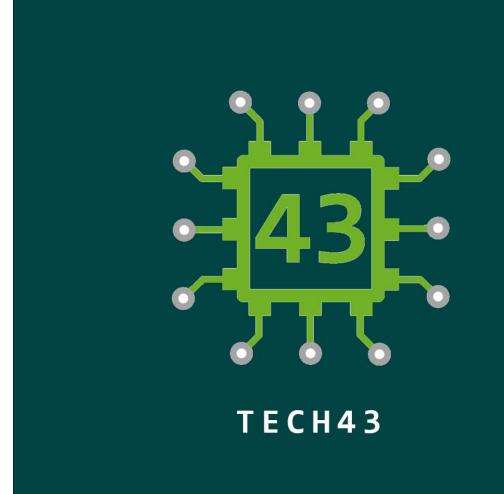
Moderni frontend development



Klasični frontend development



Počeci frontend developmenta

- HTML (statičan)
- Javascript se koristi pretežito za efekte i animacije
- Za dinamično generiranje stranica koristi se server-side rendering HTMLa (primjeri PHP, ASP, Perl, Java....)
 - Sadržaj stranice se generira na serveru i šalje klijentu (korisniku)
 - Stanje (State) se ne čuva između requestova (HTTP je stateless)
 - U ranim počecima dosta često prevladava "špageti" kod



```
<strong>Naziv poruke</strong>
  <strong>Datum</strong>
  <strong>Status</strong>
 <?php</pre>
  while($row2 = mysqli fetch array($result2)){
     if($row2['Prioritet'] -- 1)
       $strIcon = "error.png";
     elseif($row2['Prioritet'] == 2)
       $strIcon = "alert.png";
     elseif($row2['Prioritet'] == 3)
       $strIcon = "info.png";
     echo('
 (tr>
  (/tr>
 <img src="img/cm/" . $strIcon . "" title="Važnost poruke">
  <strong>' . date("d.m.Y.", strtotime($row2["Datum"])) . '</strong>
  <img src="img/cm/unread_mail.png" title="Nepročitana poruka">
 ');
echo($strTableDownCode);
else{
  echo($strTableTopCode . "Dobrodošli na korisničke stranice" . $strTableMiddleCode)
```

Server-side

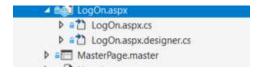
- Za primjer ćemo početi s Microsoftom
- Microsoft razvija ASP.NET
- Uvodi ASP.NET Web Forms koji pokušava riješiti izazove razvoja web aplikacija
 - Razvoj se pokušava izjednačiti s razvojem desktop aplikacija
 - Uvodi se koncept serverskih kontrola te ViewState za čuvanje stanja između requestova
 - Stranica se "izvrti" i generira na serveru i cijela se šalje natrag korisniku što je "sporo"



```
 style="margin-top: 3px; margin-bottom: 3px">
                                                                                                                  <asp:Label ID="lbUsername" runat="server"></asp:Label>
                                                                           <p style="margin-left: 6px; margin-top: 3px; margin-bottom: 3
                                                                                              <font face="Tahoma" style="font-size: 11px" color="#252735">
                                                                                               «% =GetString("Nastavitve_DialogChangePassword_NovoGeslo") %>
                                                                           <cc1:TextBox ID="tbNewPassword" runat="server" TextMode="F</pre>
                                                                           <p style="margin-left: 6px; margin-top: 3px; margin-bottom: 3px
                                                                                              <font face="Tahoma" style="font-size: 11px" color="#252735">
                                                                                               <cc1:TextBox ID="tbNewPassword2" runat="server" TextMode=
                                                                            </asp:Panel>
<cc1:Button ID="btnLogin" runat="server" Text="Potrdi" OnClick="btnLogin Click
```

ASP.NET Web Forms

- Kod je razdvojen na prezentacijski dio (.aspx/ascx) i dinamički tj. code behind (.aspx.cs)
- Struktura izgleda ovako:





```
amespace ExactWeb
  [LoginNotRequired]
  public partial class LogOn : BasePage
      protected void Page_Load(object sender, EventArgs e)
          lbMessage.Visible = false;
          tbUsername.Focus();
      protected override void InitializeCulture()
          base.InitializeCulture();
          CultureInfo clientCulture = CultureInfo.CreateSpecificCulture("sl");
          Thread.CurrentThread.CurrentCulture = clientCulture;
          Thread.CurrentThread.CurrentUICulture = clientCulture;
      public override void Translate()
          Title = GetString("Login Title");
          btnLogin.Text = GetString("Common_Button_Apply");
          litVersion.Text = GetString("Common Version");
      protected void btnLogin_Click(object sender, EventArgs e)
          string username = tbUsername.Text;
          string password;
          if (!CheckIfPasswordOk(out password))
          if(UserSession != null)
              Globals.DataProvider.Clear(Page as BasePage);
              Globals.BLSifrant.ClearCache(UserSession):
```

