COMP 445 - Theoretical Assignment 1 (TA1)
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Instructions

- Please submit your assignment as a pdf file on Moodle. The name of the pdf file must contain your name and student id.
- All questions will receive equal points.
- Each question may have zero, one, or more than one correct choices. Wrong answers will be penalized with negative points.
- Partial answers will not receive any point.
- Blank answers (no answer) will not be penalized.

Student ID: 40031689

First Name / Last Name: Jonathan Del Corpo

Signature: Jonathan Del Corpo

Introduction

Q1: A protocol of the application layer is implemented:

a) At the network core.

b) At the network edge.

c) Both at the network core and at the network edge.

Q2: Consider two hosts A and B connected through a single router X (the network looks like A - X - B). Assume that the link between A and X is of capacity $R_{A\text{-}X}$=8 Gbps and the link between X and B is of capacity $R_{X\text{-}B}$=16 Gbps. What is the time required for N=5 packets of size L=1 MB to be delivered from A to B, assuming that all delays except the transmission delay are negligible? We assume that 1 Gb=1000 Mb.

a) 5.5 ms

b) 7.5 ms

c) 1.5 ms

d) None of the above.

Q3: Starting from the same network as in the previous question, we now assume that propagation delays are not negligible:

- A and X are connected by a 5000-km link ($l_{A\ X}$=5000 km) where the propagation speed is s=10^8 m/s.
- B and X are connected by a 20-km link ($l_{X\ B}$=20 km) where the propagation speed is s=10^8 m/s.

What is the new delivery time between A and B for the same N=5 packets?

a) 45.7 ms

b) 55.5 ms

c) 51.5 ms

d) 55.7 ms

Q4: In the Internet protocol stack, the transport layer can directly use services from:

a) The application layer.

b) The network layer.

c) The link layer.

d) All of the above.

Q5: What is the probability that more than 5 users are active at the same time in a network of 15 users where each user is active 20% of the time?

a) 1

b) 0.6

c) 0.04

d) 0.06

Application layer

Q6: The content below was captured using Wireshark:

```
▸ Frame 110: 75 bytes on wire (600 bits), 75 bytes captured (600 bits) on interface 0
▸ Ethernet II, Src: IntelCor_50:80:98 (f0:d5:bf:50:80:98), Dst: mynetwork (f0:82:61:f7:5e:80)
▸ Internet Protocol Version 4, Src: 192.168.2.111 (192.168.2.111), Dst: mynetwork (192.168.2.1)
▸ User Datagram Protocol, Src Port: 60634 (60634), Dst Port: domain (53)
▾ Domain Name System (query)
    Transaction ID: 0x8ed4
  ▾ Flags: 0x0100 Standard query
      0... .... .... .... = Response: Message is a query
      .000 0... .... .... = Opcode: Standard query (0)
      .... ..0. .... .... = Truncated: Message is not truncated
      .... ...1 .... .... = Recursion desired: Do query recursively
      .... .... .0.. .... = Z: reserved (0)
      .... .... ...0 .... = Non-authenticated data: Unacceptable
    Questions: 1
    Answer RRs: 0
    Authority RRs: 0
    Additional RRs: 0
  ▾ Queries
    ▾ www.lapresse.ca: type ANY, class IN
        Name: www.lapresse.ca
        [Name Length: 15]
        [Label Count: 3]
        Type: * (A request for all records the server/cache has available) (255)
        Class: IN (0x0001)
```

This trace contains:

a) An HTTP request encapsulated in a DNS query.

b) A DNS query encapsulated in a TCP segment.

c) An IP datagram encapsulated in a UDP datagram.

d) A DNS query encapsulated in a UDP datagram.

Q7: Among the following HTTP methods, which one(s) may be used to upload a file to a Web server?

a) GET

b) POST

c) PUT

d) HEAD

Q8: Among the following protocols, which one(s) are not involved in the retrieval of the Web page at URL http://www.concordia.ca/ with a Web browser?

a) TCP

b) DNS

c) HTTP

d) SMTP

Q9: DNS may be used to retrieve the name of the email server of a specific domain:

a) by querying records of type CNAME.

b) by querying records of type NS.

c) through any type of iterated query.

d) through any type of recursive query

e) None of the above

Q10: SMTP is:

a) a push protocol.

b) a deprecated protocol.

c) a transport protocol (a protocol belonging to the transport layer).

d) a text (ASCII) protocol.