**The preview shows how the test is presented to participants. You can also see the correct answers for all questions except free text answers. No correct answers are shown to participants when they complete the test.**

Total max score: 30

Start by reading through all questions. Peter will visit the room 45 minutes after the exam has started to clarify the questions you do not understand. Max score is 30 points.

- For grade 3, 40% of max score (12 points) is required.
- For grade 4, 60% of max score (18 points) is required.
- For grade 5, 80% of max score (24 points) is required.

You are not allowed to use the computer for anything else but answering the questions on this page.

Write your answers in either English or Swedish. If you write your answers in Swedish, make sure to not introduce any translation confusement. Write proper sentences (spelling, upper/lower case characters, punctuation, etc.). Answers that do not do this good enough/are vague/are ununderstandable cannot receive full score on the questions.

For all multi choice questions in this exam: You may check as many answers you like, but each incorrectly checked answer will be punished with 1 point reduction for that question (no question can give negative points in total).

Good luck!

---

What is the URI used for in an HTTP request? Give two examples of URIs that can be used in an HTTP request.

Max score: 0.5

---

What is the method used for in an HTTP request? Write which method one should use for the following type of requests (the question is about HTTP, not web applications):

- Retrieive a single resource.
- Retrieve multiple resources.
- Create a new resource.
- Update an existing resource.
- Delete an existing resource.

Max score: 0.5

---

Explain what the HTTP headers `Accept` and `Content-Type` are used for respectively, Which of them can be used in requests and responses respectively?

Max score: 1

---

Pair each HTTP response code with its corresponding reason phrase.

**Correct answer**

| | |
|---|---|
| 200 | OK |
| | |

| | |
|---|---|
| 400 | Bad Request |
| 404 | Not Found |
| 500 | Internal Server Error |
| 204 | No Content |

Max score: 1

---

Place the lines of code below so they form a valid HTML5 document.

```
<!DOCTYPE html>
```

```
<title>Hi there!</title>
```

```
<head>
```

```
</body>
```

```
</html>
```

```
</head>
```

```
<body>
```

```
<body>
```

```
<html>
```

```
<h1>The Website</h1>
```

**Correct answer**

```
<!DOCTYPE html>
```

```
<html>
```

```
<head>
```

```
<title>Hi there!</title>
```

```
</head>
```

```
<body>
```

```
<h1>The Website</h1>
```

```
</body>
```

```
</html>
```

Max score: 1

---

If you want web browsers to display a list of words, one on each line, you can put each word inside a paragraph element, since paragraph elements are block elements and rendered on their own rows. But why shouldn't you do this?

Max score: 1

---

Which of the following tags **do not exist** in HTML?

- [ ] <money>
- [ ] <hr>
- [ ] <city>
- [ ] <tbody>
- [ ] <input>
- [ ] <a>

Max score: 2

---

Which of the following statements regarding attributes in HTML5 **are correct**?

- [ ] An attribute in the closing tag overrides the same attribute in the opening tag if it is present there.
- [ ] The src attribute can be used on both <img> elements and <javascript> elements.

- [ ] The opening tag may contain multiple attributes with the same name.

- [ ] An attribute in the opening tag overrides the same attribute in the closing tag if it is presence there.

- [ ] An element can have both an id attribute and a class attribute at the same time.

- [ ] An HTML element must have at least 1 attribute

Max score: 2

---

When submitting the form below (without altering it), which one of the following HTTP requests will the web browser send to the server (we only show the headers relevant to the form; the web browser will send many more headers in addition to these)?

```
<form method="GET" action="http://somesite.com/login">
  Username: <input type="text" name="username" value="Alice">
  Password: <input type="password" name="password" value="Abernathy">
            <input type="submit" value="Login">
</form>
```

- ○

```
POST /login?username=Alice&password********* HTTP/1.1
Host: somesite.com
```

- ○

```
GET /login HTTP/1.1
Host: somesite.com
Content-Type: application/x-www-form-urlencoded
Content-Length: 33

username=Alice&password=Abernathy
```

- ○

```
GET /login?username=Alice&password=Abernathy HTTP/1.1
Host: somesite.com
```

```
GET /login HTTP/1.1
Host: somesite.com
Content-Type: application/x-www-form-urlencoded
Content-Length: 33

username=Alice&password=*********
```

```
POST /login?username=Alice&password=Abernathy HTTP/1.1
Host: somesite.com
```

```
POST /login HTTP/1.1
Host: somesite.com
Content-Type: application/x-www-form-urlencoded
Content-Length: 33

username=Alice&password=*********
```

```
POST /login HTTP/1.1
Host: somesite.com
Content-Type: application/x-www-form-urlencoded
Content-Length: 33

username=Alice&password=Abernathy
```

```
GET /login?username=Alice&password********* HTTP/1.1
Host: somesite.com
```

Max score: 1

---

The form below exists on a webpage and can be used to send a new password to a user's email.

```
<form method="XXXXXXX" action="/email-new-password">
  Your email: <input type="email" name="email">
              <input type="submit" value="Send new password">
</form>
```

Should the form be submitted with the GET method or the POST method (what should XXXXXXX above be?)? Justify your answer.

