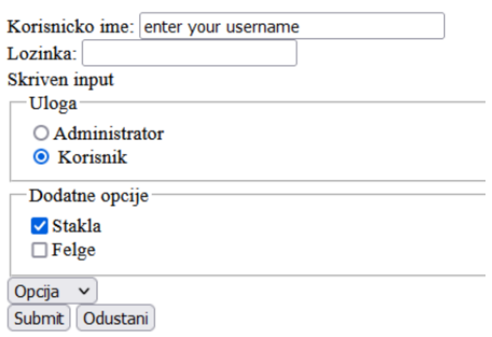
```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport"
                content="width=device-width,
                 initial-scale=1.0">
  <link rel="stylesheet" type="text/css"
                href="styles/main.css">
  <script src="scripts/main.js"></script>
</head>
<body></body>
</html>
<figure><img src="slika.jpg" height="300px"
 alt="Opis">
<tr> -> red, <td> -> stupac
<a href="http://www.fer.hr/index.html">fer</a>
<a href="#b2" title="1. poglavlje">poglavlje</a>
<h3 id="b2">Skoci na ovo poglavnje</h3>
<hr /> <!-- horz crta-->

<form target="_self" action="/processForm.php" method="GET">
   <!-- target: self unutar istog, blank unutar novog -->
   <label>Korisnicko ime: <input type="text"
                                 name="username" value="enter your username"
                                 size="30"></label><br/>
    <label>Lozinka: <input type="password"
                                  name="password"
                                  maxlength="30" required></label><br/>
     <label>Skriven input <input type="text" hidden readonly></label>

  <fieldset> <!-- radio-button -> izbor jednog -->
      <legend>Uloga</legend>
      <label><input type="radio" name="role"
                                 value="admin">Administrator</label><br/>
      <input type="radio" id="user" name="role" value="user" checked>
      <label for="user">Korisnik</label>
   </fieldset>
   <fieldset> <!-- checkbox -> bilo koji broj -->
          <legend>Dodatne opcije</legend>
          <label><input type="checkbox"
                        name="stakla" value="da" checked>Stakla</label><br/>
          <label><input type="checkbox"
                        name="felge" value="da">Felge</label>
    </fieldset>
      <select name="padajuca_lista" size="1">
          <!-- multiple za selectanje vise -->
          <option value="opcija" selected>Opcija</option>
          <option value="opcija">Opcija2</option>
       </select><br/>
      <input type="submit" value="Submit">
      <input type="reset" value="Odustani">
</form>
    <!--
      greske kodiranja sadrzaja:
      ponovljeno ime elementa, atribut disabled, atribut nije definiran
      application/x-www-form-urlencoded -> cust=Pero+Peri%C4
      text/plain -> za developere -> cust=Pero address=Ulica
    -->
```


