

# CS193H

## High Performance Web Sites

### Final Exam

Student:

SUID:

SCPD:      Yes / No

Date:

Instructions: Time limit for this test is 2 hours, although the test is intended to take 1 hour. This is a closed book test (no references allowed). Write your answers to each question in the space provided.

List rules 12-14 as well as the first four chapters of High Performance Web Sites Volume 2 that were made available:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

8. What are two typical causes of duplicate scripts?

9. List two ways that duplicate scripts can be bad for performance.

10. Why were ETags introduced in HTTP/1.1?

11. For each of the following states of Last-Modified and ETag validation, indicate whether the response code is a 304 or 200:

    Last-Modified matches, ETag matches:

    Last-Modified matches, ETag doesn't match:

    Last-Modified doesn't match, ETag matches:

    Last-Modified doesn't match, ETag doesn't match:

12. What component in Apache's default ETag syntax hurts performance, and why? Ditto for IIS.

13. Why do ETags (with the default Apache and IIS syntax) degrade performance with regard to proxy caching?

14. List five of the first 14 rules that should be applied to Ajax?

15. Give two examples of what Doug Crockford meant when he said "touch lightly" with regard to DOM.

16. List three reasons why so little of the JavaScript downloaded is actually executed by the time of the onload event.

17. If the initial payload of JavaScript is split and some of the code is lazy loaded, this might create a race condition for DHTML features where the user invokes an action but the JavaScript for that action hasn't been completely downloaded and undefined symbol errors may occur. What are two ways to avoid this situation?

18. What are the six techniques for loading scripts in parallel?

19. Which trigger busy indicators?

20. Which do not guarantee scripts are executed in the order specified?

21. Why can't these asynchronous script loading techniques be used with ads? What would happen if you did?

22. Why would the HTTP/1.1 spec suggest fewer connections per server than in HTTP/1.0?

23. What's the # of connections per server for these browsers using HTTP/1.1?

IE 6 & 7:

IE 8:

Firefox 2:

Firefox 3:

Safari 4:

Chrome:

24. What's the benefit of splitting resource downloads across multiple domains? In general, how many domains should you shard across?

25. What are five image optimization techniques?

26. List two pros and two cons of using iframes.

27. How can flushing the document early make pages load faster?

28. Why is it wasteful to send cookies on requests for static resources, and what are two ways to avoid this problem?

29. What are four techniques for reducing cookie weight?

30. What are the two choices for handling "www"? List the downsides of each.

31. List the seven types of CSS selectors and give an example of each.

32. What's the key thing to remember about how selectors are applied?

33. List five techniques for making selector matching faster.

EXTRA CREDIT (2 points each):

EC1. Describe the situation that Facebook ran into that Bobby Johnson called "network incast".

EC2-5. Assuming all downloads take 2 seconds (including parsing and execution when necessary), and all inline scripts take 1 second to parse and execute, indicate how long it would take for these elements to finish loading. Assume the browser is Internet Explorer 7, stylesheets are loaded using the LINK tag, and all downloads come from the same server.

Example: external script, image: 4 seconds

EC2. stylesheet, image, stylesheet:

EC3. external script, inline script, stylesheet, external script:

EC4. image, image, inline script, inline script, stylesheet, external script:

EC5. inline script, stylesheet, inline script, image: