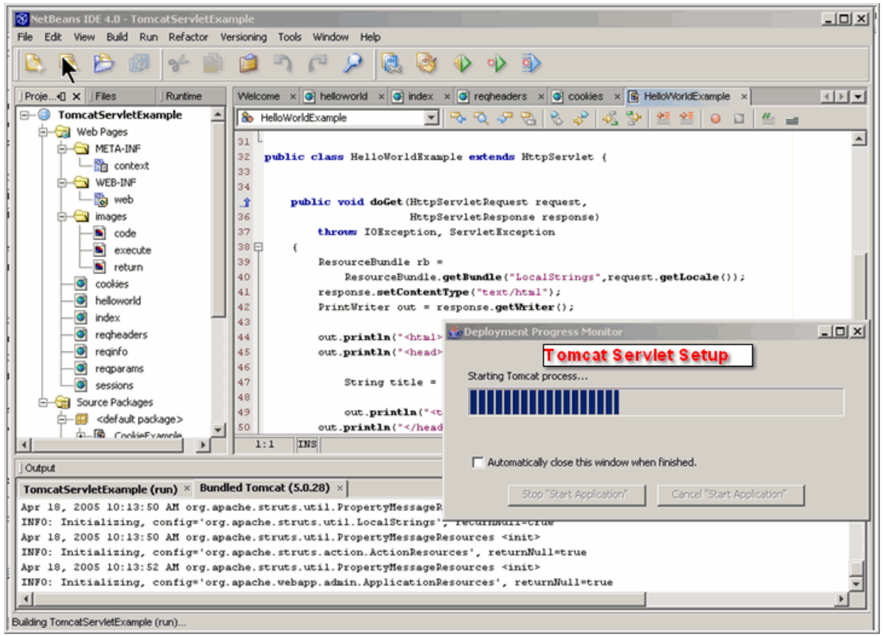
presentation

programmatic approach

pick a programming language of your choice and start developing

could be based on a general programming language such as Java together with associated web-specific technologies such as JSP

could be a special language or framework for web development such as Ruby on Rails



```

public class HelloWorldExample extends HttpServlet {


    public void doGet(HttpServletRequest request,
                      HttpServletResponse response)
        throws IOException, ServletException
    {
        ResourceBundle rb =
            ResourceBundle.getBundle("LocalStrings",request.getLocale());
        response.setContentType("text/html");
        PrintWriter out = response.getWriter();

        out.println("<html>
        out.println("<head>

            String title =

            out.println("<t
        out.println("</head
```

Starting Tomcat process...

□ Automatically close this window when finished.

```
Apr 18, 2005 10:13:50 AM org.apache.struts.util.PropertyMessageR
INFO: Initializing, config='org.apache.struts.util.LocalStrings', returnNull=true
Apr 18, 2005 10:13:50 AM org.apache.struts.util.PropertyMessageResources <init>
INFO: Initializing, config='org.apache.struts.action.ActionResources', returnNull=true
Apr 18, 2005 10:13:52 AM org.apache.struts.util.PropertyMessageResources <init>
INFO: Initializing, config='org.apache.webapp.admin.ApplicationResources', returnNull=true
```

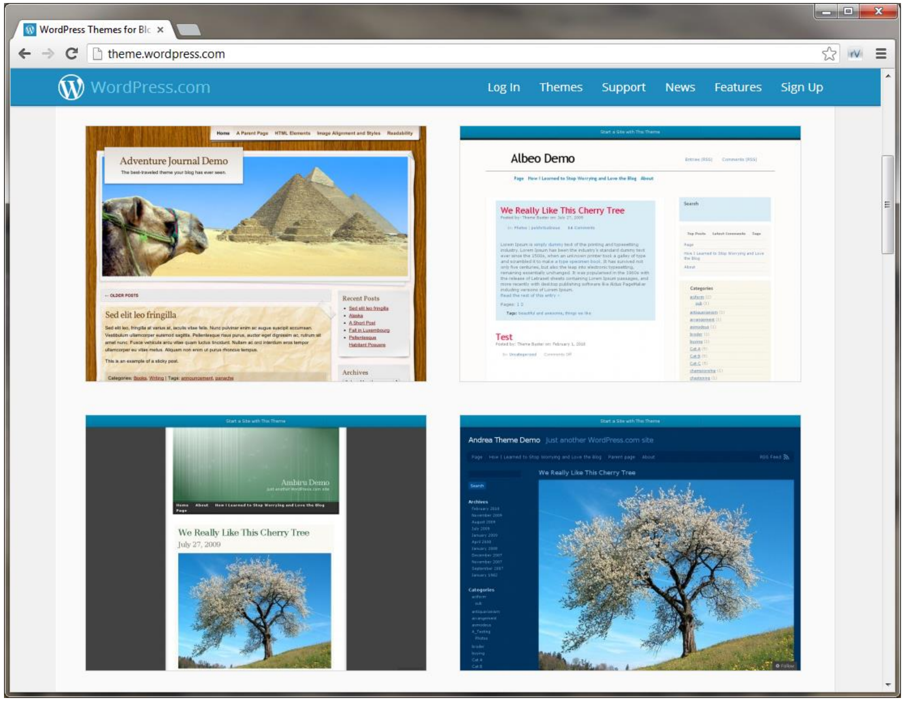
Building TomcatServletExample (run)...

example-based approach

platforms such as WordPress allow end-users to develop web sites by selecting themes and supplying their own content

these platform support extensibility through plugins

power users can also create their own plugins and themes



WordPress 4.1 > 13 million downloads

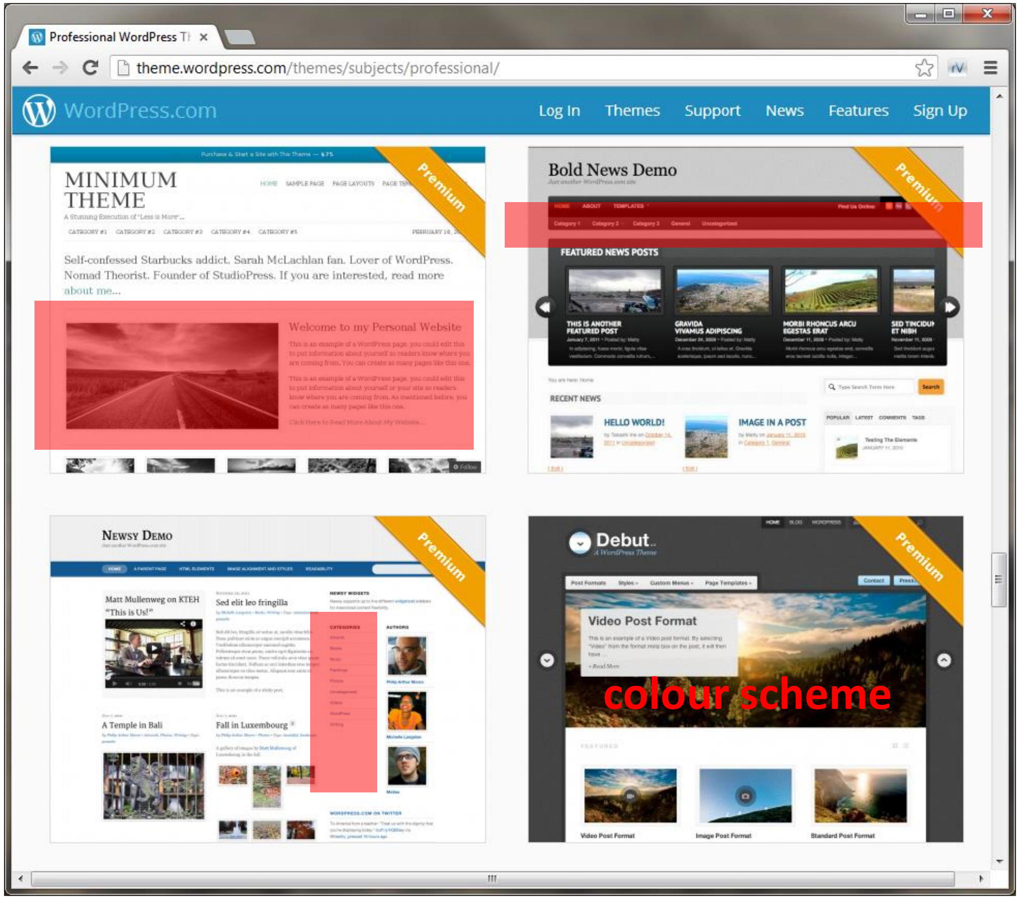
estimated that 23.4% of top ten million web sites running on WordPress
w3techs.com 11 Feb 2015

our vision – designing by example

example-based approaches currently limited as it is not possible to mix-n-match themes

wouldn’t it be good if we could build a web site by selecting and reusing components from existing web sites?

proposed by HCI researchers but they don’t address the technical challenges of realising such an approach



Self-confessed Starbucks addict. Sarah McLachlan fan. Lover of WordPress. Nomad Theorist. Founder of StudioPress. If you are interested, read more about me...