Korisnicko ime: enter your username
Lozinka:
Skriven input
Uloga
○ Administrator
● Korisnik
Dodatne opcije
☑ Stakla
☐ Felge
Opcija
Submit Odustani

```
Jednostavni:
* => sve
h1, li => svi h1 i li
li.c1  => svi li s klasom c1
Atributni:
li[id="z2"] => svi li s id=z2
Kombinirani:
div span => svi span unutar div
div > span => neposredna djeca span roditelja div
div+span => prvi span nakon diva, ista razina
div~span => isto kao +, ali sve elemente nakon diva iste razine
Pseudoklasa:
div:hover => na hover misa
li:first-child => li koji je prvo dijete roditelja
input:required => svi required inputi
Pseudoelementi:
p::before, p::after {content: "\"";} => ubaci " prije i poslije paragrafa
p::first-letter
p::first-line
p::selection => dio elementa koji je odabrao korisnik
inline => 1000
#id => 100
.class, :pseudo-class, [attribute] => 10
<TAG>, ::pseudo-element => 1
<body>, * => 0
border: inherit => uzmi od roditelja
border: initial => iskljuci sve, uzmi od browsera
border: unset => inherit ako ima matching value, initial inace
neki css elementi:
font-family, font-weight:bold, font-size, font-style:italic, text-decoration:underline/none
text-align, text-indent, letter-spacing, line-height
background-image: url('./images/x.jpg')
background-repeat: no-repeat, repeat
box-sizing: border-box
display: block/inline/inline-block
padding, border, margin
margin:auto => centriranje
max-width, width,vw,vh,vmin,vmax
position: relative/absolute/fixed
Važniji globalni atributi: id,class,
lang,title,style
```

```
var x = 123e-5; let y = "string";
const z = 'string';
// "1"+'2'="12", Number(1)+Number(2)=3
let exp = 2**3 // 2^3 = 8
                // strings \\
let s = "he said: \"xd\"";
let len = s.length;
let index = s.indexOf("xd");  // .lastIndexOf()
let newString = s.slice(1,2); // [od,do),e
let numToString = (123).toString();
let stringToNum = Number(numToString);
                // functions \\
function f1(x="default value") {
                console.log(x);
}
let f2 = function(x) {console.log(x);}
let f3 = (x) => console.log(x);
                // arrays \\
let arr = [1,2,3,5,6,1,7,8];
let last = arr.pop(); // makne i returna zadnji
arr.push(4);  // append na kraj
let first = arr.shift(); // makne i returna prvi
arr.unshift(5); // ubaci na pocetak
arr.splice(1,2); // brise 2 elementa od indeksa 1
let arr2 = [6, 7];
let arr3 = arr.concat(arr); // spoji
arr4 = arr3.slice(1,3); //indexi od 0, 1 element,2 element, 3 ne
console.log(arr4.includes(6)); //vraca bool
arr.sort( function(a,b){return b - a} ); // sort sa komparatorom
(desc)
arr.reverse();
arrEven = arr.filter( (x) => x%2==0);
for (let element of arr) {console.log(element);} // elementi
for (let index in arr) {console.log(index);}    // indeksi
                // classes, objects \\
class Person {
    lastName = "Doe";
    age = 50;
    constructor(firstNameValue) {this.firstName =
firstNameValue;}
    get lastName() {return this.lastName;}
    set lastName(newLastName) {this.lastName =
newLastName}
}
let person1 = new Person("John");
person1.lastName = "Williams";
person1.firstName = "Jake";
for (let value of Object.values(person1)) {console.log(value)}
                // try-catch \\
try {
                throw "error";
} catch(err) {
                console.log(err);
} finally {
                var x = 2; }
```

by Aux,Spike,Krampert

```
setTimeout( () => console.log(3) , 3000 ); // nakon 3s
let promise = new Promise( (resolve, reject) => {
              setTimeout( () => {
              console.log("nakon 3 sekunde...");
               if (false) {
                   resolve("dobro izvrsen");
                } else {
                  reject("lose izvrsen");
              },
              3000);
});
promise.then(
  function(result) {console.log(result);},
  // ako resolve, result = "dobro izvrsen"
  function(error) {console.log(error);}
  // ako reject, result = "lose izvrsen"
);
promise.catch(
  function(error) {console.log(error);}// samo ako reject
)
promise.catch(
              function(error){console.log(error);}
).then(
              function(result){console.log("Resolve:"+result)},
              function(result){console.log("Reject:"+result)}
);     // catch ce uhvatit error, u then se ce pozvat prva funkcija s result = undefined
                                          //Fetch\\
let promise2 = fetch("https://web1lab2.azurewebsites.net/products?categoryId=1");
promise2.then(      // obraduje se promise od fetcha
              function(response) {
                     if (!response.ok) { throw new Error("Cannot load"); }
                     else { return response.json(); } // novo obecanje reponse.json()
              },
              function(error) { throw error; }
).then(            // obraduje se promise od response.json
              function(response) { console.log("Loaded JSON"); }
).catch(           // catch hvata gresku u bilo kojem promiseu
              function(error) { console.log(error); }
)
                                          //LoadJson\\
async function LoadJSON() {     // funkcija se izvodi asinkrono
     let promise = await fetch("https://web/categoryId=1");
         // unutar funkcije, await se izvodi sinkrono (ostatak funkcije ceka)
     if (!promise.ok) { throw new Error ("Cannot load"); }
     else { var jsonContents = await promise.json(); }
              console.log(jsonContents);
}
LoadJSON().catch(
              (error) => {console.log(error);}
)
```

