COMS3200 Computer Networks I

final exam checklist

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1. **Final exam**:

- Weight: worth 50% of final marks
- Scope: Covers material/content from all the lecture (including supplementary slides), tutorials and assignments.
- This exam checklist is relevant to both on-campus and online final exam.
- Exam duration: 120 minutes
- Time and place: please refer to your personalised examination timetable for details.
- Internal mode: This exam will be **closed-book** and will contain a combination of problem-solving and short/long answer questions.
- External mode: The exam will be an **invigilated** online exam. A final examination will be held as an online **Blackboard test** with the use of **ProctorU** during the final examination period. This exam will be **closed-book** and will contain a combination of problem-solving and short/long answer questions.
- **No** cheat sheet is allowed.

I have a number of comments:

- It is important that you read the questions carefully.
- Do answer only what is asked. Explanations are only required when explicitly asked for. Otherwise do not spend time on writing explanations, this will not give marks.
- When asked "show your workings" then you should expect that even when giving the correct end result you will not get full marks when I can't see how you have solved it. Please record your workings online.
- Please practice the tutorial questions and examples (e.g., application messages, routing algorithms, error correction) introduced on the lecture slides, supplementary lecture slides, and handwritten notes.

2. A checklist for the final-exam

Note that this is a guideline and does not provide a full coverage of the final exam questions.

- Introduction
  - Can you explain the TCP/IP stack?
  - Can you compare the packet switching and circuit switching networks with a number of users?
  - Can you calculate link capacity of the packet switch and circuit switching networks with a number of users, respectively?
  - Can you calculate various delays (e.g., transmission, propagation)?
- Application layer
  - Can you find and explain detailed information on a given application message (e.g., HTTP request/ response, DNS request/response, DHCP)?
  - Can you explain the request and response of application messages?
- Transport layer
  - Can you explain the differences between UDP and TCP?
  - Can you explain how to guarantee reliable delivery of application messages?
  - Can you find information (port number, direction, application protocol etc) given transport layer protocol header (TCP or UDP) dump?
  - Can you calculate checksum and verify it?
  - Can you explain the differences between flow control and congestion control?
  - Can you explain RDT versions with FSMs?
  - Can you explain and solve problems related to congestion control?
- Network layer
  - Can you explain the packet scheduling in a router and solve problems related to this?
  - Can you explain the packet fragmentation and how it works?
  - Can you explain the differences between the operation of distance vector and link state routing algorithms?
  - Given a network graph, can you make a table that contain the minimum-cost routes from a source node to all other nodes using Dijkstra's algorithm and Distance Vector algorithm (Bellman-Ford algorithm), respectively?
  - Can you explain NAT?
  - Can you explain the difference between IPv4 and IPv6?

- Link layer
  - Can you explain how odd/even parity bit works? Can you find parity bit given binary digits? Can you explain the 2-D parity and its limitation?
  - Can you calculate/show how CRC is used to detect error(s)?
  - Can you explain why forward error correction (FEC) is used? Can you show how FEC is used to detect and/or correct error(s)?
  - Can you explain MAC address? Can you find relevant information given MAC address?
  - Can you explain how MAC addresses/IP addresses are used in a LAN and between different LANs?
  - Can you explain the MAC protocols and their differences (e.g., CSMA, CSMA/CD, CSMA/CA)?

- Can you explain how VLAN is working?
- Can you explain how MPLS is working?

3. Relevant questions in the past final-exam

Past final exams can be found at the URL:
https://www.library.uq.edu.au/exams/papers.php?stub=coms3200

- 2021 final exam
  - Q14, Q19, Q20, Q22, Q24, Q25
- 2020 final exam
  - Q1, Q12
- 2019 final exam
  - Q4, Q6, Q7

Please let me know if you have any questions (dan.kim@uq.edu.au)

Best regards,

Dan