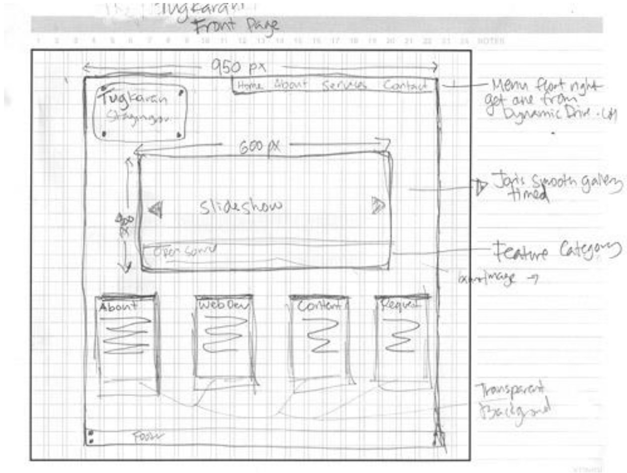
interface-driven approach

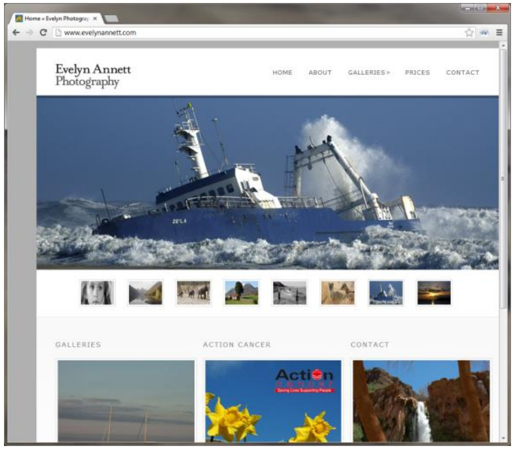
start by designing the interface

implement a mock-up web site using HTML/CSS based on the design with sample content

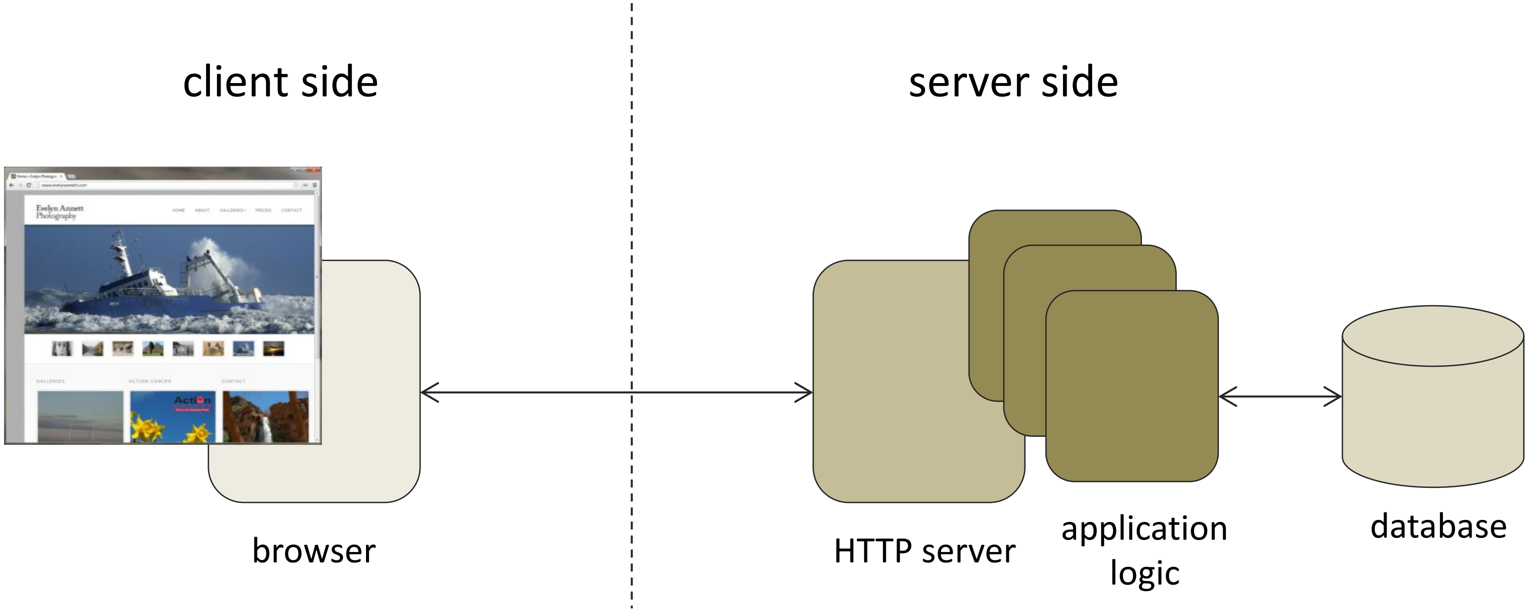
add client-side functionality

implement server-side possibly using a content management platform such as WordPress or Drupal





inside-out



client side

server side

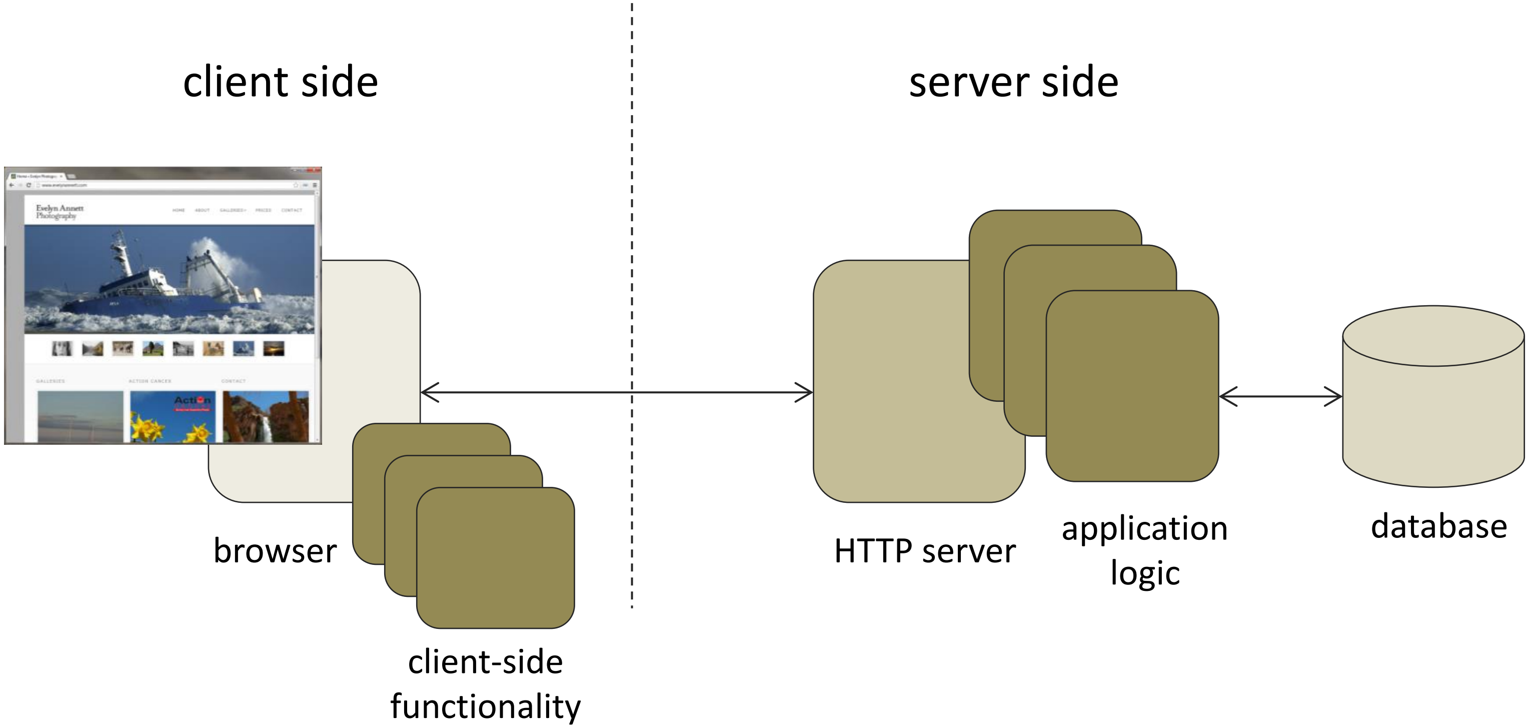
browser

HTTP server

application logic

database

outside-in



client side

server side

browser

client-side functionality

HTTP server

application logic

database

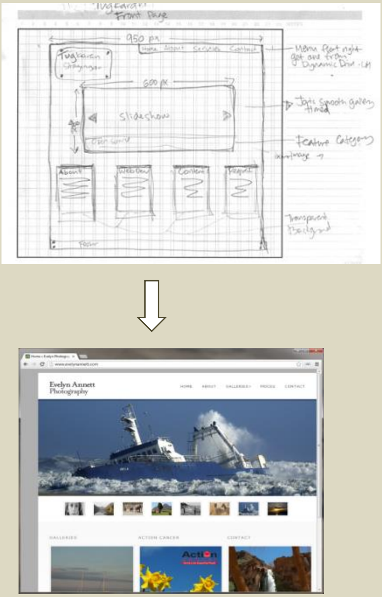
outside-in

good basis for discussing requirements with customer

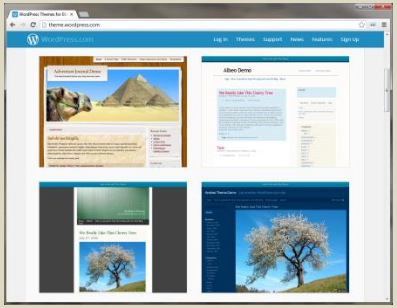
can be considered as “agile method” in web engineering
- move quickly to a prototype
- gradually add functionality and refine design

state-of-the-art in terms of practitioners

fits well with powerful platforms such as WordPress


Front Page
950 px
Home About Services Contact
Menu float right got one from Dynamic Drive
600 px
Slideshow
Feature Category
About
Web Dev
Content
Transparent Background
Footer
Evelyn Annett Photography
HOME ABOUT GALLERIES PRICES CONTACT
GALLERIES ACTION CANCER CONTACT

interface-driven



example-based

state of the art

interface-driven approach most commonly used by professionals

model-driven approaches are mainly promoted within the research community

platforms like WordPress and Drupal have meant that programmatic approaches less frequently used

example-based approach most commonly used by endusers

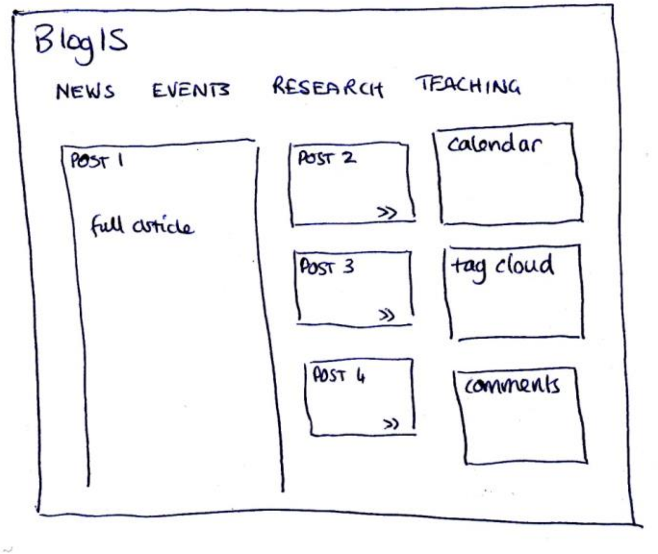
```
    font-weight: bold;
    color: #000000;
    font-family: Georgia, "Times New Roman", Times, serif;
}
.standardtable {
    width: 580px;
    cellspacing: 0px;
    cellpadding: 2px;
    border: 0;
}
td {
    font-family: Verdana, Arial, Helvetica, sans-serif;
    font-size: 12px;
    border: 0px;
    border-color: #FFE5C3;
}

.dots {
    border-top-width: 1px;
    border-right-width: 1px;
    border-bottom-width: 1px;
    border-left-width: 1px;
    border-left-style: dotted;
    border-right-style: none;
    border-top-style: none;
```

