UG Exam Performance Feedback
Second Year
2016/2017 Semester 1

COMP28411 Computer Networks

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Comments Please see the attached report.

COMP28411 Examination Performance Feedback

2016-2017

Fact that majority of students chose not to attend lectures was very evident in answers given in the examination.

Question 1

a) The question was looking for reasons why each of the three factors is important.

Generally, the answers for the scalability and extensibility factors where all right. Although some answers defined what they were, not why they were important. A significant number of the resilience answers were about recovering after the occurrence of errors, resilience is about continuing to operate in the presence of problems.

b) The question was asking for the description of two approaches to scalability and for how these approaches gave scalability.

A significant number of answers only described one approach. Other answers gave details of how an approach operated, not explicitly why it gave scalability. A popular approach to describe was caching and generally this was done well. Another approach was the use of server farms. However, in this case the issue of data consistency across all servers was not adequately addressed. Many answers overlooked the simpler approach to providing multiple servers used by the web and DNS where data is simply partitioned across multiple independent machines.

c) The question was looking for the attachment of a digital signature signed by Alice to the unencrypted message which would both show that the message was unaltered and from Alice. The point is that to prove that a message is unaltered, two pieces of information must be sent so that a comparison can be performed by the receiver.

A significant number of answers just suggested Alice encrypting the whole message with her private key. The message received by Bob could have been sent by anyone encrypted using any key. Others suggested using Bob's public key, but anyone could do this, soo it provides no proof of anything.

d) This question was looking for the use of a symmetric key to encrypt the message so that it was confidential. The message being signed by Alice was still required to prove that it was unaltered and from Alice. The question did not remove the "achieved in a single message" constraint of the previous part.

Some of answers suggested exchanging a number of messages, this is unnecessary to achieve the requirements of the question. Others suggested encrypting the whole message with a public key, this is computationally expensive and thus not meeting the requirements set out in the question. Others suggested encrypting the message with a private key, but them anyone could decrypt the message and it would not be confidential. Some answers even suggested double encryption using Alice's private key and Bob's public key. This is even more computationally expensive, and anyone can undo the application of Alice's private key. A significant number of answers correctly identified creating a symmetric session key to encrypt the message and sending it securely to Bob using his public key. A few forgot to transfer the session key to Bob.

Question 2

a) The question was looking for looking for reasons why particular QoS parameters where needed or not.

Given that both video and voice and multi-media content streams consumed by a human, there was inconsistency in the answers given. A human can subconsciously ignore missing bit of multimedia data, thus neither application requires 100% reliability. However, a number of answers suggested that in would be in one case and not the other. Most answers identified by interactive communication requires low packet delays, however, many fail to not that a video can be time shifted by a significant amount without the viewer being aware of this. Hence for video, minimum packet delays are not required. Delays are not the same as variations in delays (jitter).

b) The question specifically asked for an outline of how the approaches achieved reliability.

Many answers described the detailed operation of the approaches rather than an outline of them. The key things are that there are acknowledgements, timeouts and retransmissions. A number of answers indicated that there would be retransmissions without indicating what the trigger for these would be. A number of answers failed to distinguish the precise meaning of an Ack in the two approaches. In one, it acknowledges just the receipt of a single packet; in the other, it acknowledges the receipt of all packets up to that point.

c) This question was about the efficiency of the two approaches to produce a recommendation.

A significant number of answers just indicated that the selective repeat should be used because it would only reset the lost packets. However, this failed to identify the overhead of this approach where an acknowledgement must be sent for all packets rather than the single acknowledgement for a group of packets used by the go-back-n approach. Thus, with only occasional packets being lost, this overhead is likely to be greater than the overhead of resending successfully received packets.

d) This question was looking for an outline of the packets transferred for the scenario described and was similar to a number of questions in previous papers. It also indicated that for packets from the receiver, the current value of the window size being sent to the sender should be shown.

Although a number of answers correctly described the transfers that would occur, generally this section was poorly answered. The sender knew the initial window size of 100 bytes, thus it could be expected to send 100 bytes at time 0 and then wait until space was available before sending more. However, answers sent various numbers of bytes in a sequence of packets. When data is removed from the receive buffer by the application, a message will be sent to the transmitter indicating the available space. Thus, the transmitter will not start to send data to fill this space until after the space becomes available. A number of answers indicated that the transmitter could predict the future and send the data before the space was available so that the arrive the moment the space was available.

e) The question asked both why manual configuration is a poor choice and the key characteristics of ARP and DHCP, and of their similarities and differences.

A number of answers only addressed one of these two aspects. Reasons that manual configuration are a bad idea is not because the network is constantly changing, but because of the time and effort it takes to try and manually keep up with this. A number of answers to the ARP/DHCP part of the question just gave detailed descriptions of the protocols. What was required was key characteristics, e.g. they use broadcasts to find the information that they require. Having given details of the operation of the protocols, answers then failed to identify to give any similarities or differences.

Question 3

A larger than expected number of students attempted this (60+). This type of question needs a period of thoughts and note taking (planning) before answering and there were very few who appear to have done this! However, most students gained a point or two when I read their plan for items missed in the main text! There were some answers with very little to say (¼ to ¾ of a page) and as might be expected these did not get very high marks. Longer essays or lists of points clearly correlated with considerably higher marks.

Almost everybody clearly understood the need for distribution in order to scale these systems. For higher marks some detail of how this distribution can be achieved was needed.

A number of answers failed to understand that differences between downloading for instant or delayed playback has different information, timing requirements and often protocols to the requirements for more tightly constrained 2 way real-time systems.

There were some good strong answers, quite a few in the middle but also quite a few with little content.

Question 4

Quite a lot of incomplete partial answers to this question which ignored (left blank) the main point earning sections of the question. It seemed clear that this material had not been studied. Around 12 very weak answers and 5 very good ones. Almost nobody in the middle.