ASP.NET Web Forms

- Stanje između requestova na istu stranicu se čuva između ostalog u viewstateu
- Stanje između različitih stranica se čuva u sesiji (Session)
- Način na koji server side frameworksi kao što su Web Formsi rade zahtjevaju cijelo vrijeme slanje velikih količina podataka, ovisno o stranici
- Developeri se okreću Javascriptu kako bi to minimizirali i mogli osvježavati samo određene dijelove stranice



```
File Edit Format
       59 <input type="hidden" name="SPPageStateContext PreviousAuthoringVersion" id="SPPageStateContext F</p>
      60 <input type="hidden" name="MSOSPWebPartManager DisplayModeName" id="MSOSPWebPartManager DisplayModeName"</p>
      61 <input type="hidden" name="MSOSPWebPartManager_ExitingDesignMode" id="MSOSPWebPartManager_ExitingDesignMode" id="MSOSPWebPartManager_ExitingDesignMode"
       62 <input type="hidden" name="MSOWebPartPage_Shared" id="MSOWebPartPage_Shared" value="" />
       63 <input type="hidden" name="MSOLayout LayoutChanges" id="MSOLayout LayoutChanges" value="" />
      64 <input type="hidden" name="MSOLayout InDesignMode" id="MSOLayout InDesignMode" value="" />
       65 <input type="hidden" name="_wpSelected" id="_wpSelected" value="" />
      66 <input type="hidden" name=" wzSelected" id=" wzSelected" value="" />
      67 <input type="hidden" name="MSOSPWebPartManager OldDisplayModeName" id="MSOSPWebPartManager OldDisplayMod
      68 <input type="hidden" name="MSOSPWebPartManager StartWebPartEditingName" id="MSOSPWebPartManager
       69 <input type="hidden" name="MSOSPWebPartManager_EndWebPartEditing" id="MSOSPWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartEditing" id="MSOSPWebPartManager_EndWebPartEditing" id="MSOSPWebPartManager_EndWebPartEditing" id="MSOSPWebPartManager_EndWebPartEditing" id="MSOSPWebPartManager_EndWebPartEditing" id="MSOSPWebPartManager_EndWebPartEditing" id="MSOSPWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_EndWebPartManager_
      70 <input type="hidden" name=" maintainWorkspaceScrollPosition" id=" maintainWorkspaceScrollPosition
      71 <input type="hidden" name="MSOShowUnapproved_Xml" id="MSOShowUnapproved_Xml" value="" />
      72 <input type="hidden" name="SPPageStateContext_PreviousAuthoringItemUser" id="SPPageStateContext_PreviousAuthoringItemUser" id="SPPageStateConte
      73 <input type="hidden" name="_VIEWSTATE" id="_VIEWSTATE"
                 value="/wEPDwUILTc2NTI4NzYPZBYCZg9kFgICAQ9kFgICAw9kFhACAw9kFgIFJmdfYmM5YzFhOTVfZGFjMF80MGUxX2EyN
                 vaW50LCBWZXJzaW9uPTE0LjAuMC4wLCBDdWx0dXJlPW5ldXRyYWwsIFB1YmxpY0tleVRva2VuPTcxZTliY2UxMTFlOTQyOW
                29sbAMcU31zdGVtLkNvbGx1Y3Rpb25zLkhhc2h0YWJsZQIAAAAJAwAAAQDAAAAHFN5c3R1bS5Db2xsZWN0aW9ucy5IYXNoc
                zAAADAwAFBQsIHFN5c3RlbS5Db2xsZWN0aW9ucy5JQ29tcGFyZXIkU3lzdGVtLkNvbGxlY3Rpb25zLklIYXNoQ29kZVByb32