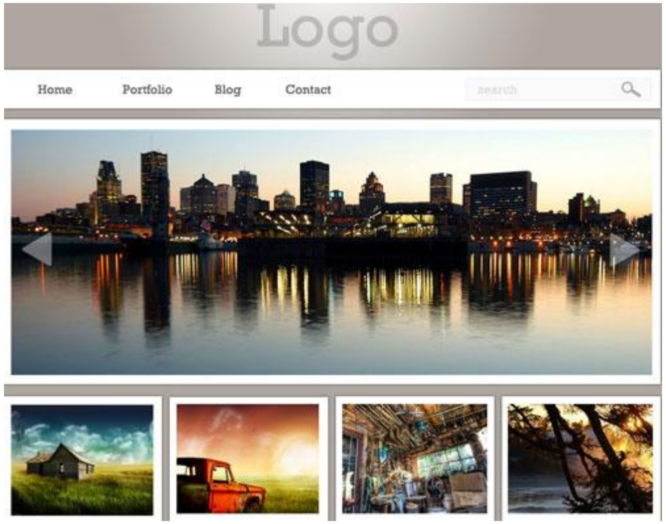
web design

create an initial mock-up of the web site

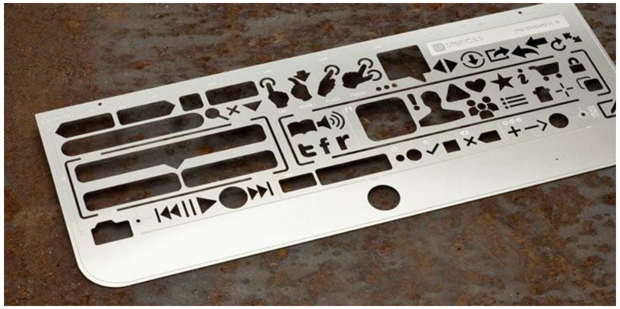
usually first involves sketching on paper

designers will often produce a mock-up in Photoshop





tools to help sketch



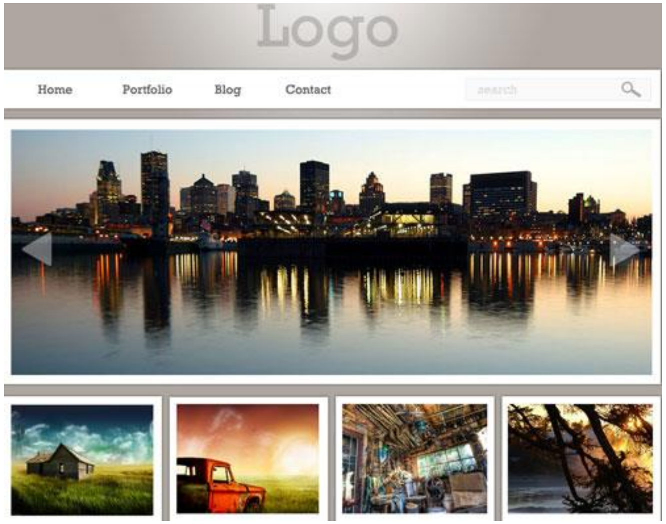
www.uistencils.com

mock-ups in Photoshop

good basis for reaching agreement between designers and clients

but it’s possible that designer produces something that is later found difficult to implement

can give clients the impression that the main work has been done



the dangers of the outside-in approach

if you show a non-programmer a screen which has a user interface that is 100% beautiful they will think that the program is almost done

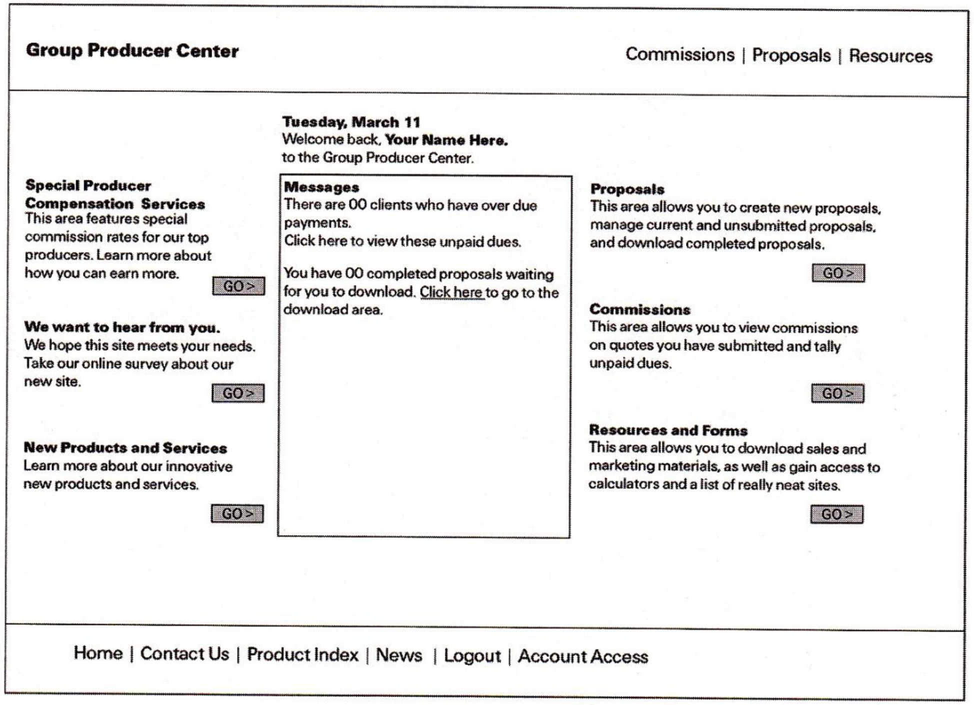
excerpt from “The Iceberg Secret” by Joel Spolsky,
13 February 2002, www.joelonsoftware.com

wireframe mock-ups

wireframes focus on the elements and layout rather than presentation

can be produced on paper or digitally and there are tools to support this

content can be nonsense – but better to use real examples



Group Producer Center

Commissions | Proposals | Resources

Tuesday, March 11
Welcome back, **Your Name Here.**
to the Group Producer Center.

Special Producer Compensation Services
This area features special commission rates for our top producers. Learn more about how you can earn more.
GO >

We want to hear from you.
We hope this site meets your needs. Take our online survey about our new site.
GO >

New Products and Services
Learn more about our innovative new products and services.
GO >

Messages
There are 00 clients who have over due payments.
Click here to view these unpaid dues.

You have 00 completed proposals waiting for you to download. Click here to go to the download area.

Proposals
This area allows you to create new proposals, manage current and unsubmitted proposals, and download completed proposals.
GO >

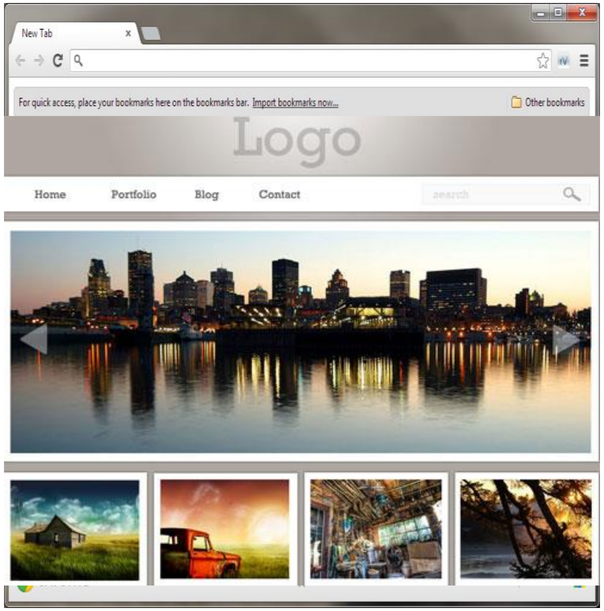
Commissions
This area allows you to view commissions on quotes you have submitted and tally unpaid dues.
GO >

Resources and Forms
This area allows you to download sales and marketing materials, as well as gain access to calculators and a list of really neat sites.
GO >

Home | Contact Us | Product Index | News | Logout | Account Access

from design to implementation

Logo
Home
Portfolio
Blog
Contact
search



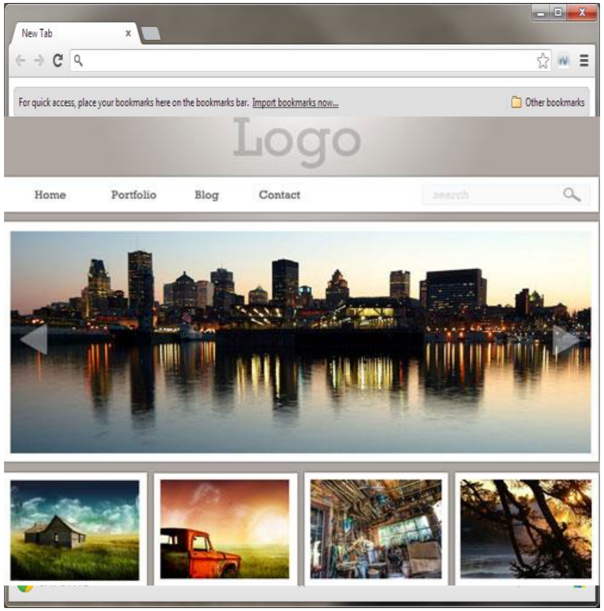
For quick access, place your bookmarks here on the bookmarks bar. Import bookmarks now...

produced by designer

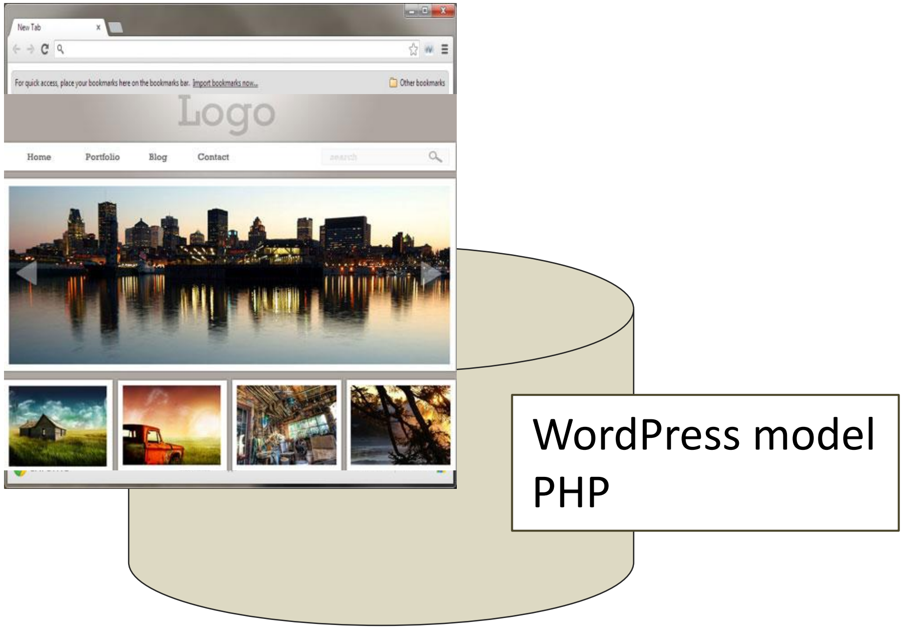
1 developer implements first prototype in HMTL/CSS

2 implement client-side functionality in JavaScript/jQuery

from design to implementation . . .


