TAKE HOME ASSIGNMENT#3

Due Date: November 29, 2004 (3x200=600 points)
CS 6/75995 ST: INTERNET-BASED APPLICATIONS
Fall 2004, Department of Computer Science, Kent State University

1. (Proxy Video Cache) Explain the FGS scheme proposed by the authors Liu, Chu & Xu [F04-MMP-03]. Explain how video can be sent in multiple rate/quality?

2. (Firewall) Explain the following anamolies with illustrative examples (a) Shadowing Anamoly, (b) Correlation Anamoly and (c) Generalization Anamoly in distributed firewall setting as classified by Authors Ehab S. Al-Shaer and Hazem H. Hamed. [F04-SEC-01].

3. (Web Security) Explain the threats (a) Cross-Site Scripting (XSS), (b) SQL Injection, and (c) General Script Injection, and explain the general principle of the technique proposed to detect them by Huang, Fang Yu, Hang, Tsai, Lee, and Kuo [F04-SEC-04].

TAKE HOME ASSIGNMENT#3

[C#1,2,3,4,5, NETWORK & APPLICATIONS]

Due Date: November 1, 2004 (5x200=1000 points)

CS 6/75995 ST: INTERNET-BASED APPLICATIONS

Fall 2004, Department of Computer Science, Kent State University

1. (Random Walk) Explain the impact of the rate of topology change on the performance of search by Random Walk and Flooding.

2. (Freenet) Consider a 4 node (N1,N2,N3 and N4) ring connected Freenet system. The files with following keys originates at the corresponding nodes N1: A01,A03, N2: A02,B02, N3à B01, B03, and N4à A03,B01. Consider that each node has a routing table with 3 entries. Consider the users at following nodes now searchers for the following files in sequence USER at N1 searches B01, USER at N2 searches A01, USER at N1 searches for A03. Show the initial routing table, and how they changes after each query.

3. (Reputation management) Lets consider that in the example given in Aydin Sel and et. al. [P2P-04] the local trust value of X3 is T=.5 and DT=.125, and the reputation query returned by X7 about X4 tells t=.875 and dt=.25. Recalculate the decision process. While file version will eventually be selected?

TAKE HOME ASSIGNMENT#1

[C#1,2,3,4,5, NETWORK & APPLICATIONS]

Due Date: November 1, 2004 (5x200=1000 points)

CS 6/75995 ST: INTERNET-BASED APPLICATIONS

Fall 2004, Department of Computer Science, Kent State University

1. (HTTP conversation) For this assignment I have hidden a HTML page in my Website under URL http://www.cs.kent.edu/~javed/internetbook/webbook/test-page.html. Outline the HTTP 1.1 requests and responses that must be carried out between the Browser and the server before this document can be retrieved. List the key fields with their values, and provide an explanation of the dialogue. (You need to read HTTP 1.1 specification. The RFC can be found in the webbook).

2. Explain the advantages and disadvantages of multithreading in the server design. Explain what strategies can be used for concurrency control?

3. Explain the basic cookies mechanism. Explain how it can help in maintaining states across user sessions. Explain the mechanism by which too much use of cookie discovered by Bent, Rabinivitch et. Al. [SER02] degrades web performance. What might be the solution?

4. Explain the advantage and disadvantages of ICP and CARP.

5. Explain the basic mechanism of the Greedy Delete and Greedy-Insert family of replica placements algorithms in a CDN explained by Tang & Xu [CDN01]. What are the time complexities of these strategies?

TAKE HOME ASSIGNMENT#3

[NETWORK & APPLICATIONS]

Due Date: DEC 01, 2003 (4x200=800 points)

CS 6/75995 ST: INTERNET-BASED APPLICATIONS

Fall 2003, Department of Computer Science, Kent State University

1. Marsan et. al. (MW-3B) discusses an algorithm to form Piconet and Scatternet for adhoc Personal Area network. (a) What was their optimization objective? (b) What do you think is the computational complexity class of their solution? (NP-complete? Polynomial). Give justification.

2. Discuss the advantage and disadvantages of the security measures suggested for the SAVE source validation protocol given by the authors Jun Li et. al. (TRACK-1B).

3. Huang et. al (MONITOR-3B) obtain and analyzes negative responses to understand the vulnerability of an application. What are the differences between the response types R1, R2, and R3, and what can you infer from their similarity or dissimilarity? Table-4 of the paper can be useful.

4. Rash et. al. (VIR-2) uses suffix tree to reduce the complexity of virus search. Can you draw the suffix tree for the strings cagtgc, cagttc, and catgga?

TAKE HOME ASSIGNMENT#2

[NETWORK & APPLICATIONS]

Due Date: NOV 15, 2003 (4x200=800 points)

CS 6/75995 ST: INTERNET-BASED APPLICATIONS

Fall 2003, Department of Computer Science, Kent State University

5. Four types of adapters have been used by Peter Schojer, 2003 et. al, MM1. What are these? Explain each of their operation to adapt Internet Video.

6. What are the four time transforms those are supported in SMIL 2.0 (Patrick Schmitz, 2002,MM2)? Explain each of them. How they modify the actual playtime of the container duration?