                m91bmNlbWVudHMGCAAAAAlvcGVuX21lbnUGCQAAAA1pZFByZXNFbmFibGVkBgoAAAAKU2VsZWN0ZWRJRAYLAAAAEWR2dF9zc
                @YQYPAAAAFU9wZW5NZW51S2V5QWNjZXNzaWJsZRAFAAAACgAAAAYQAAAAHFNlbGVjdCBvciBkZXNlbGVjdCBhbGwgaXRlbXN
                2N1bWVudCBsaWJyYXJ5LgYSAAAACU9wZW4gTWVudQYTAAAAIFByZXN1bmNlIGVuYWJsZWQgZm9yIHRoaXMgY29sdW1uBhQAA
                hZ2VkPVRSVUUmUGFnZWRQcmV2PVRSVUUmcF9Tb3J0QmVoYXZpb3I9MCZwX0ZpbGVMZWFmUmVmPTI1MjBDbG91ZHM1MmVwbmc
                GlvbnMyjQUAAQAAAP///8BAAAAAAAAAAAAAAAAAAKwJTeXN0ZW0uQ29sbGVjdGlvbnMuR2VuZXJpYy5EaWN0aW9uYXJ5YDJbV
                9Yjc3YTVjNTYxOTM0ZTA4OV0sW01pY3Jvc29mdC5TaGFyZVBvaW50LldlYlBhcnRQYWdlcy5GaWx0ZXJPcGVyYXRpb24sIE1
                TliY2UxMTFlOTQy0WNdXQMAAAAHVmVyc2lvbghDb21wYXJlcghIYXNoU2l6ZQADAAiSAVN5c3RlbS5Db2xsZWN0aW9ucy5HZ
                 sIEN1bHR1cmU9bmV1dHJhbCwgUHVibGljS2V5VG9rZW49Yjc3YTVjNTYxOTM0ZTA4OV1dCAAAAAAJAgAAAAAAAAAAAAAAAAAA
                3JsaWIsIFZlcnNpb249Mi4wLjAuMCwgQ3VsdHVyZT1uZXV0cmFsLCBQdWJsaWNLZXlUb2tlbj1iNzdhNwM1NjE5MzRlMDg5)
                TY3JpcHQFSXdpbmRvdy5sb2NhdG1vbiA9ICdqYXZhc2NyaXB0OkNvcmVJbnZva2UoXCdDaGFuZ2VXaWtpUGFnZU1vZGVcJyv
                2VNb2R1XCcsIHRydWUpOx4EVGV4dAUJRWRpdCBQYWdlHgtEZXNjcmlwdGlvbgUfRWRpdCB0aGUgY29udGVudHMgb2YgdGhpc
                lSW52b2tlKCdUYWtlT2ZmbGluZVRvQ2xpZW50UmVhbCcsMSwgMSwgJ2h0dHBzOlx1MDAyZlx1MDAyZmludHJhbmV0Lmdhdmf
                C0xLCAtMSlkAhUPFgIeB1Zpc2libGVoZAIXD2QNAmYPDxYGHhxQcmV2aW91c0F1dGhvcmluZ010ZW1WZXJzaW9uBQE0HhpQc
                hcmVQb2ludC5XZWJDb250cm9scy5TUENvbnRyb2xNb2RlLCBNaWNyb3NvZnQuU2hhcmVQb2ludCwgVmVyc2lvbj0xNC4wLj4
                S8eD0Fycm93SW1hZ2VXaWR0aAIFHhBBcnJvd01tYWd1SGVpZ2h0AgMeEUFycm93SW1hZ2VPZmZzZXRYZh4RQXJyb3dJbWFnZ
                2aWRlcmRkAgUPFgQeBkFjdGlvbgspigFNaWNyb3NvZnQuU2hhcmVQb2ludC5XZWJDb250cm9scy5QYWdlU3RhdGVBY3Rpb24
                TcxZTliY2UxMTFlOTQyOWMAHwlnZAIBD2QWBAIFD2QWAgIBDxAWAh8JaGQUKwEAZAIHD2QWAmYPZBYCZg8UKwADZAUlaHR0c
                FCWhkAgUPZBYCAgEPDxYCHg1NYXhMZW5ndGgCe2RkAiMPZBYCAgEPZBYCZg9kFgICAQ8PZBYGHgVjbGFzcwUibXMtc2J0YWJ
                BYEAgEPDxYCHgt0YXZpZ2F0ZVVybAVKL19sYXlvdXRzL1J1Y2VudFdpa2lQYWdlcy5hc3B4P0xpc3Q9ezMzMDkzQTM4LT1F0
                PZBYCAgUPDxYEHgZIZWlnaHQbAAAAAAAAAAAAHgRfIVNCAoABZBYCAgEPPCsACQEADxYEHg1QYXRoU2VwYXJhdG9yBAg
                3V0cy9pbWFnZXMvZWRpdG10ZW0uZ21mHw0FAUkeEVB1cm1pc3Npb25Db250ZXh0CymKAU1pY3Jvc29mdC5TaGFyZVBvaW50I
                1cmU9bmV1dHJhbCwgUHVibGljS2V5VG9rZW49NzFlOWJjZTExMWU5NDI5YwIeC1Blcm1pc3Npb25zKCmAAU1pY3Jvc29mdC9
                HVyZT1uZXV0cmFsLCBQdWJsaWNLZX1ub2tlbj03MWU5YmN1MTExZTk0Mj1jDUVkaXRMaXN0SXR1bXMfCWhkZAJHD2QWAgICI
                vbGRlclRvcE5hdkJhciRQbGFjZUhvbGRlckhvcm16b250YWxOYXYkVG9wTmF2aWdhdGlvbk1lbnVWNA8PZAUISW50cmFuZXF
      74
                </div>
      75
       76 <script type="text/javascript">
```