******* prez 8 *********

GET{metoda} / predmet / rppzwpu HTTP{oznaka resursa}/1.1{oznaka protokola}
Host: www.fer.hr {ime posluzitelja}
HTTP - (hypermedia) prijenos u formatima -> html,meta-data,chunk,
Media Type -> text/html,image/jpeg,video/quickTime,application/javascript

```
                    logo.png?
Browser ------------------------> www.fer.hr
                          Content-type image/jpeg
                          Content-length:1399
            <-------------------------
```

MME Type - (tip/podtip) -> application/javascript, application/json, text/plain
Ciklus zahtjev-odgovor= jedna konverzacija
HTTPS port(443) --> HTTS --> TLS/SSL --> TCP --> IP
Uspostava komunikacije TLS - faza rukovanja(dogovor parametara),
faza komunikacije(kljuc za sifriranje poruka)
Tijek komunikacije Server <-> Client
<- salje zahtjev , -> odgovara certifikatom, <- provjerava certifikat, generira kljuc sjednice , salje kljuc sifriran javnim kljucem, -> desifrira kljuc sjednice, <-> koriste kljuc sjednice

Primjena HTTP - Cloud Computing, Rest, www, WOT
URI - uniformni (struktura zapisa)
- identifikator (infromacija koja omogucuju razlikovanje resursa)
- resurs (informacijski izvor)
URL,URN - podskup od URI
URN -jedinstvenost i trajnost identifikacije
pr. urn:ietf:rfc:2616
URL - sadrzi informaciju o lokaciji
pr. http://www.ietf.org/rfc/rfc.txt
Primjeri URI-a (http://www.ietf.org/rfc/rfc2396.txt,mailto:John.Doe@example.com
--> apsolutni (puno ime web adrese,www.fer.hr)
--> relativni (skraceno, npr localhost)

Analiza URI-a
http:{shema,nacin pristupa resursu(HTTP)}//www.fer.unizg.hr{host name(ip adresa ili ime)}/
|kako| |gdje|
predmet/rppzwpu{put resursa}
|sto se dohvaca|
shema:(http,ftp,urn,file)// <autoritet> <put {/predmet}> ? <upit {web=prag}> {put,upit isto neobavezno}
pr. http://www.google.com:81/search?q=web{html#b3 -> skakanje po poglavljima}
<a href="../djelatnost/nastava/intstv.html>Internet stvari </a> (popni se na folder vise, spusti na djelatnost/nastava/ , otvori intstv.html

Poruke HTTP

request	reply
Get /pred/web HTTP 1.0	HTTP 1.1 200 OK Pocetni redak
...	Content-type Zaglavlja
...	...
prazan	redak
...	<!Doctype html> <html> tijelo poruke

Metode zahtjeva
GET - dohvacanje sadrzaja, HEAD- dohvacanje podataka o resursu(nema sadrzaja u tijelu za razliku od GET)
, POST(sign up, comment,burza grupa),PUT,DELETE
HTTP reply - HTTP/1.1 {inacica protokola} 404 {kod} Not FOund {opis}
Kod - 1xx (info){100-Continue}, 2xx(success){200-OK}, 3xx{301-permanet redirect},4xx(client err){400-Bad request}{404-Not Found}
5xx(server error){500-Internal server err}{503-Service Unavailable}{505- http version not supported}
GET koristi link, POST body

```
opera        dns server     www.fer.hr
fer.hr?
------------------>
<------------------
          GET /pred/web
------------------------------->
  HTTP 200 OK +index.html
<-------------------------------
GET css
-------------------------------->
GET js
-------------------------------->
<--------------------------------
<--------------------------------
```