7. A second redundant disjoint path B has significantly bad error rate than that of path A. Will you still divert some packets to path B to increase overall efficiency of FEC? Justify your answer by providing numerical example from Fig-2 and 3 of Patrick Schmitz et. al, 2003, MM3B.

8. Explain why two thresholds were used in the interface selection algorithm- while 802.11 and G3 wireless interfaces were available in the Seamless Video over 802.11 and G3 CDMA2000 integrated network suggested by M. Buddhikot, et. al, 2003 (MM-3A).

9. TAKE HOME ASSIGNMENT#1

[C#1,2,3,4,5, NETWORK & APPLICATIONS]

Due Date: October 10, 2003 (4x200=800 points)

CS 6/75995 ST: INTERNET-BASED APPLICATIONS

Fall 2003, Department of Computer Science, Kent State University

1. (HTTP conversation) For this assignment I have hidden a HTML page in my Website under URL http://www.cs.kent.edu/~javed/internetbook/webbook/test-page.html. Outline the HTTP 1.1 requests and responses that must be carried out between the Browser and the server before this document can be retrieved. List the key fields with their values, and provide an explanation of the dialogue. (You need to read HTTP 1.1 specification. The RFC can be found in the webbook).

2. Explain the advantages and disadvantages of multithreading in the server design. Explain what strategies can be used for concurrency control? What type of thread control adjustments were made in the experiments described in "CSN-1A"?

3. Explain the main roles of "SemTag" and "Seeker" in the CSN-3A. Can you explain the algorithm explained in Fig-2 and Fig-3? I think the authors did not do a good job explaining them. But your score will depend on how well you can make it understandable, perhaps with an example.

4. Explain the edge addition and deletion process in YAPPIR in P2P-1 paper.

TAKE HOME ASSIGNMENT#1

[C#1,2,3,4,5, NETWORK & APPLICATIONS]

Due Date: October 4, 2001 (4x200=800 points)

CS 6/75995 ST: INTERNET-BASED APPLICATIONS

Fall 2001, Department of Computer Science, Kent State University

1. (HTTP conversation) For this assignment I have hidden a HTML page in my Website under URL http://www.mcs.kent.edu/~javed/internetbook/webbook/test-page.html. Outline the HTTP 1.1 requests and responses that must be carried out between the Browser and the server before this document can be retrieved. List the key fields with their values, and provide an explanation of the dialogue. (You need to read HTTP 1.1 specification. The RFC can be found in the webbook).

[Redirection+Authentication+Request/reply for HTML file + request/reply for GIF file]

2. (Access distribution) A set of webpages of a company are linked like a chain. The front page is A_1.html. It links to A_2.html, which links to A_3.html and so on. Derive the rank distribution as shown in [ArKR01] paper (such as in Fig-4) for the following cases: All visitors in this website begins from the home page A1.html. (a) If a visitor is in the site, then the probability that a visitor will visit up to depth n in this hyperspace is 1/n, If k is the location then Pr{k=n}=1/n. (b) If a person is depth x, then the probability that s/he will visit at depth x+1 is 1/n. Pr {k = x+1 | k = x}= 1/n.

[i. 1/x ii. 1/x^i]

3. (Multimedia networking) In [SlSm01] Slingerland and Smith studied the cache behavior for real word multimedia. He described 'Capacity', 'Line Size', and 'Associativity' as important design parameters for Hardware cache. Write short definitions of these quantities. What would be the web equivalent of these quantities for a Web Cache?
[Capacity= Cache size, Line Size= file size limit? Associativity= Replication? Hashing? Segmented cache based on media type,locality of refernce?]

4. (Content networking) Biliris and other has presented an architecture of content networking in their paper [BCDR01]. Identify at least three potential costs of their CDN brokering approach as compared to normal DNS brokering. List at least two potential savings of the CDN brokering.

[Cost of selection, redirection, distribution/ Saving from fast response, load balacing, fault-tolerance]

TAKE HOME ASSIGNMENT#2

[C#1,2,3,4,5, NETWORK & APPLICATIONS]

Due Date: MARCH 10, 1999 (3x200=600 points)

CS 6/75995 ST: INTERNET-BASED APPLICATIONS

Spring 1999, Department of Math and Computer Science, Kent State University

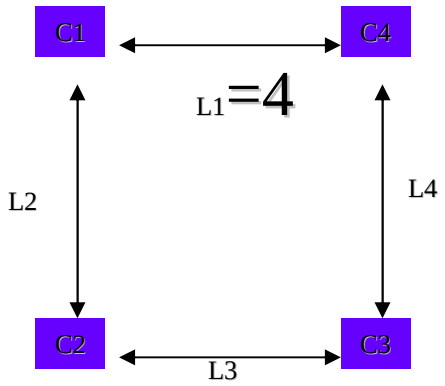
1. For this assignment I have hidden a HTML page in my Website under URL http://www.mcs.kent.edu/~javed/internetbook/webbook/test-page.html. Outline the HTTP 1.1 requests and responses that must be carried out between the Browser and the server before this document can be retrieved. List the key fields with their values, and provide an explanation of the dialogue. (You need to read HTTP 1.1 specification) (100 points).