New Tab
For quick access, place your bookmarks here on the bookmarks bar. Import bookmarks now...
Other bookmarks
Logo
Home
Portfolio
Blog
Contact
search

mock-up in HTML/CSS/ JavaScript/jQuery


New Tab
For quick access, place your bookmarks here on the bookmarks bar. Import bookmarks now...
Other bookmarks
Logo
Home
Portfolio
Blog
Contact
search

WordPress model
PHP

3 generate WordPress theme to create database-driven site that allows content to be created and managed

responsive design

in addition nowadays it is important to support access from the wide range of devices in common use

web sites should be designed to adapt to particular viewing contexts and modes of interaction

structure of course

start by taking you through these development steps covering the various technologies and their use

HTML/CSS
JavaScript/jQuery
HTML5/CSS3
WordPress/PHP

think beyond the mouse and keyboard

interaction frameworks based on jQuery

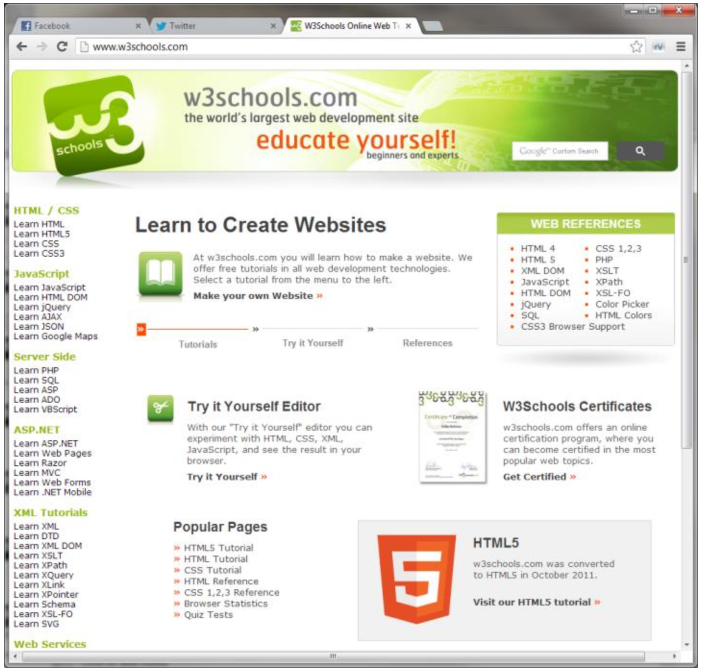
then look at alternative approaches based on programming frameworks

client- and server-side frameworks
real-time web applications

tutorials on basic web technologies

we will focus on the use of basic web technologies such as HTML, CSS and JavaScript rather than providing details of the syntax and semantics

W3Schools provides excellent introductory tutorials and references to these technologies as well as HTML5, CSS3 and jQuery



w3schools.com
the world's largest web development site
educate yourself!
beginners and experts

HTML / CSS
Learn HTML
Learn HTML5
Learn CSS
Learn CSS3

JavaScript
Learn JavaScript
Learn HTML DOM
Learn jQuery
Learn AJAX
Learn JSON
Learn Google Maps

Server Side
Learn PHP
Learn SQL
Learn ASP
Learn ADO
Learn VBScript

ASP.NET
Learn ASP.NET
Learn Web Pages
Learn Razor
Learn MVC
Learn Web Forms
Learn .NET Mobile

XML Tutorials
Learn XML
Learn DTD
Learn XML DOM
Learn XSLT
Learn XPath
Learn XQuery
Learn XLink
Learn XPointer
Learn Schema
Learn XSL-FO
Learn SVG

Web Services

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At w3schools.com you will learn how to make a website. We offer free tutorials in all web development technologies. Select a tutorial from the menu to the left.

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Tutorials » Try it Yourself » References

WEB REFERENCES
- HTML 4
- HTML 5
- XML DOM
- JavaScript
- HTML DOM
- jQuery
- SQL
- CSS3 Browser Support
- CSS 1,2,3
- PHP
- XSLT
- XPath
- XSL-FO
- Color Picker
- HTML Colors

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With our "Try it Yourself" editor you can experiment with HTML, CSS, XML, JavaScript, and see the result in your browser.

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HTML5

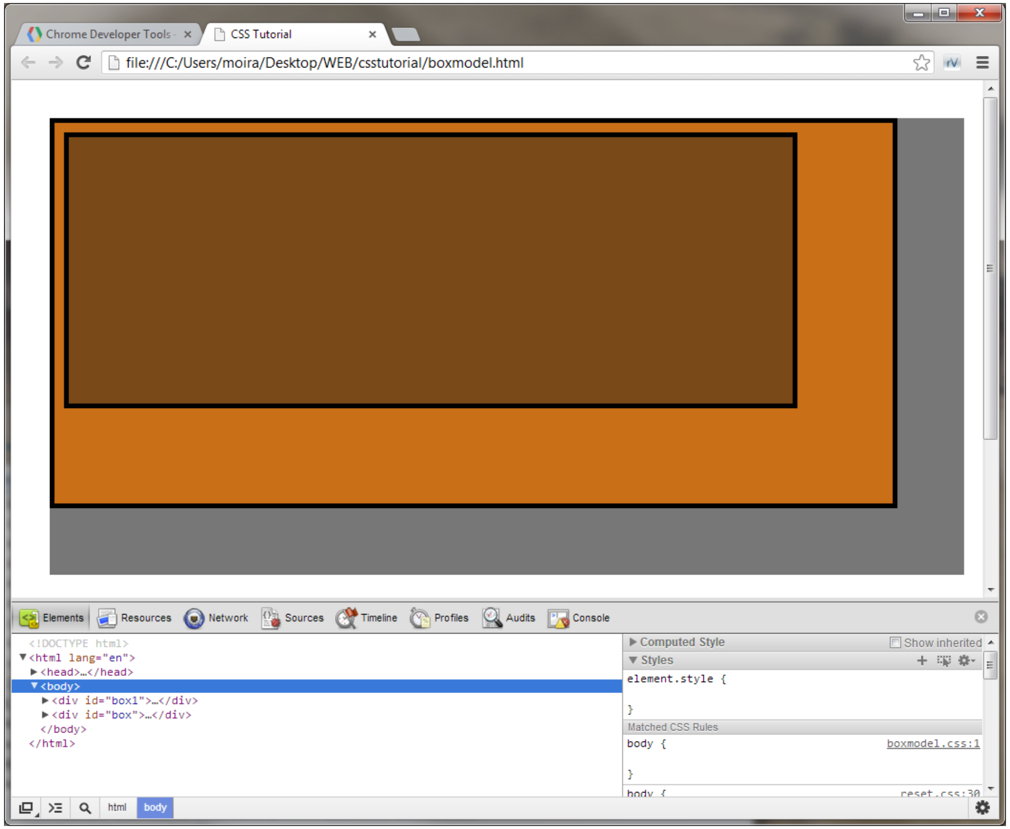
w3schools.com was converted to HTML5 in October 2011.

Visit our HTML5 tutorial »

w3schools.com

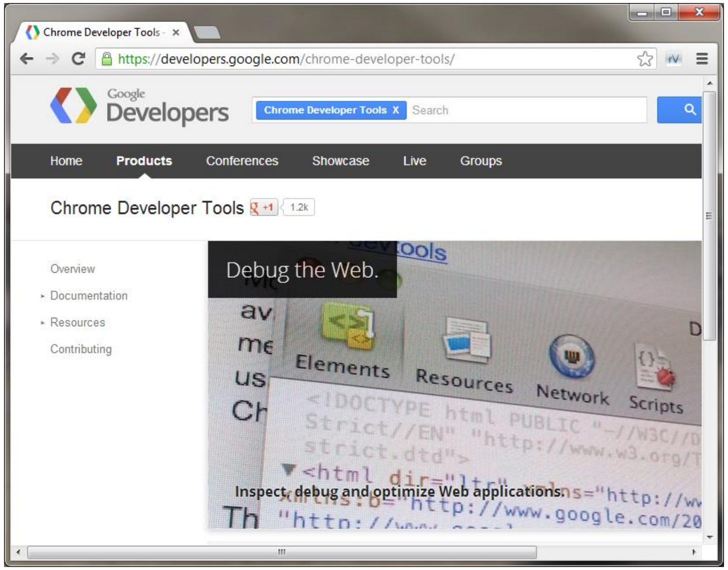
developer tools

various developer tools for different browsers



```
<!DOCTYPE html>
▼<html lang="en">
 ▶<head>…</head>
 ▼<body>
  ▶<div id="box1">…</div>
  ▶<div id="box">…</div>
  </body>
</html>
```

```
element.style {
}
Matched CSS Rules
body {                    boxmodel.css:1
}
body {                    reset.css:30
```