ToDo List Application PHP and MySQL database

Use what you have learned Add Task

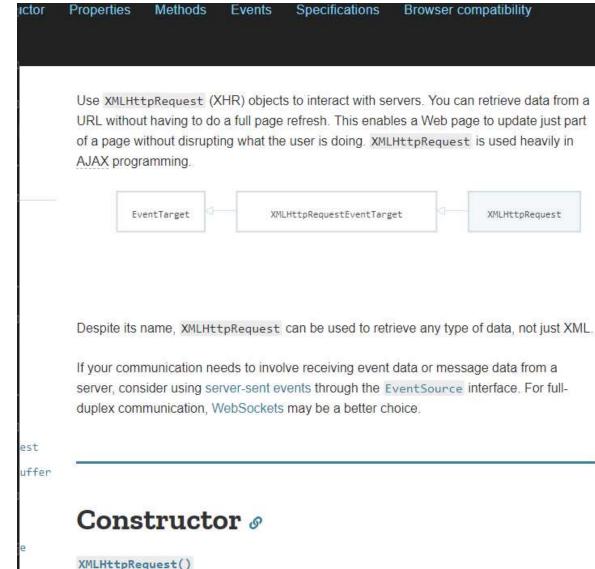
N	Tasks	Action
1	Plan your day using a todo list application	x
2	Watch web development tutorials on YouTube	x

B



Javascript < 3

- Ljudi otkrivaju XmlHttpRequest tj. AJAX
- Jako fragmentiran što se tiče podrške u web browserima
- Internet Explorer je generalno bio najveći prijestupnik što se tiče ne držanja standarda implementacije jezika
- Samim time povrh javascripta se javljaju razni libraryi kao što su jQuery



The constructor initializes an XMLHttpRequest. It must be called before any other



jQuery

- Olakšava rad s DOM-om (html elementima na stranici)
- Rješava nekompatibilnosti između web browsera
- Frontend development postaje kompliciran jer se nalazi dijelom na klijentskoj strani, dijelom na serverskoj strani
- jQuery potencijalno pridonosi špagetiziranju koda

```
43
```

```
var App = {
                     init: function () {
                             this.todos = util.store('todos-jquery');
                             this.todoTemplate = Handlebars.compile($('#todo-template').html());
                             this.footerTemplate = Handlebars.compile($('#footer-template').html());
                             this.bindEvents();
                             new Router({
                                     '/:filter': function (filter) {
                                             this.filter = filter;
                                             this.render();
                                     }.bind(this)
                             }).init('/all');
                    3,
                     bindEvents: function () {
                             $('.new-todo').on('keyup', this.create.bind(this));
                             $('.toggle-all').on('change', this.toggleAll.bind(this));
                             $('.footer').on('click', '.clear-completed', this.destroyCompleted.bind(this)
                             $('.todo-list')
                                     .on('change', '.toggle', this.toggle.bind(this))
                                     .on('dblclick', 'label', this.editingMode.bind(this))
                                     .on('keyup', '.edit', this.editKeyup.bind(this))
                                     .on('focusout', '.edit', this.update.bind(this))
                                     .on('click', '.destroy', this.destroy.bind(this));
                    3.
                     render: function () {
                             var todos = this.getFilteredTodos();
                             $('.todo-list').html(this.todoTemplate(todos));
                             $('.main').toggle(todos.length > 0);
                             $('.toggle-all').prop('checked', this.getActiveTodos().length === 0);
                             this.renderFooter();
                             $('.new-todo').focus();
                             util.store('todos-jquery', this.todos);
74
                     renderFooter: function () {
                             var todoCount = this.todos.length;
                             var activeTodoCount = this.getActiveTodos().length;
```