Max score: 1

---

Here is some CSS code:

```
#body header h1.dark{
  background-color: black;
}
```

Write HTML code that contains a match for the CSS selector in the code above.

**Note**: You only need to write the HTML code found in the <body> element (including the <body> element), you do not need to write the HTML code for an entire HTML document.

Max score: 1

Explain what a *rule* is in CSS.

Max score: 1

---

Explain what pseudo-classes can be used for in CSS. Also, name one and explain what that pseudo-class do.

Max score: 1

---

Explain how middlewares work and describe how they are implemented in Express, including how a single middleware in Express works.

Max score: 2

When a website offers login-functionality, it is very important that the website is using HTTPS instead of HTTP. Give example of another functionality (not login) on a website which makes it important for the website to use HTTPS instead of HTTP. Justify your answer.

Max score: 1

Here is an HTML form on a website one can use to login to that website:

```
<form method="post" action="/login">
   Username: <input type="text"     name="username">
   Password: <input type="password" name="password">
             <input type="submit"   value="Sign in!">
</form>
```

Here is the code on the server handling the HTTP request sent when the form is submitted:

```
app.post('/login', function(request, response){
  const username = request.body.username
  const password = request.body.password
  // Query to be sent to the database to check if password and username are
correct.
  const query = "SELECT id FROM members WHERE username = '"+username+"' AND
password = '"+password+"'";
  // Query sent to database, the id of the user is retrieved, etc.
  // ...
})
```

As your answer, write a username and password you can use to login without creating your own account in advance.

```
username: YOUR_USERNAME_HERE
password: YOUR_PASSWORD_HERE
```

Max score: 1

---

A programmer states the following:

*On my website I encrypt my users' passwords before I store them in the database, so even if a hacker comes over my web application, there is no way for the hacker to figure out my users' password (except for brute-force).*

Is the programmer wrong or correct? Justify your answer.

Max score: 1

---

Explain what a cookie is, give two examples of what they can be used for and explain how they are created/transferred. Be as detailed as possible.

Max score: 2

Explain what a session is, give two examples of what they can be used for and explain how they work/can be implemented.

Max score: 2

The code below is taken from an Express application with bank accounts (imagine the condition `from != "the account the user is logged in to"` works as it should).

```
const app = express()
app.use(bodyParser.urlencoded({extended: false}))
app.post("/transfer-money", function(request, response){
    const from = request.body.from
    const amount = request.body.amount
    const to = request.body.to
    if(from != "the account the user is logged in to"){
        response.send("Unauthorized")
    }else{
        transferMoney(from, amount, to)
        response.send("Transfer complete")
    }
})
```

The code contains a security vulnerability hackers can try to exploit to trick users into transfering money to the hackers own account. What is the vulnerability? How could a hacker exploit it? And how would you protect the website from the vulnerability?

Max score: 2

---

Why is it some times important to replace < with < in HTML code? When do you need to do this?

Max score: 1

---

Use JavaScript to implement the function `to_the_power_of_four` which receives a positive integer as argument and returns 4 to the power of that integer.

Example: `to_the_power_of_four(3) --> 4 * 4 * 4 --> 64`

Max score: 1

---

Use JavaScript to implement the function `getSums` which receives an array with integers as argument and returns an object that contains the sums of the even integers, the odd integers and all integers respectively. To check if `anInteger` is even you can use the condition `anInteger % 2 == 0`.

Example: `getSums([1, 2, 3, 4]) --> {even: 6, odd: 4, all: 10}`

Max score: 1

---

The code below is taken from an Express application making use of an SQLite database.

```
app.get("/humans", function(request, response){
   db.all("SELECT * FROM humans", function(error, humans){
      if(error){
         console.log(error)
      }else{
         response.json(humans)
         return
      }
   })
   response.json({"error": "Got an error from the database :("})
})
```

When receiving a GET request for `/humans`, it should send back all human resources stored in the database, or an error message if it for some reason can't fetch them from the database, but the code does not work as intended. Why? Also, explain what needs to be done do make the code work as intended.

Max score: 1

---

Use JavaScript to implement the following two functions:

```
double(3) --> 6
quadruple(3) --> 12
```

Implement `double` using multiplication by two (no other computations allowed), and implement `quadruple` by using/calling the `double` function (no other computations allowed).

First implement the functions according to the sample usage above. Then implement the functions again, but this time making use of callback functions instead of return values.

Max score: 1