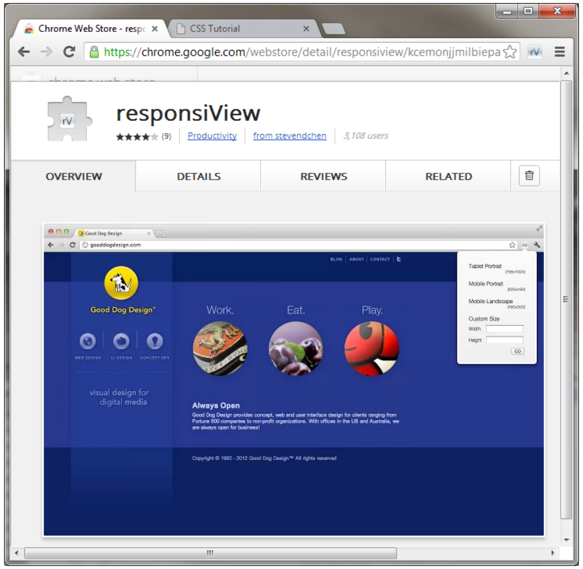


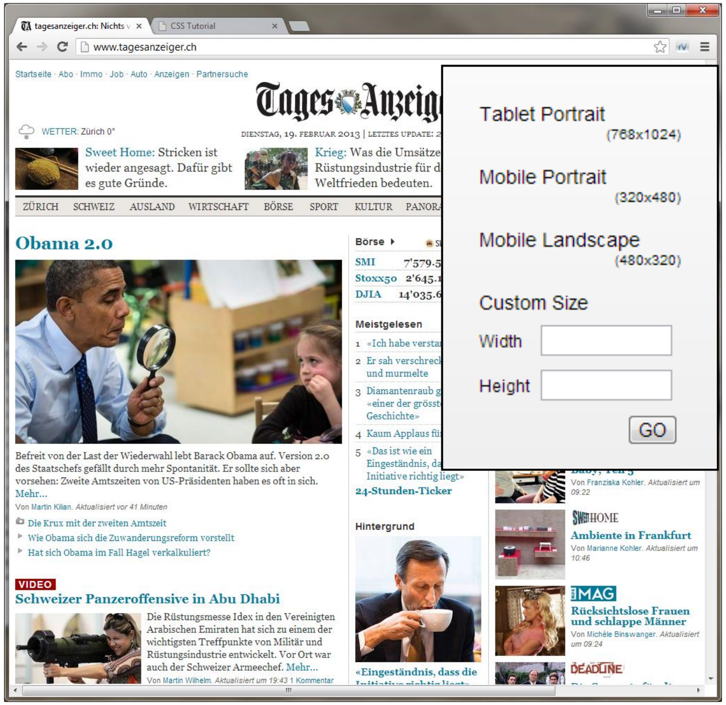
Debug the Web.

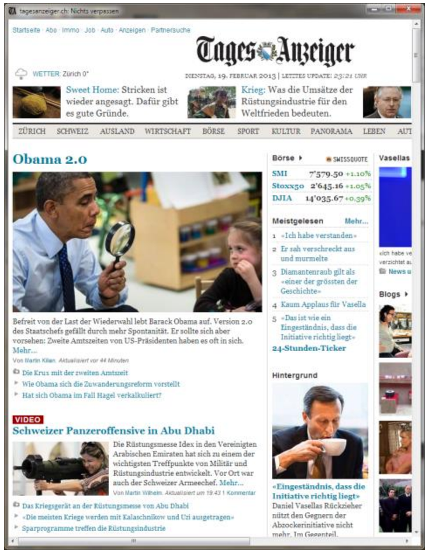
Inspect, debug and optimize Web applications.

developer tools . . .

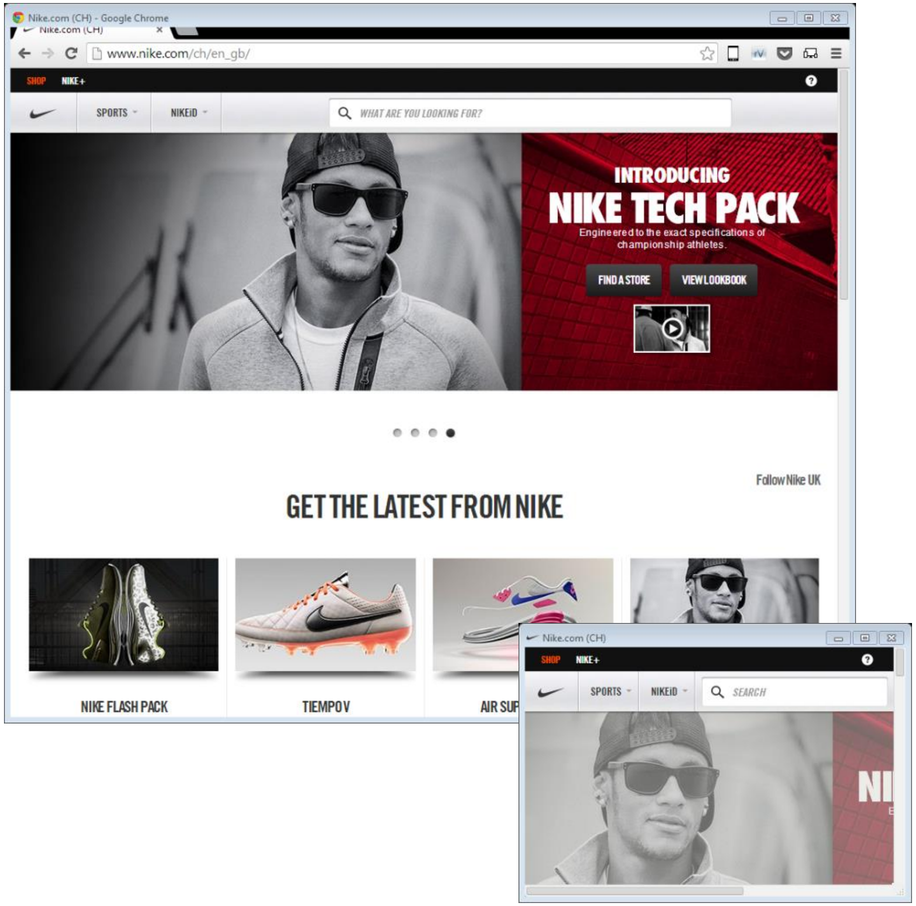
various tools for supporting responsive design by allowing you to view sites at different viewport sizes

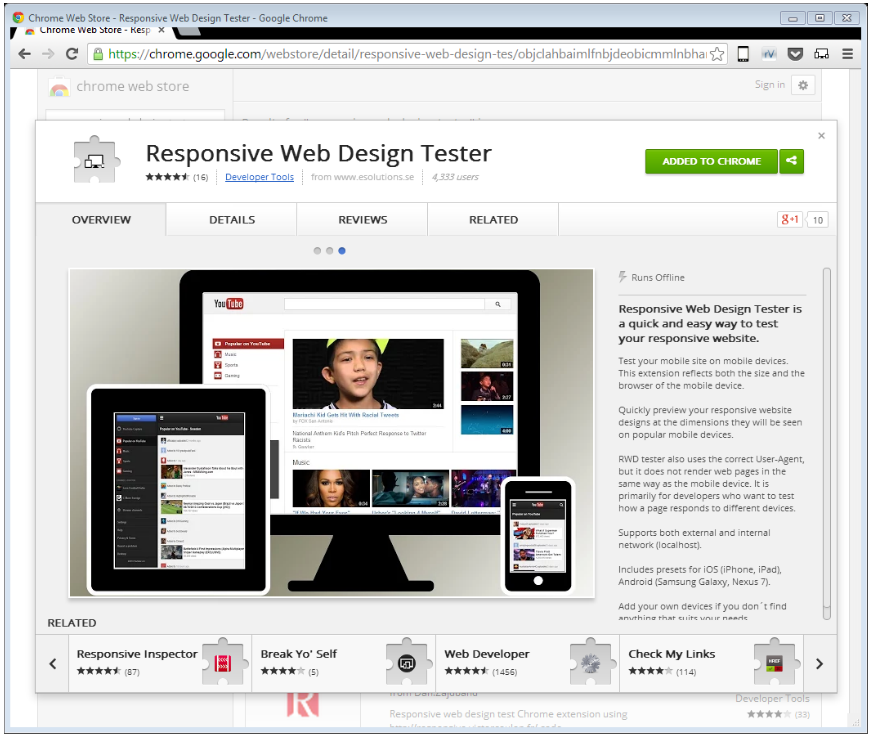






developer tools . . . . . .




Chrome Web Store - Responsive Web Design Tester - Google Chrome
Chrome Web Store - Resp
https://chrome.google.com/webstore/detail/responsive-web-design-tes/objclahbaimlfnbjdeobicmmlnbhai
chrome web store
Sign in
ADDED TO CHROME
OVERVIEW
DETAILS
REVIEWS
RELATED
g+1
10
RELATED

Responsive Web Design Tester

★★★★★ (16) | Developer Tools | from www.esolutions.se | 4,333 users

Runs Offline

Responsive Web Design Tester is a quick and easy way to test your responsive website.

Test your mobile site on mobile devices. This extension reflects both the size and the browser of the mobile device.

Quickly preview your responsive website designs at the dimensions they will be seen on popular mobile devices.

RWD tester also uses the correct User-Agent, but it does not render web pages in the same way as the mobile device. It is primarily for developers who want to test how a page responds to different devices.

Supports both external and internal network (localhost).

Includes presets for iOS (iPhone, iPad), Android (Samsung Galaxy, Nexus 7).

