

**UNIVERSITY OF BRISTOL**

**Summer Examination Period**

**FACULTY OF ENGINEERING**

**Example Examination for the Degree of  
Bachelor and Master of Engineering and Bachelor and Master of  
Science**

**COMS10012/COMSM0085  
Software Tools**

**TIME ALLOWED:  
1 Hour**

**Answers to COMS10012/COMSM0085: Software Tools**

**Intended Learning Outcomes:**

**Q1.** Which of the below protocol orderings reflects a correct network stack?

- A. HTTP, TLS, TCP, IP**
- B. IP, TLS, TCP, HTTP
- C. HTTP, TCP, IP, TLS
- D. TLS, IP, HTTP, TCP
- E. IP, TCP, HTTP, TLS

[1 mark]

**Solution:** HTTP(S) depends upon TLS which depends upon TCP which depends upon IP. HTTP can run on just TCP, IP, but that is not an option here. This protocol layering was explained in the "The Internet" lecture in the HTTP session.

**Q2.** Consider the following HTTP request as received by a web server:

```
GET /about.html HTTP/1.1
Host: www.example.com
User-Agent: Mozilla/5.0 (X11; Linux x86_64; rv:108.0) Firefox/108.0
Accept: text/html,application/xhtml+xml,application/xml
Accept-Language: en-GB,en;q=0.5
Accept-Encoding: gzip, deflate, br
Connection: keep-alive
```

Assuming the request headers can be trusted, which of the following best describes what has happened to cause this request?

- A. Someone attempted to run gzip on the webpage about.html from their Linux terminal.
- B. Someone running the X11 windowing system navigated to `http://www.example.com/about.html`.**
- C. Someone running the Mozilla OS navigated to `www.example.com`.
- D. Several browsers made the same request for about.html at once, forcing the server to keep the connection alive.

[1 mark]

**Solution:** A & D are nonsense, C involves a misreading of the user-agent and ignoring the path component of the GET request. The first lab involved studying these requests.

**Q3.** You encounter an unfamiliar HTTP status code 413. Without knowing more than this code, which of the below might you reasonably conclude?

- A. The request has completed successfully, with some additional effects.

(cont.)

- B. The server needs to redirect you to another location.
- C. The server has encountered an internal error.

**D. There is an error in the request sent by the client.**

[1 mark]

**Solution:** We covered HTTP status codes and the first-digit meanings in the HTTP lecture (slide 11).

**Q4.** The *fragment* part of a URI represents:

- A. A reference to the specification for the remainder of the URI.
- B. A hierarchical identifier for the targeted resource.
- C. An optional mapping of values to specified parameters.

**D. An optional reference to a subordinate resource.**

[1 mark]

**Solution:** A is the scheme, B is the path, C is the query. Looking up what *fragment* is was an exercise from the first lab.

**Q5.** Consider this snippet of HTML:

```
<p>
  I'm creating a link to
  <a
    href="https://www.mozilla.org/en-US/"
    title="The best place to find more information about Mozilla's
    mission and how to contribute">the Mozilla homepage</a>.
</p>
```

Which of the below reflects the text you would click on in the browser to follow the link?

A. "I'm creating a link to the Mozilla homepage."

**B. "the Mozilla homepage"**

C. "https://www.mozilla.org/en-US/"

D. "The best place to find more information about Mozilla's mission and how to contribute"

[1 mark]

**Solution:** This example comes from the required MDN reading, and answering it only requires understanding how anchor tags work, which is explained in the HTML5 lecture.

**Q6.** Client-side validation of HTML form fields. . .

- A. Protects the server from malicious requests.
- B. Requires the user to provide authentic details.
- C. Cannot be disabled in most browsers.

**D. None of the above.**

[1 mark]

**Solution:** Client-side validation was part of the required reading in the second session. It provides no protection to the server, cannot possibly force people to write only true things, and is easily disabled in most browsers.

**Q7.** Which of the following HTML elements should contain `<meta>` elements?

- A. `<header>`
- B. `<head>`**
- C. `<nav>`
- D. None of the above.

[1 mark]

**Solution:** We covered the fact that metadata goes in the `<head>` in the first HTML lecture. This should also have become apparent in several of the labs.

**Q8.** A Thymeleaf application is acting as a frontend to a database of student grades. You see that one method in the `Controller.java` file has an annotation:

```
@GetMapping("/student/{id}")
```

What do you know about the method this annotation is attached to?

- A. It accepts a student ID as a parameter.**
- B. It returns a student ID.
- C. The method will not be called because the mapping is malformed.
- D. None of the above.

[1 mark]

**Solution:** The get mapping refers to the mapping of the get request to a method, and the curly braces indicate a parameter that the method will be passed. This exact syntax was a key part of the second exercise in the HTML lab.

