

Web Basics:

1. What is the purpose of Domain Name System (DNS)?
2. What is the WWW? Identify relevant technologies / standards for the WWW architecture.
3. What is the W3C?
4. Explain the basic Web Stack.
5. What is the meaning of “Web as platform”?
6. Explain the concept of “dynamic Web (pages)”
7. Name Client-Side technologies for Web Application development
8. What is “Web Push” and why is it needed?
9. What are so called Hybrid Apps?
10. What are new features of HTTP/2?
11. What does a webpage need to contain at least in order to be displayed in a Web Browser correctly?
12. What is the purpose of the HTML 5 Application cache (app cache)?
13. What is the purpose of JavaScript? Name and explain some APIs.
14. Argue differences of native and Web Apps.
15. Explain:
 - a. HTTP
 - b. HTML
 - c. DOM
 - d. CSS
 - e. URL
 - f. JavaScript
 - g. Web RTC
 - h. XMLHttpRequest
 - i. SSE

Web & Media:

1. What is the meaning of the abbreviation DASH in MPEG DASH?
2. How does HTTP Streaming work?
3. Explain the principle of adaptive streaming. What technical challenges does it address?
4. What is the purpose of MPEG DASH?
5. Which W3C HTML5-Erweiterungen allow adaptive and encrypted streaming in the Web Browser?
6. What is an MPD (Media Presentation Description)?
7. What is enabled by CENC (Common Encryption)?
8. What is the purpose of MSE?
9. Which technologies have been replaced by HTML5 <video>? What are the advantages?
10. Which W3C standard requires a CDM (Content Decryption Module)?
11. Explain the „Streaming Media Stack“ and assign respective standards and technologies.
12. What are the principle differences between traditional TV delivery (broadcast), IPTV, WebTV with focus on technical challenges?
13. What are the means to optimize streaming latency?
14. Explain Type1/2/3 playback in Web Browsers
15. Explain typical bandwidth requirements of SD, HD, UHD video formats.
16. Explain the principle function of CDNs. Why are CDNs needed?
17. Explain:
 - a. EME
 - b. MSE
 - c. DASH
 - d. HLS
 - e. ISOBMFF
 - f. MPEG2-TS
 - g. MPD
 - h. CDM
 - i. CENC
 - j. OTT
 - k. CDN
 - l. IPTV
 - m. WebTV
 - n. HybridTV
 - o. HbbTV

TV Apps:

1. What are current trends for TVs/ Smart TVs?
2. What is HDR?
3. What is HFR?
4. What is the resolution of 4K UHD (Ultra High Definition)? (R: 3840 × 2160px)
5. For what stands the abbreviation HbbTV? (R: Hybrid Broadcast Broadband TeleVision)
6. What is a Smart TV?
7. How to make your TV smart?
8. What is HbbTV? How does it work?
9. What is a broadcast-related app?
10. What is a broadcast-independent app?
11. What are the main new features in HbbTV 2.0? (R: HTML5, CSS3, Companion Screen, Media Synchronizer)
12. Which Live-Stream-Video Format is supported in HbbTV 1.0? (R: Chunked Transfer Encoded MPEG2 Transport Stream – MPEG2-TS)
13. Can HbbTV 2.0 plays two videos in parallel? (R: No)

Multiscreen:

1. Which Technology can be used to mirror a Smartphone screen on a large display? (R: Airplay, Miracast)
2. For what stands the abbreviation SSDP? (R: **S**imple **S**ervice **D**iscovery **P**rotocol)
3. For what is SSDP useful? (R: Discover and expose Devices/Services in local network)
4. For what stands the abbreviation UPnP? (R: Universal Plug and Play Protocol)
5. Which technology uses UPnP for Device Discovery? (R: SSDP)
6. What are the Layers of UPnP? (R: Addressing, Discovery, Description, Control, Event, Presentation)
7. What is the format of UPnP Device/Service Description? (R: XML)
8. Which technology can be used to launch an App on TV e.g. from a mobile device? (R: DIAL)
9. What does the abbreviation DIAL stand for? (R: Discovery and Launch Protocol)
10. Which technology uses DIAL for Device Discovery? (R: SSDP)
11. What are the main Features of Airplay? (R: Screen Mirroring, Media Sharing)
12. Which technology uses Airplay for Discovery? (R: mDNS/DNS-SD, Bonjour)
13. Which technologies can be used to pair devices not in the same network? (R: QR-Code, PIN-Code, Audio-Code + Proxy Server)
14. Which communication protocol allows a direct communication between web applications? (R: WebRTC)
15. Which communication protocol allows a bidirectional communication between client and server? (R: WebSockets)
16. What is W3C Second Screen Presentation API? (R: API to enable web content to access external presentation-type displays and use them for presenting web content)