Validacija - moze se povuci js koji radi validaciju da se ne salje na server
Cilj cache-a -> smanjiti odziv,internetski promet, opterecenje
Uvjetni GET -> IF-Match,IF-None-Match,If-Range

************* prez 9,10 ****************
Procesni modeli i protokoli
-> in-process (opasno,ISAPI,Apache Server Api,low usage)
-> poseban proc(sporo,CGI,low usage)
-> poseban proc s pool-om(Fast CGI,PhP)
-> proc s 2 dretve
-> proc s pool-om
-> vanjski proc s pool-om dretvi
Arhitekture
browser <---> server <---> vanjski intrepeter(python)
browser <---> server <---> aplikacijski server(Node.js)
Event Loop -> ako je fja async stavlja se u queue sve dok se sve ne obradi

Versioning -> minor ^version- 1.2.3 -> 1.{1-9}.3
-> major ~ version- 1.2.3 -> {1-9}.2.3

```
                  Promises
  let makePromise=function (x) {
     return new Promise(function (res, rej) {
        try {
           setTimeout(function () {
              res(x);
           }, 1000)
        } catch (err) {
           //handle err
        }
     })
  }
  let afAll = async function(){
     let sum=0;
     let res = await Promise.all([
        makePromise(getRandomBetw([1,5])).then(function (r1){
           sum+=r1;
           })
        .catch(function (err){
           //handle err
        }),
        makePromise(getRandomBetw([1,5])).then(function (r2){
           sum+=r2;
        }).catch(function (err){
           //handle err
        })
                  ])
  }
  let sum=0;
  makePromise(getRandom([]))
  .then(function (r1){
     sum+=parseInt(r1);
     return makePromise(getRandom([]));
  }).then(function (r3){
     sum+=parseInt(r3);
     console.log(`sum is ${sum}`);
  }).catch(function (err){
     //handle err
  })
  let asyF = async function () {
     let r1 = await makePromise(getRandom([]));
     let r2 = await makePromise(getRandom([]));
     let r3 = await makePromise(getRandom([]));
     console.log("${r1}+${r2}+${r3}=${r1+r2+r2}");
  }
```

************* prez 12 ****************

<%= x %> -> x
<%- @x %> ->@x
validacija - provjera ispravnosti podataka
 (moze se provesti na: serveru, bazi, klijentu)
       -> forma(disabled, maxlength, max, min, step)
       -> js (regex, neka fja)

Stanja -> na razini citavog sustava(globalno)
          -> na razini korisnika sustava(kosarica)
          -> na razini sjednice izmedu korisnika i sustava(login)
Tranzijetna pohrana -> nema trajnog cuvanja stanja
Prezistentna -> trajno cuvanje(pr. sustav i korisnik)

Sjednica -> slijed vremenski omeđenih i logički povezanih
                transakcija između pojedinog klijenta i poslužitelja
    1. pocetak sjednice(zahtijev klijenta prema serveru
                              nakon duljeg vremena neaktivnosti)
    2. trajanje sjednice(logicki povezane transakcije
                izmedu klijenta i servera)
    3. zavrsetak sjednice(prestanak rada klijenta)

Identifikator sjednice(session token) -> odreduje sjednicu,
                dodan svakoj transakciji koja pripada sjednici
Prijenos sesssion tokena-a -> URI, header, body