**Q9.** Which of these CSS selectors will apply a style to one <p> element immediately following an <img> element with the class attribute 'insert'?

- A. `img#insert p`
- B. `img.insert > p`
- C. `img#insert ~ p`
- D. `img.insert + p`**

[1 mark]

**Solution:** Classes are identified as `img.insert`, the `#insert` would refer to an element with the ID of 'insert', not the class. The syntax for one immediately following element is '+', not '>'. This was addressed directly in the first CSS lecture.

**Q10.** A style with the selector of `.aside, h2, h3` would be applied to:

- A. All elements with the class 'aside', and all second- and third- level headings.**
- B. The element with the ID 'aside', and all second- and third- level headings.
- C. Any third-level headings subordinate to a second-level heading inside an element with the ID 'aside'.
- D. Any third-level headings or second-level headings inside an element with the class 'aside'.

[1 mark]

**Solution:** The comma indicates an 'and' relationship between selectors. Selector syntax was covered in the first CSS lecture.

**Q11.** When representing a colour in CSS, the keyword 'green' is equivalent to

- A. `#FF0000`
- B. `#00F000`
- C. `#00F00F`
- D. `#00FF00`**

[1 mark]

**Solution:** The system is R-G-B. Colour keywords were discussed in the MDN reading, and both hexadecimal and other representations were mentioned in the first CSS lecture.

**Q12.** You have been tweaking the style of an `<img>` element so that it has a visible border. You want to create some visual space between the border and other elements on the page, with twice as much space below as there is above. Which of these rules should you use?

- A. `padding: 10px 5px 20px 5px;`
- B. `margin: 8px 8px 16px 8px;`**
- C. `padding: 16px 8px 16px 8px;`
- D. `margin: 5px 5px 5px 10px;`

[1 mark]

**Solution:** Two pieces of information allow you to answer this question: you want the margin rather than the padding for space to other elements, and the four dimensions are listed clockwise starting from the top. This was covered in the discussion of the box model in the first CSS lecture.

**Q13.** Consider the following stylesheet:

```
html { font-size: 14px; }
p {font-size: 0.8em; }
div {font-size: 1.2em; }
```

Imagine this stylesheet is applied to a page which contains a `<p>` element inside a `<div>` element. What would be the size of the text in the `<p>` element, as measured in px?

- A. 14
- B. 12
- C. 16.80
- D. 13.44**

[1 mark]

**Solution:** If you understand that the `<p>` size is defined relative to the `<div>` that contains it, which modifies the root font-size, then this becomes a simple test of arithmetic.  $14 * 1.2 * 0.8 = 13.44$  (though just knowing it is not going to be 14, 12 or 16.8 would land you at the answer).

**Q14.** Consider the following CSS rules:

```
.container {
  display: grid;
  gap: 20px;
}
.listitem {
  grid-area: 1 / 2 / 3 / 4;
}
```

(cont.)

Assuming an element corresponding to the second selector is placed in the grid container, on which row will the element end?

- A. 1
- B. 2
- C. 3**
- D. 4

[1 mark]

**Solution:** The 1/3 relate to the row start and end respectively. The grid-area, including interpreting this way of defining element bounds, was discussed in the second CSS session's lecture on the CSS grid.

**Q15.** Karen is using `wget` to download a website `example.com`. The index page of `example.com` contains the following HTML:

```
<!DOCTYPE html>
<html>
<head>
  <meta charset="UTF-8">
  <link type="text/css" href="style.css" rel="stylesheet">
  <title>Example Page</title>
</head>
<body>
<h1>Example Page</h1>
<p>See the <a href="./about.html">about</a> page for more about this
site, or check out the <a href="https://www.iana.org/domains/example">
IANA resources</a> for more about example pages.</p>

</body>
</html>
```

If she downloads the page by invoking

```
wget -r -l 1 http://example.com
```

How many files will be retrieved in total?

- A. 1
- B. 2
- C. 3
- D. 4**

[1 mark]

**Solution:** The index page, the about.html page and the style.css from the header will be retrieved. -l 1 means no further recursion will proceed on linked pages, and wget will not follow the link to the external domain. However, wget will download the robots.txt file as well. Controlling wget recursion is part of the first set of web scraping exercises.

**Q16.** Cloud computing involves:

- A. Moving data to near-edge devices such as routers.
- B. The on-demand availability of resources such as storage and computational power.**
- C. A distributed architecture making use of a shared hash table to achieve consensus.
- D. All of the above.

*[1 mark]*

**Solution:** A is fog computing, C is a hazy description of the blockchain. Cloud computing was introduced in the Cloud lecture.