2. Once an HTML page is updated, the origin server generally sends the complete new document. Outline a strategy that will allow a server to send the "difference" between old and the modified versions of the document, hopefully resulting in reduced communication. The concept of "difference" can be designed in many interesting ways. For example you can compute a direct bit to bit difference. Or you can even try to find section tags and obtain differences between sections. I am confident, you probably can come with many other innovative ideas. The designer, however, have to be careful about (a) the cost of computing the difference between two HTML documents, (b) resulting saving in bandwidth, (b) and the cost of reconstruction. The assignment is to:

   (i) Design a concept of difference between two HTML documents. Explain with example.
   (ii) Show precisely with flow charts the server algorithm for computing the difference. Explain the steps with example.
   (iii) Show precisely with flow charts the browser algorithm for reconstruction. Explain the steps with example.
   (iv) Estimate the complexity of the difference computing algorithm and
   (v) Estimate the complexity the reconstruction algorithm.

   (Hints: You many want to read few papers on delta encoding & data compression) Total Points (50+100+100+50+50=350 points).

3. Modify the server/client codes provided in your class. The client will send two numbers **A** and **B** to the server. Upon receiving the message, the server should spawn (or iterate in iterative version) **A** children. Each child should compute (initial **C=0; C=C+A+B**) and then send the result back to the client. When the client receives message from each Child, it should note down the **response time**. Upon receiving the all the return messages from all the **A** children, client should compute an **average response time** and exit. Implement both iterative and concurrent versions of the above program. Run the program for various values of **A** and **B**. Plot graphs for comparing the performances of iterative and concurrent versions. Plot two graphs one showing the average response time (y-axis) for various A (x-axis) for constant B, and another for various B (x-axis) with a constant A. Explain the graphs. (200 points).



4. C1, C2, C3 and C4 are four large computer clusters connected via links L1, L2, L3 and L4. The bandwidth of the links are respectively 10MB, 100MB, 20KB, and 2 MB, with latency 100 ms, 200 ms, 1000 ms and 20 ms. Let average HTTP request is 1KB, and average response is .25MB. The group has decided to purchase a Big Cache. But they need to find out where to place it out of the four clusters. Rest three can use the small little caches they already have. If User Agents at C1, C2, C3, and C4 are respectively generating 10,000, 20,000, 1000 and 5000 hits/hour and their local hit ratios are .2, .8, .5 and .6 respectively.

   (i) Select the best location to place the Big Cache. (100 points)

   (ii) After few months they found out that their base numbers have all changed. So they decided that every month they will change the location of the Cache if needed by their new average request-response message sizes, hit ratios and hits/hour rates. However, they want to have an algorithm to automatically compute the best location. Design this algorithm in the most general way you can(100 points).

Warning: Assignments have to be performed individually. Collaboration with friends should not extend beyond conceptual level discussion. Any copy/ or cut and past submission from web will result in direct zero. Do not cut and pest lines from the RFCs or any other web documents for questions asking for your own words. If you quote exactly, never forget to state it immediately and add citation.

TAKE HOME ASSIGNMENT#1

[C#1,2,3,4,5, NETWORK & APPLICATIONS]

Due Date: FEB 15, 1999 (3x200=600 points)

CS 6/75995 ST: INTERNET-BASED APPLICATIONS

Spring 1999, Department of Math and Computer Science, Kent State University

5. You are a network administrator. A class C network address 192.52.47.0 has been assigned to your organization. You need to create three internal sub-nets within your organization respectively of sizes 128, 64 and 64. You also have three routers to connect these subnets. (a) Design the network. Explain the design with a neat drawing. (b) Show the network addresses and the subnet masks for each of the subnets. (c) Assign IP addresses to the routers. Show the assignments (100+50=50=200 points).

6. The location http://www.rfc-editor.org/isi.html maintains a list of protocol RFCs categorized as (i) standard, (ii) drafts, (iii) proposed and (iv) experimental. Identify 10 protocols in any of these categories developed/proposed after 1993 which can operate above Internet transport protocol HTTP (that operate above HTTP/TCP/UDP and IP layer). Briefly explain their purpose using your own words. (10x20=200 points).

7. One of the serious problem of current HTTP 1.1 is that they cannot preserve state. In future we need to incorporate state. RFC 2109 by Kristol & Montulli (you can get this RFC from course **Webbook** or from URL ftp://ftp.isi.edu/in-notes/rfc2109.txt) is a proposal for incorporating state in HTTP Browser Server communication. The proposal suggests the use of a Cookie like technology that you see now a days. Page-12 of the RFC 2109 provides two examples of conversation between a web server and a web client regarding cookie. (a) Explain in detail the meaning of the first conversation using your own words. (b) Explain using your own words why the second example failed? (c) What was the purpose for designing the protocol in that way? (100+50+50=200 points).

   Hint: Explain all the key words of the coded conversation like:

   ```
   HTTP/1.1 200 OK
   Set-Cookie: Customer="WILE_E_COYOTE"; Version="1"; Path="/acme"
   ```

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