Add your own devices if you don´t find anything that suits your needs

Responsive Inspector ★★★★★ (87)

Break Yo' Self ★★★★☆ (5)

Web Developer ★★★★★ (1456)

Check My Links ★★★★☆ (114)

Developer Tools ★★★★☆ (33)

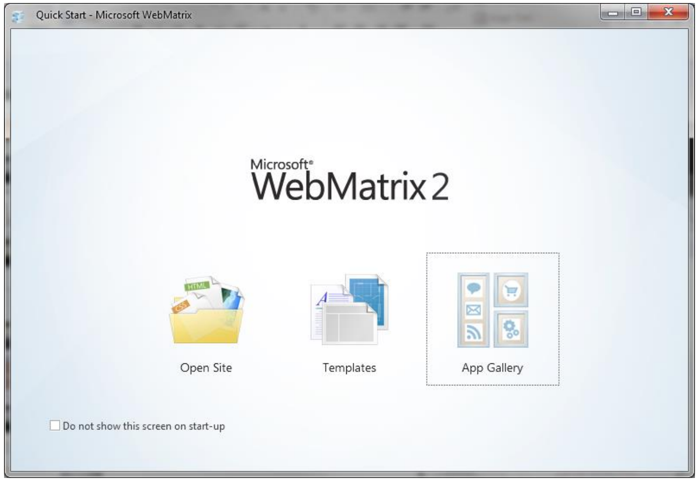
Responsive web design test Chrome extension using

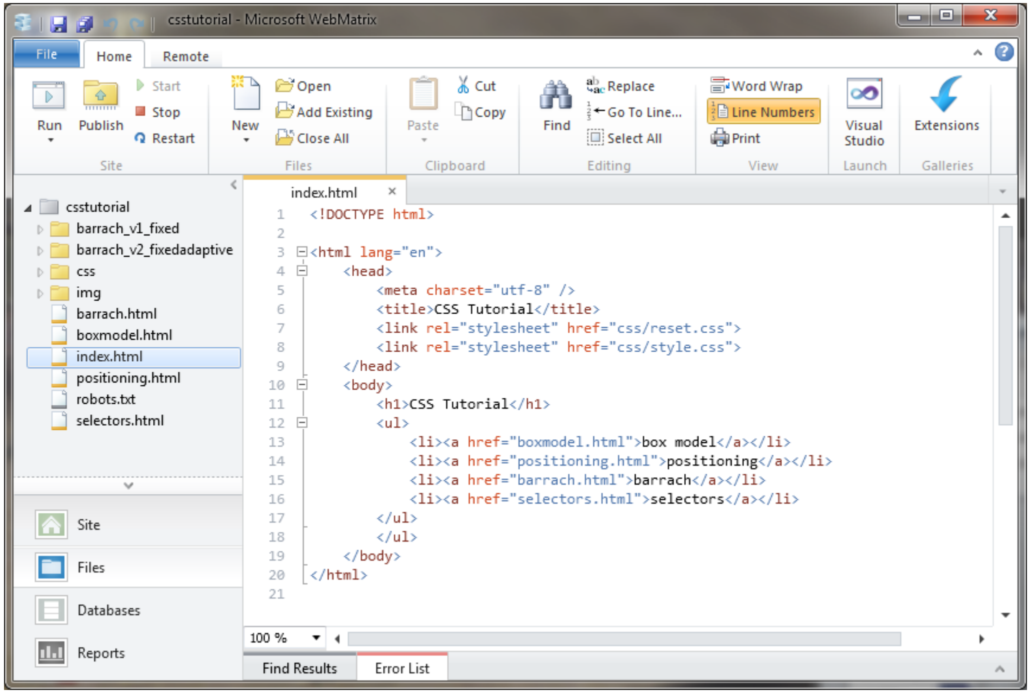
choice of whole range of specific devices

developer tools . . . .

WebMatrix is a free, lightweight development environment

- HTML, CSS, PHP editors
- server
- integrated development environment for WordPress together with database


Quick Start - Microsoft WebMatrix
Microsoft® WebMatrix 2
Open Site
Templates
App Gallery
□ Do not show this screen on start-up



```
<!DOCTYPE html>

<html lang="en">
    <head>
        <meta charset="utf-8" />
        <title>CSS Tutorial</title>
        <link rel="stylesheet" href="css/reset.css">
        <link rel="stylesheet" href="css/style.css">
    </head>
    <body>
        <h1>CSS Tutorial</h1>
        <ul>
            <li><a href="boxmodel.html">box model</a></li>
            <li><a href="positioning.html">positioning</a></li>
            <li><a href="barrach.html">barrach</a></li>
            <li><a href="selectors.html">selectors</a></li>
        </ul>
        </ul>
    </body>
</html>

```

schedule

week	date	lecture
1	19 feb	introduction
2	26 feb	basics of CSS
3	05 mar	responsive web design
4	12 mar	JavaScript and jQuery
5	19 mar	HTML5, CSS3 Animations and Flexbox
6	26 mar	WordPress model
7	02 apr	extensibility in WordPress
8	09 apr	*easter holiday*
9	16 apr	beyond mouse and keyboard
10	23 apr	server-side frameworks
11	30 apr	client-side frameworks
12	07 may	real-time web applications
13	14 may	*ascension day*
14	21 May	future trends
15	28 May	review

web documents

content management systems

programming frameworks

course assessment

grade will be determined by

25% coursework based on major exercises to be presented

75% two hour written exam (no materials to be brought to exam)

the first set of exercises will take you through the steps of web site development

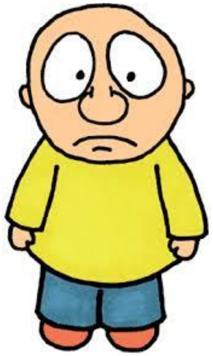
the solutions to all exercises have to be presented and each exercise will be graded

exercise groups

exercises should be done in groups of 3

you can form yourselves into groups and register these groups at the end of today's lecture

we recommend that all group members are there to present a solution



if only one group member there, then they will have to answer questions on all parts of the solution

their performance will determine the grade of the entire group

exercise sessions

two 45min sessions

first hour general session often used to introduce exercises and for students to give presentations of exercises as well as for demos and tutorials

second hour is an opportunity for students to individually get help with exercises or any material covered in the lectures

evolution of the web

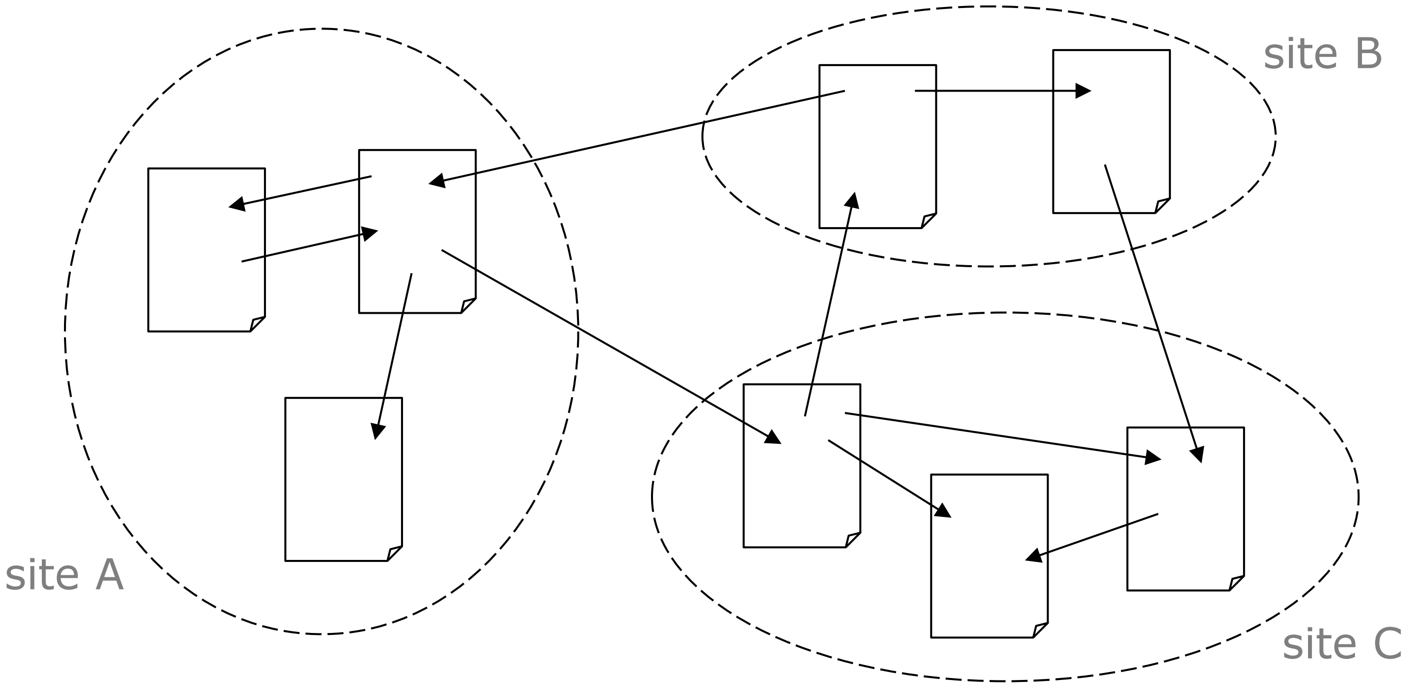
conceived in 1989 to allow geographically dispersed people to share information

information stored on different servers

information retrieved and viewed by means of a single browsing interface

information consisted mainly of text documents inter-linked based on hypertext model

web-based hypertext model



the web today

environment to deliver all kinds of information and services

multimedia of different types (images, video, animations, audio)

software distribution

applications (search engines, calculators, design tools, ...)

complex systems (e-Commerce, enterprise planning, ...)

platform for collaboration

discussion forums

social networking sites

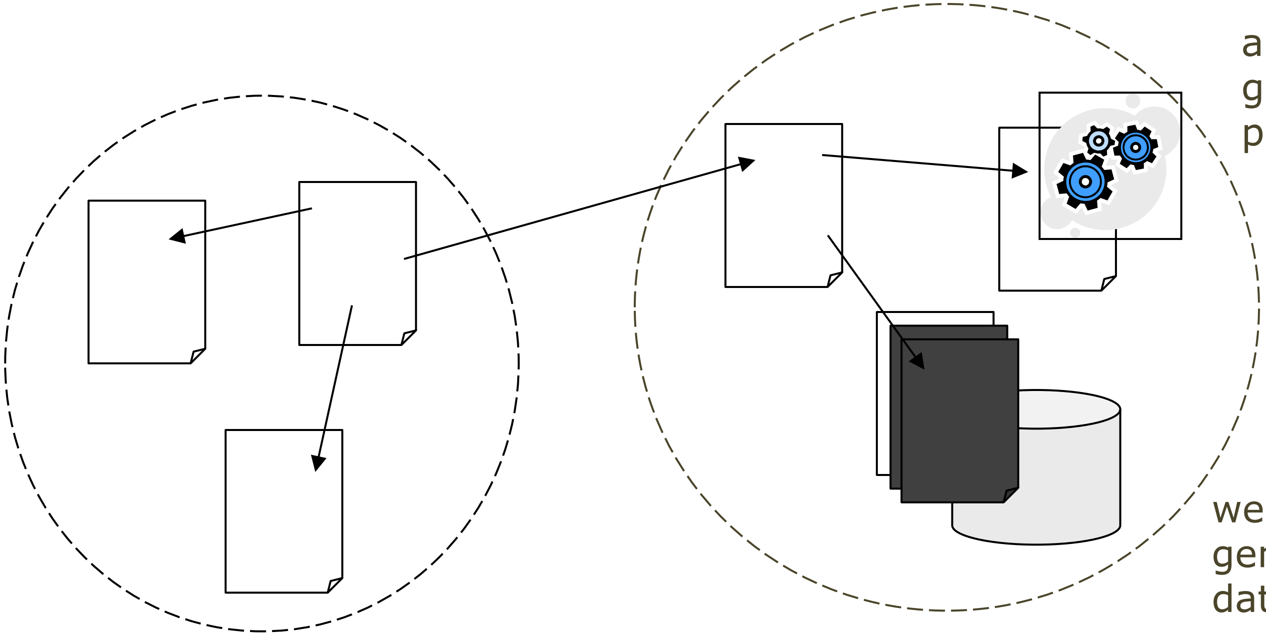
collaborative authoring (wikipedia, ...)