Prijenost stanja -> hidden field, URL rewriting, cookies
Hidden field ->   <input name="naziv" type="hidden" value="SID=abc123">
   --> pros - podrzan na svakom browseru, ne moze se onemoguciti, performanse
   --> cons - vidljivi kod izvornog koda, prijenos kod svake transakcije, koristenje obrazaca

```
                //index.js\\
//implementacija session-a
router.use(session.sessionManager);
if(req.session.access_counter === undefined) // postavi access_counter koji smo izmislili
                req.session.access_counter = 0;
                //sessionFER\\
//session record store
let sessionStore = new Map();
                ***
//extract sessionID from GET or POST request
let sessionID = (req.query[sIDName] || req.body[sIDName]);
                ***
//fetch the session record
let sidRecord = sessionStore.get(sessionID);
                ***
if(!sidRecord) {
sidRecord = {id: uuid.v4(), created: Date.now()};
sessionStore.set(sidRecord.id, sidRecord)
//add the session record to the request object
req.session = sidRecord;
                ***
//pass the control to the next middleware layer
next();
```

Url rewriting -> mehanizam oznacavanja sjednica kada cookie nije dostupan
                (https://www.fer.unizg.hr/predmet/or?sid=234a3f0cc7)
      --> pros - neovisan o browseru, ne moze se onemoguciti na klijentu,jednostavan
      --> const - prijenos kroz URI, ogranicena kolicina, manja citljivost, dodatna funkcionalnost

```
//add sessionID parameter to URL query segment
return function(url) {
                let newURL = new URL(url)
                newURL.searchParams.append(sIDName, sessionID)
                return newURL.toString()
}
```

Cookies -> mala kolicina slobodno definiranih vrijednost, do 4kB
             -> stvara server, sprema klijent
                --> domena+put=doseg
                --> sadrzaj - ime=vrijednost,obvezno
                --> domena - ako nije definirano uzima se od servera, npr www.fer.unizg.hr/predmet/or
                --> put - ako nije definiran uzima se dio URI-a,fer.unizg.hr/nastava/or/labosi.html --> /nastava/or
                -->rok valjanosti, ogranicenje pristupa,sigurnost prosljedivanja(isto za druge domene) <-- opcionalno

```
                        GET /predmet/or
                        HOst www.fer.unizg.hr
Client------------------------------------------------------->
                        Set-cookie: sid=mileVOliDisko(sadrzaj);
                        Path=/nastava/or(put);Domain=www.fer.unizg.hr(domena);
                        Secure(sigurna veza);HttpOnly(nema lokalnog pristupa);
                        Expires: Wed, ...(istjece, moze i Max-age=3600)
<-------------------------------------------------------------Server
```

Uvjeti prosljedivanja cookie-a
   1. server pripada domeni (pr. www.fer.unizg.hr(*host-only),fer.unizg.hr,unizg.hr,hr ->da, carnet.hr->ne)
   2. sadrzan unutar puta (/nastava/or/labosi,nastava/or->da, nastava/oop-> ne)
   3. nije isteko rok trajanja, 4.ako je defirrniran secure salje se kroz https(ne http)
   5. ako zabranimo, cookie nece bit proslijeden iz druge domene

```
                        GET /nastava/or
                        Host www.fer.unizg.hr
                        Cookie: sid=abc123
Client------------------------------------------------------->
                        HTTP/1.1 OK
                        Content-type: text/html
                        ...
<-------------------------------------------------------------Server
                        GET /intranet/or
                        Host www.fer.unizg.hr
                        Cookie: sid=abc123
Client------------------------------------------------------->
```

Trajni -> definiran rok valjanosti

```
SameSite
   -> none (cookie se salje na drugu domenu)
   -> strict(cookie preko druge domene se ne salje,
            isto ako postoji link na nju)
   -> lax
      (cookie preko druge domene
            se ne salje ali radi link na nju)
      //cookies.js\\
res.cookie(req.query.name,
            req.query.value, { path: req.query.path })
res.clearCookie(req.query.name,
            {path: req.query.path})
       //app.js\\
const cookieParser = require('cookie-parser')
//cookie parser middleware
app.use(cookieParser());
      //page.js\\
router.get('/*', function(req, res, next) {
res.render('page', {
path: req.path,
cookies: req.cookies
});
```