Moderni frontend development



Prednosti

- Logika aplikacije tj. klijenta se prebacuje na kod korisnika na njegov web browser
- Manje su opterećeni serveri koji se mogu baviti obradom podataka
- Prihvaća se stateless princip (nema sesija i full requestova) što znatno olakšava stvari
- Ide se na single page application (SPA) pristup
- Generalni princip rada je:
 - Klijentska aplikacija (frontend) se izvršava u web browseru
 - Ovdje se u pravilu odvija samo prezentacijski dio
 - Za sve ostalo (podatke, autentikaciju i poslovnu logiku) se pozivaju endpointi na serverima (API itd.)



Nedostaci

- Inicijalni load stranice je ogroman naspram klasičnog server-side pristupa jer morate učitati xxxx KB (ubaci_js_framework_i_ovisnosti_ovdje)
- Morate koristiti Javascript
- Frontend development postaje užasno kompliciran (alati, package manageri, build sistemi, <u>node modules</u> ⁽²⁾
- Svaka dva mjeseca izlazni "the next big thing" u frontend developmentu
- Lak je put do propasti i neodrživog koda



Svijetlo na kraju tunela

- Srećom, već dugo na tržištu dominiraju vrlo kvalitetni alati koji nam znatno olakšavaju frontend development
- Sva tri dijele filozofiju podijele korisničkog sučelja na reusable komponente
- Ti alati su "velika trojka" koji izgleda ne idu nikud:
 - Angular => https://angular.io/
 - React => https://reactjs.org/
 - Vuejs => https://vuejs.org/
- Kao primjer i upoznavanje ćemo prikazati implementaciju TodoMVC aplikacije u sva tri alata



Angular (ne JS)

- Javascript (bolje rečeno Typescript) framework by Google
- Ima sve što trebate i puno toga što ne trebate
- Inicijalno ogroman no nakon što kompajlirate kod u produkcijskom modu koristi tehnike kako bi smanjio finalni proizvod (.js i asseti)
- Dolazi s CLI alatima koji olakšavaju kreiranje projekata (ne morate znati build sisteme kao što su WebPack i sl.)
- Vole ga developeri koji migriraju iz klasičnih server side frameworka
- Može se iskoristiti i razvoj mobilnih aplikacija putem NativeScripta*





Demo Angular:O



React

- Javascript library by Facebook
- Core dio se uglavnom fokusira samo na View* dijelu
- Ostatak morate koristiti community libove (react-router, react-navigation, redux itd.)
- Samim time je dosta modularan
- Uveo je koncept Virtual DOMa i JSX-a
- Možete početi s ubacivanjem jedne js skripte na postojeću stranicu pa sve do punokrvnih SPA aplikacija
- Dolazi s CLI alatima koji olakšavaju kreiranje projekata
- Sve je Javascript (ali bar ES6 javascript)
- Podaci su izvor istine, na izmjenu podataka (state) "reagira" i sučelje



React A JavaScript library for building user interfaces Get Started Take the Tutorial

Todos

What needs to be done?

Demo React :>



Į.

Vue.js

- Javascript framework by neki lik (Evan You)
- Ideja je da bude aproachable i lagan za naučiti
- Najmanje veličine naspram ostalih dvoje*
- Također ima Virtual DOM i bazira se na komponentama
- Možete početi s ubacivanjem jedne js skripte pa progresivno graditi do punokrvnih SPA aplikacija
- Dolazi s CLI alatima koji olakšavaju kreiranje projekata



The Progressive JavaScript Framework



GET STARTED



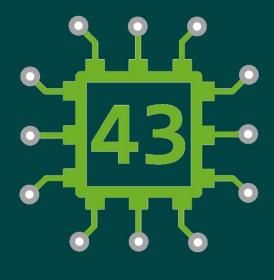


What needs to be done?



Demo Vue.js:/





TECH43