web conferencing and meeting systems

.....

the web nowadays . . .

increasing number of documents generated dynamically rather than being stored statically



application generates web page

web pages generated from a database

static web pages

need for web engineering

private individuals, businesses, governments and all sorts of organisations have come to rely on the web

web-based systems and applications now deliver a wide range of information and application services to a diversity of users

web technologies increasingly being adopted as a universal platform for all kinds of applications

large-scale commercial sites developed by multi-disciplinary teams of people with diverse skills and backgrounds, using cutting edge technologies

in many ways, the development, deployment and maintenance of web sites more complex than traditional software development

differences to software engineering

variety of user roles

programmers, database experts, designers, content providers, ...

typically developed for unknown set of users with no training

intrinsic characteristics of web applications

- hypertext-based interaction (non-sequential)
- range of technologies
- multi-platform accessibility

speed of development and evolution

users

generally unknown

- expectations and behaviour patterns not known at development time
- more difficult to design interface
- no training
- dealing with globalisation - different cultures, languages, etc.

nowadays covers a variety of roles

- browsers
- content providers
- editors
- ....

coping with diversity

web developers must work with multiple technologies in parallel

HTML

CSS

JavaScript/jQuery

WordPress

PHP

.....

made even more difficult because of the rapid development of new technologies and standards

HTML5/CSS3

while supporting multiple devices, multiple browsers and multiple versions

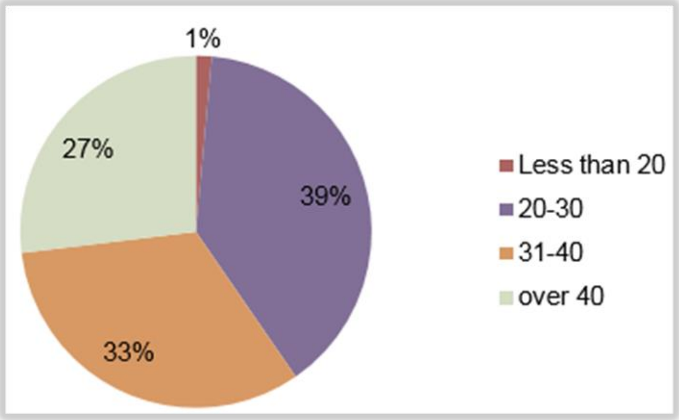
Internet Explorer, Safari, Google Chrome, Firefox

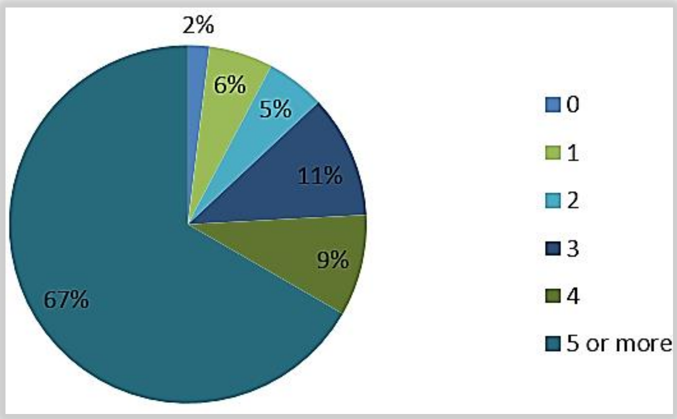
online survey 2014

208 participants
(83% male, 17% female)

24 different countries

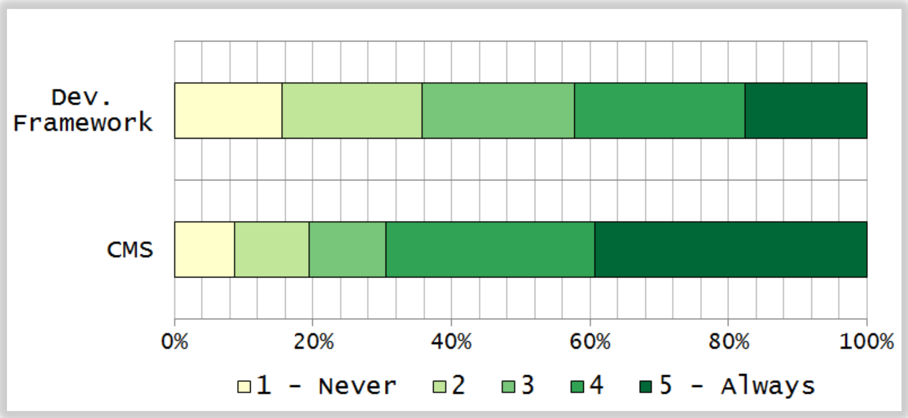
majority from
US/Switzerland/Germany/UK





The Forgotten Many? A Survey of Modern Web Practices
Moira C. Norrie, Linda Di Geronimo, Alfonso Murolo, Michael Nebeling
in *Proc. 14th Intl. Conf. on Web Engineering (ICWE), Toulouse, France, July 2014*

CMS or framework?



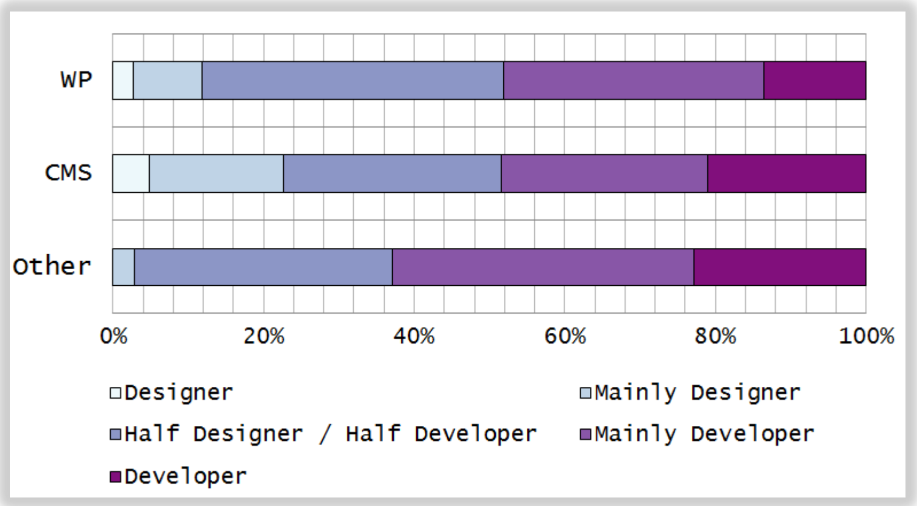
39% of CMS developers always use a CMS

18% always use a development framework

categories of developers

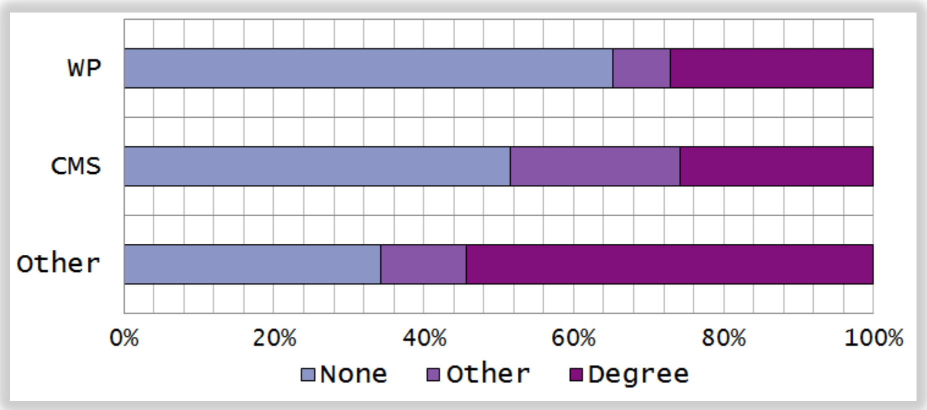
WP	WordPress developers
CMS	often use a CMS other than WordPress
other	rarely use CMS

designer or developer?



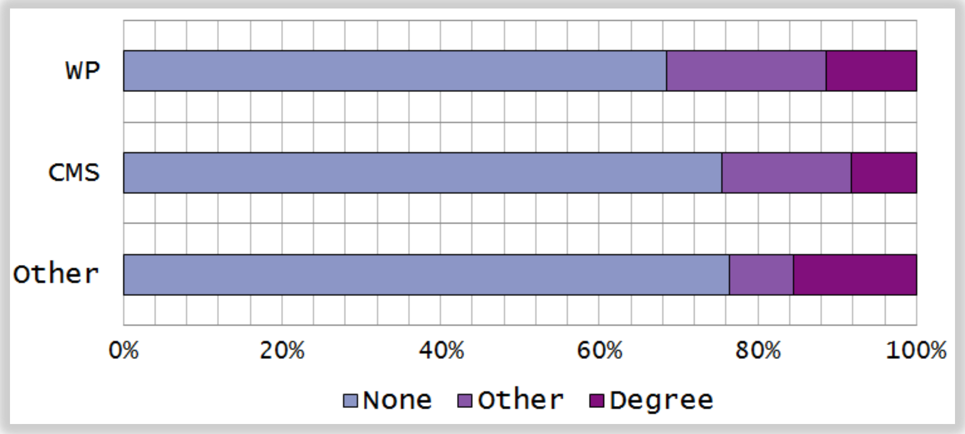
40% of WordPress developers classified themselves as half designer/half developer

