# CSCI 604 Distributed Systems

# Unit 1

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| Teacher | George Rudolph |  |
| Subject | System Models |  |
| Objective 1 | Define key terms and concepts |  |
| Objective 2 | Characterize Distributed Systems |  |
| Objective 3 | Describe System Models |  |
| Objective 4 | Review Scientific Reading, Writing and Rhetorical Skills |  |
| Due Date | Sept 4 |  |

## C Level Maximum 50 points

1. Make flash cards of on key terms and concepts in Distributed Programming. (10 pts)
2. List 5 types of hardware resources and 5 types of software resources that can be shared. For each one, give an example of how that is used in practice. (10 pts)
3. Give an example of an HTTP URL. Give each of the components of the URL, showing how they are delimited using your example. To what extent is a URL location-transparent? (10 pts)
4. Read George Orwell ‘s essay, ["Politics and the English Language," 1946](http://www.mtholyoke.edu/acad/intrel/orwell46.htm). What was he complaining about? What suggestions did he offer? (10 pts.)
5. Watch your favorite hour-long TV show. During the show, note how many commercials there are, the starting time and duration of each, and which form or forms of persuasive appeal are being used in the advertisement. If more than one type of appeal is used, choose the most dominant form. (15 pts)
6. Create a flyer that contrasts characteristics of distributed systems with those of traditional desktop systems (5 pts).
7. List 8 forms of transparency. For each, give an example of a system that has that property. (10 pts)
8. List the types of local resources that are vulnerable to attack by an untrusted program that is downloaded from a remote source and run on a local computer. (5 pts)
9. Host computers in peer-to-peer systems are often desktop computers users’ offices or homes. What are the implications of this for the availability and security of any shared objects they hold? To what extent can replication overcome any weaknesses?

## B Level 30 points—Choose Two

1. Write an algorithm that allows the clocks in two or more networked computers to synchronize their times without reference to an external time source. What problems limit the accuracy of the result using your procedure? Implement and demonstrate your algorithm on two computers.
2. A user arrives at a railway station they have never visited before with a wireless PDA. How can the user be provided with information about the station, its services and amenities, without having to enter or say the station’s name or other attributes? Write an algorithm.
3. Download and install ESB framework/tool such as Mule. Run one of the examples, such as file transfer, to show that Mule works. Submit screenshots demonstrating the results. What patterns and technologies are used in making this example work?

**A Level 20 points—Choose One**

1. Compare and contrast cloud computing with traditional client-server computing. What is novel about cloud computing as a concept and as implemented in practice?
2. Use the web to illustrate the concepts of client, server and resource sharing. What are the advantages and disadvantages of HTML,URLs and HTTP as core technologies for information browsing? Are these technologies suitable for client-server computing in general?
3. What problems are there in the direct coupling implicit in remote invocation approaches? What potential advantages are there in decoupling an invocation by space and time?
4. Consider two communication services, A and B, for use in asynchronous distributed systems. In A, messages may be lost, duplicated, delayed, and checksums apply only to headers. In B, messages may be lost, delayed or delivered too fast for the recipient, but messages that are delivered are correct. Describe the classes of failure exhibited by each service. Classify each failure according to properties of validity and integrity. Is service B a reliable communication service?

F: < 60 D: < 70 C: < 80 B: < 90 A: >= 90