EC 512 – E-commerce Software Services
Final Exam – Spring 2005
MS in E-commerce - George Mason University

This exam is take-home. You are not allowed to seek help from anyone nor discuss the exam with anyone until the grades are posted. The exam is open book and you are allowed to look up information on the Internet or in any other online source. You must sign below to indicate that you have read and that you understand these rules. The answers to this exam must be typed using a word processor. You must return this page with your answers.

Student Name: ________________________________

Student Signature: ________________________________

You need to justify all of your answers to get full credit. Please write clearly. I will not grade what I do not understand. Points will be taken for inaccurate concepts.

[25 points] Question 1: Select one of the topics below and write about it in no more than one page, font size 12pt, single spaced. Nothing written outside this space will be graded. The question will be graded based on what you select to include in your answer, the accuracy of your answer, and how well presented your answer is. The topic you select cannot be related to the topic you selected for your term paper. If you use any references in order to answer this question, please make sure to cite the references.

Topics (select one):
- Intrusion detection
- Denial of service
- Mobile commerce
- XML security
- The role of XML in E-business
- Economic aspects in E-business
- Online auctions
- E-voting
- Biometrics in E-commerce
- Micropayments
- Trust and assurance in e-commerce
- Privacy in E-commerce
- Virtual Private Networks
- Content Management
- Cybersecurity
- XML Schemas
- Web Service Composition

Indicate topic selected: ________________________________
[40 points] Question 2: Consider paper no. 2 in the list of readings in the course web site (“Mapping SLAs in Distributed Applications”). Consider a distributed application with web services: WS1, WS2, WS3, and WS4. The application always starts by executing WS1.

- Twenty percent of the time, no other Web Service will be invoked by WS1 and the application ends with just a single execution of WS1.
- Forty percent of the time, WS1 invokes WS2. In this case, WS2 invokes WS3 with probability 0.5 and does not invoke any other web service with probability 0.5.
- Thirty percent of the time, WS1 invokes WS3 and WS3 does not invoke any other web service.
- Ten percent of the time, WS1 invokes WS4, which does not invoke any other service.

(a) Give an expression for the average execution time, $T$, of the application as a function of the execution times $T_1$, $T_2$, $T_3$, and $T_4$ of the four web services.

Answer:

For items (b)-(d) below consider $E_{min}$ for WS1-WS4 are: 2 sec, 3 sec, 4 sec, 2.5 sec, respectively.

(b) Compute the average number of times that web services WS1, WS2, WS3, and WS4 are executed per execution of the application.

(c) Use the heuristic proposed in the paper to compute the SLAs for the four web services for two cases: $E = 6$ seconds, and $E = 10$ seconds.

(d) Using the same cost functions given in the paper, compute the total cost under both cases ($E=6$ and $E=10$). Compare both results.

You may want to use an Excel spreadsheet to do your computations. Your final results for items (b) through (d) should be given in the table below. In addition to providing the results in the table, show your computations in the space below the table.

<table>
<thead>
<tr>
<th>WS</th>
<th>$V_m$</th>
<th>$E_{max}$</th>
<th>$C_m$</th>
<th>$V_m * C_m$</th>
<th>$E_{max}$</th>
<th>$C_m$</th>
<th>$V_m * C_m$</th>
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<tbody>
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</tbody>
</table>

Computations for items (b)-(d)
[35 Points] Question 3: Explain the operation of a DRM system in the space below. Use diagrams to illustrate your explanation and make sure to indicate at each step what type of cryptographic operations are performed.