cs education



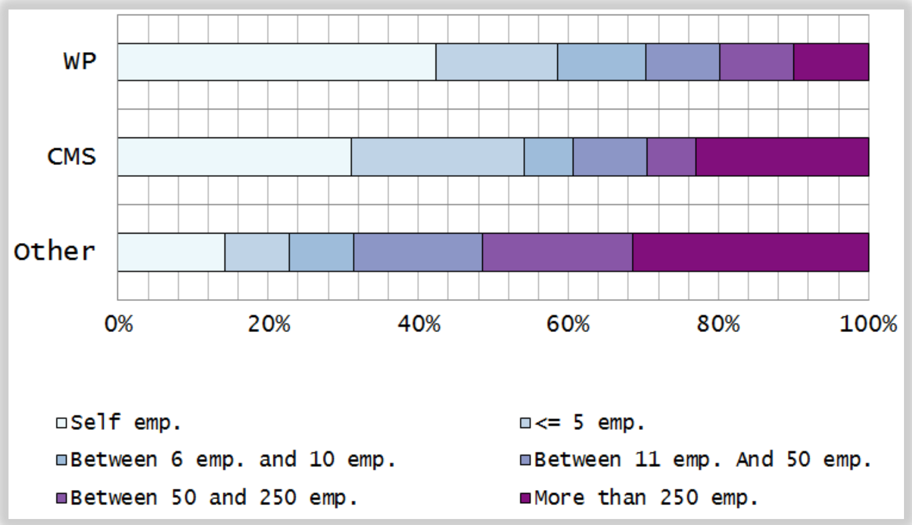
65% of WordPress developers have no formal education in computer science

design education



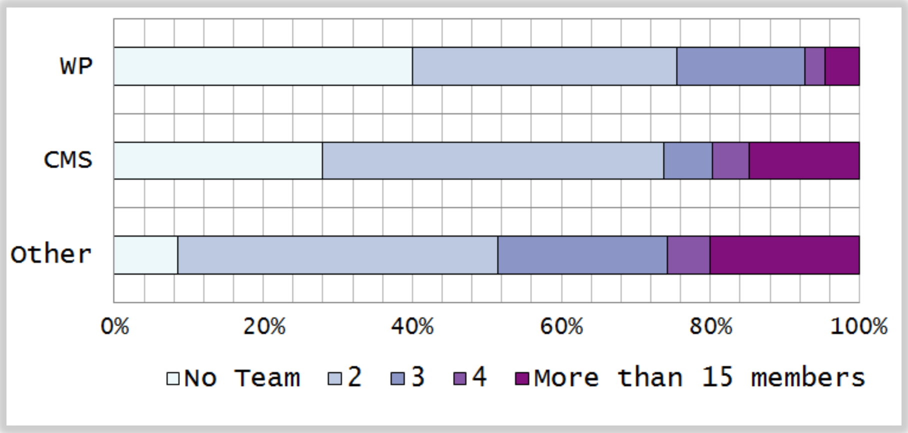
31% of WordPress developers had some form of qualification in design

size of organisation



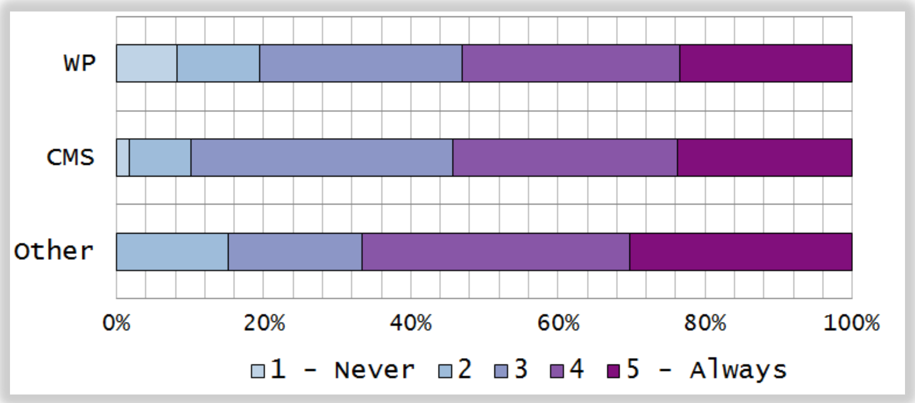
42% of WordPress developers are self-employed or working in organisations with 5 or fewer employees

size of team



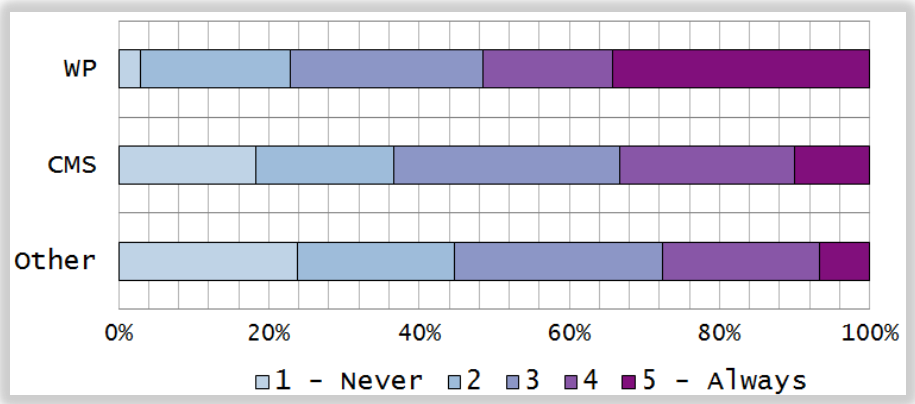
75% of WordPress developers work in teams with 5 or fewer members

inspiration from other sites



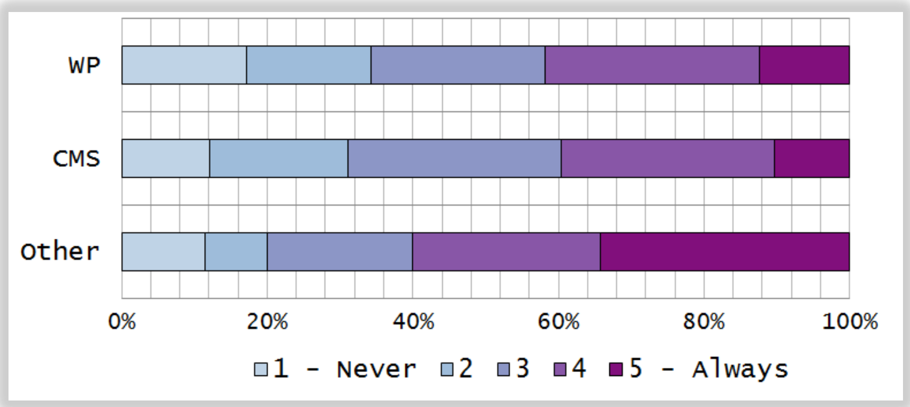
more than 50% of all developers often inspect web sites for inspiration

modelling data



28% of WordPress developers stated that they always or often model data

modelling functionality



42% of WordPress developers stated that they always or often model functionality

modelling tools

“text documents”

“spreadsheets and/or code editors”

“Django to create prototypes”

“brain and text editors”

“not sure if I misunderstand this, but I usually just write some requirements out”

“Excel”

“PowerPoint”

“Sequel Pro”

“JSON”

only 11% listed modelling tools

5% stated paper or whiteboards

recent trends

heavier focus on mobile

simplified content

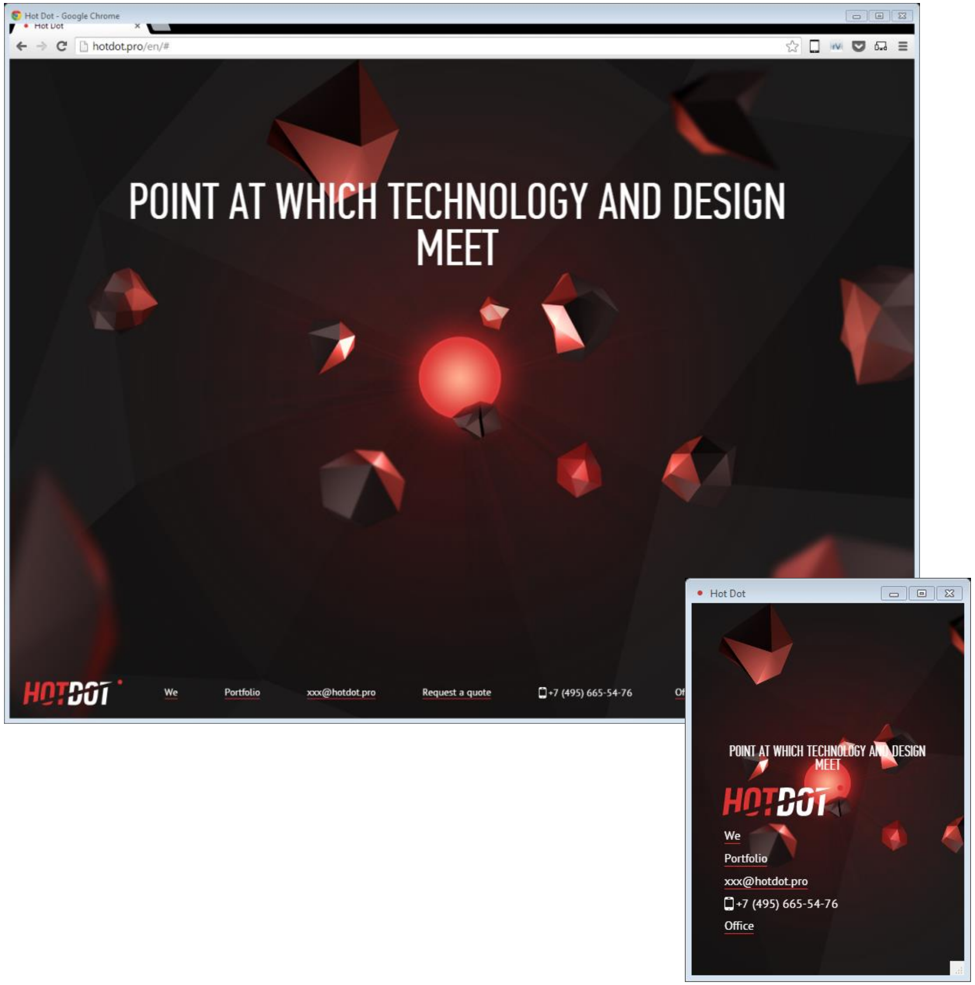
flat design

dropping the sidebar

background images & video

single-page web sites

typography is big



POINT AT WHICH TECHNOLOGY AND DESIGN MEET