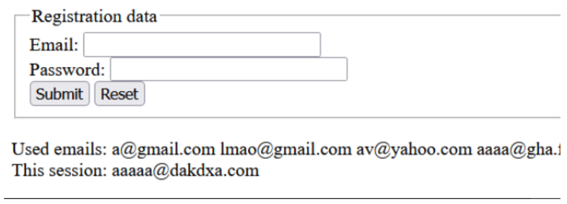
```
      *******server.js*******
const express = require('express');
const app = express();
const path = require('path');
const pg = require('pg')
const db = require('./db')
const session = require('express-session')
const pgSession =
            require('connect-pg-simple')(session)
const router = require('./routes/router');
app.set('views', path.join(__dirname, 'views'));
app.set('view engine', 'ejs');
app.use(express.static(path.join(__dirname, 'public')));
app.use(express.urlencoded({ extended: true }));
app.use(session({
   store: new pgSession({
      pool: db.pool,
   }),
   secret: 'fer-web-lab4',
   resave: false,
   saveUninitialized: true,
            cookie: {maxAge: 24 * 60 * 60 * 1000}
}));
app.use('/register', router);
app.listen(3000);
```

Opis modela : upisujemo mail i password
i tako se registriramo, ispisujemo stare
mailove i trenutnog, req.session.user =
{email: req.body.email}; moglo se i
req.session.user=req.body.email ali ovako
mozemo dodat i neki dodatni parametar kojem
mozemo pristupit preko ejs-a, npr username: req.body.username

```
            *******router.js*******
const express = require('express');
const router = express.Router();
const {body,validationResult} = require('express-validator');
const db = require('../db');
router.get('/', async function (req, res, next) {
   let rsp = await db.query('SELECT email FROM users');
            //router.get('/:id', function(req,res,next) {
            //id = parseInt(req.params.id)
           // rsp.rows[i] pristup elementima,
          // rsp.rows[i].atribut pristup atributu

   res.render('register', {
      title: 'Register',
      err: undefined,
      users: rsp.rows,
      user: req.session.user
   });
});
router.post('/', [
body('email').trim().isEmail(),
body('pass').trim().isLength({ min:3, max:20 })
//body('employedsince').toInt().isInt({min:1970,max:2021}),
],
async function (req, res, next) {
const errors = validationResult(req);
if (!errors.isEmpty()) {
            res.render('register', {
                        title: 'Register',
                        err: "Invalid input!",
                        users: [],
                        user: req.session.user
            });
} else {
            try {
                        await db.query('INSERT INTO
                        users(email, password) VALUES ($1, $2)',
                                    [req.body.email, req.body.pass]);
                        req.session.user = {email: req.body.email};
                        res.redirect('/register');
            } catch (err) {
                        console.log(err);
                        res.render('register', {
                                    title: 'Register',
                                    err: "Database error!",
                                    users: [],
                                    user: req.session.user
                        });
            }
}
});
module.exports = router;
```

```
            *******register.ejs*******
<html>
<head>
   <title> <%= title %> </title>
</head>
<body>
<%- include(`partials/header`); %>
<form action="/register" method="POST">
<fieldset>
            <legend>Registration data</legend>
            <div>
            <label for="email">Email:</label>
            <input type="text" name="email" id="email"
                                    maxlength="20"
                                    minlength="2" size="30">
            </div>
            <div>
            <label for="password">Password:</label>
            <input type="text" name="pass" id="password"
                                    maxlength="20"
                                    minlength="2" size="30">
            </div>
            <div>
            <input class="btn" type="submit" value="Submit">
            <input class="btn" type="reset" value="Reset">
            </div>
            <% if (err !== undefined) { %>
            <div>
                        <%= err %>
            </div>
            <% } %>
            </fieldset>
</form>
<div>
   Used emails:
   <% for (usr of users) { %>
      <%= usr.email %>
   <% } %>
</div>
<% if (user !== undefined) { %>
<div>
   This session:
   <%= user.email %>
</div>
<% } %>
</body>
</html>
```



Used emails: a@gmail.com lmao@gmail.com av@yahoo.com aaaa@gha.
This session: aaaaa@dakdxa.com