COMS3200

Week 13
Exam Overview & Revision

School of Information Technology and Electrical Engineering
The University of Queensland

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Outline

- Exam
- Revision
  - Important concepts
  - Protocols you should know

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Exam

- Exam date – 19 November, 5.45 pm, 27A ExhHall
- Exam covers
  - Lecture material (without network programming)
  - Tutorial material
  - Assignment concepts (but no programming)
- Objectives listed for the lectures are the important concepts
- 10 Questions, 100 marks total, 2 hours
  - Question values range from 6 to 15 marks

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Open book exam

- Open book exam – anything on paper (books, notes etc) permitted
- Non-programmable calculator may be useful
  - Not required – leaving answer as formula OK
- Past exam papers
  - 2003 – 2008 exams were open book
    - (almost) all questions relevant for 2009
  - earlier exams were closed book so not all questions may be relevant
  - copies of exams are on the library web site

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Timing suggestions

- Exam is worth 100 marks
- Exam time is 120 minutes
- Suggest you allocate 1 minute per mark
- This is only a guideline, but is indicative of the amount of detail required in each answer

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Answering suggestions

- Start each question (not part) on a separate page
- Keep all parts of one question together if possible
- Be as brief as possible!
- You are welcome to use bullet points as part of your answers
  - for example, when listing examples, etc.
- Never, ever leave a question blank
  - if you write something down, even if it's incomplete or off track, at least we can try to give you partial marks if some of your answer is good

Consultations

- A couple of consultation sessions will be held prior to the exam
- The consultation schedule will be sent by email

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Other exam issues?

Any Questions?

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Revision

Important concepts

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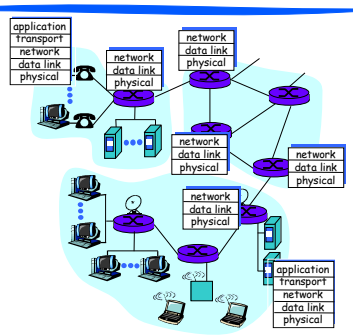
Protocols, architectures, network devices



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Concepts

- Protocols – what are they?
- Protocol architectures
  - All layers are examined
- Header encapsulation
- Connection-oriented, connection-less protocols
- Reliable, unreliable protocols
- Addressing used in protocols
- Networking devices (hubs, bridges/switches, routers)

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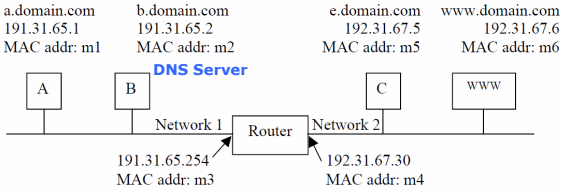
Sample Question from 2001

COMS3200 – COMPUTER NETWORKS I Page 3
Second Semester Degree Examination, November 2001

Question A4 **(14 marks)**
Consider the following internetwork, consisting of two broadcast-access networks.



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Week 1

- Network topologies
- Protocol stacks
- Services vs Protocols
- Connection-oriented vs connectionless
- OSI Reference Model vs TCP/IP Model
- Standards Bodies

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Week 2

- Message Passing
  - Blocking vs non-blocking
- Remote procedure call
  - RPC semantics
- Data representations

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Week 3

- UDP
- TCP
- Headers
- Connection establishment and teardown
- Flow control
- Sliding Window Protocol

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Week 4

- Physical Layer
- Fundamental Theory
  - Nyquist, Shannon limits
- Signals, Spectrum, Modulation
- Transmission Media
- Multiplexing, Switching
- Example physical layer protocols

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Week 5

- Link Layer functionality
- Framing
  - HDLC, bit-stuffing
- Error detection
  - CRC
- Reliable delivery
- Flow Control

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Week 6

- Medium-Access Sub-layer
  - Multiple-access protocols
  - Collision Based protocols
    - Aloha, Slotted Aloha, CSMA, CSMA/CD
  - Collision Free Protocols
  - WDM and WLAN protocols

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Week 7

- MAC Layer
- IEEE 802 standards
  - 802.3
  - Wireless: 802.11 802.16 802.15
- Internetworking
  - Devices for interconnecting networks:
  - Repeaters, Bridges, Hubs
  - Switches, Routers
- Virtual LANs
- Two Network Models:
  - Connection-oriented Virtual Circuit Networks
  - Connectionless Datagram Networks

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Week 8

- Internet Protocol (IP)
  - Packet format
  - Fragmentation
  - Addressing
  - Subnets
  - NAT
- Internet Control Message Protocol (ICMP)
- Address Resolution Protocol (ARP)
- Dynamic Host Configuration Protocol (DHCP)
- IPv6

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Week 9

- Routing
  - Distance Vector Routing
  - Link State Routing
    - Dijkstra's algorithm
  - Broadcast routing
  - Multicast routing
- Routing in mobile or dynamic networks
  - Delivery of packets to Mobile Hosts
  - Introduction to routing in Ad-hoc networks

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Week 10

- Multimedia applications
- Digital audio
- Streaming audio
- Internet radio
- Voice over IP
- Video on demand
- Video servers
- Distribution networks
- Internet Multicast Backbone

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Week 11

Aspects of Security

- Encryption
  - Secret Key (DES)
  - Public Key (RSA)
- Authentication Protocols
- Message Integrity - Digital signatures
- Key Distribution – Public Key Certificates
- Security Protocols
  - IPsec
  - TLS/SSL
- Firewalls

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Week 12

- QoS requirements for Multimedia Applications
- Transport protocols vs QoS
  - TCP, UDP, RTP
- Techniques to achieve QoS
- QoS in ATM networks
- QoS models for the Internet
  - Integrated Services, IntServ, TSpec
  - Differentiated Services
  - MultiProtocol Label Switching

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No lecture on Friday

- Remember there is no Friday lecture this week, but there still will be tutorials in week 13.

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