Web of Things:

1. What is the main problem addressed by WoT? (R: lack of interoperability between IoT Platforms by using open web standards)
2. Which standard is used in WoT to address things? (R: URI)
3. Which HTTP Verb can be used in REST to retrieve a resource? (R: GET)
 - a. POST: create a new resource
 - b. PUT: update a resource
 - c. DELETE: delete a resource
4. For what stands the abbreviation CoAP? (R: Constrained Application Protocol. IoT communication protocol for constrained devices)
5. What is the main difference between CoAP von HTTP? (R: CoAP uses UDP, HTTP uses TCP)
6. What is MQTT? (R: Message Queue Telemetry Transport. Based on TCP und uses publish/subscribe using MQTT Broker)
7. What is Physical Web? (R: The Physical Web is an open approach to enable quick and seamless interactions with physical objects and locations)
8. What is the main technology used in Physical Web to broadcast URLs? (R: BLE Beacon)
9. For which mobile platform HomeKit can be used? (R: iOS)
10. What is WoT Thing Description? (R: JSON-LD based format to describe Things interfaces, metadata, binding to underlying protocols and additional semantical information)

Web Security:

1. What is Browser Sandbox? (R: controls access to System APIs)
2. What is "Same Origin Policy"? (R: denies access to resources from 3rd party domains)

3. What is CORS? (R: Cross-Origin Resource Sharing. Allows access to 3rd party domains by setting a specific CORS HTTP headers).
4. What is Subresource Integrity specification in context of W3C? (R: the specification defines a mechanism by which user agents may verify that a fetched resource has been delivered without unexpected manipulation)
5. Explain the following Content Security Policy (CSP): "*Content-Security-Policy: default-src 'self'; img-src *; media-src media1.com media2.com; script-src userscripts.example.com*"? (R: load images from any source, video/audio only from media1.com media2.com, scripts only from userscripts.example.com, for all other resources from same origin).

Data Mining:

1. What are the main application areas for predictive data mining?
2. What is data mining, data discovery and data prediction?
3. Give the definition for a regression task!
4. Give the definition for a classification task!
5. What is the difference between regression and classification?
6. Give examples for regression and classification tasks.
7. What is supervised learning?
8. What is unsupervised learning?
9. What is the difference between supervised and unsupervised learning?
10. Give example for supervised and unsupervised learning algorithms.
11. How to differ between metadata attributes?
12. Describe the workflow of Association Rules and apply it on a simple list of transactions:
 {„Simpsons“, „Scrubs“, „tagesschau“, „Fußball“, „Family Guy“}
 {„Futurama“, „Family Guy“, „Simpsons“, „American Dad“, „tagesschau“}
 {„Family Guy“, „Scrubs“, „Simpsons“, „Futurama“, „American Dad“}
 What is the recommendation with the highest confidence and highest support, if a new user watches {„Family Guy“}? (correct: {„Simpsons“})
13. Give examples for context-sensitive data.
14. Which key values can be determined with the help of social network analysis?
15. What is sentiment analysis/ sentiment detection?
16. Name the key rules/ elements (as given in the lecture) of the data protection act?

Recommender Systems:

1. Give examples for implicit and explicit feedback types? (implicit: views; explicit: ratings)
2. What is Content-based Filtering?
3. What is Collaborative Filtering?
4. What are the main subclasses of Collaborative Filtering? (User-based and Item-based Collaborative Filtering)
5. What is the difference between User-based and Item-based Collaborative Filtering?
6. What is Hybrid Filtering?
7. Apply the Slope One algorithm on a simple user item matrix. E.g.:

		
	4	3
	2	?

(correct: 1)

8. Name and describe the core issues and challenges in recommender systems. E.g.
 - a. Accuracy and Errors
 - b. New-User-Problem
 - c. New-Item Problem
 - d. Cold-Start Problem
 - e. Gray-Sheep Problem
 - f. Overspecialization
 - g. Portfolio-Effect
9. What is the Mean Absolute Error (MAE), what is the Root Mean Square Error (RMSE) and what is the difference between them?