CARLETON UNIVERSITY
School of Computer Science

COMP3203– Principles of Computer Networks
Assignment 4

Instructor: Prof. AbdelRahman Abdou

Winter 2022

The assignment is **worth 3.64%** of the total course grade. It is graded out of 23, so your mark will be scaled accordingly.

You should submit a PDF document with your solutions in the respective assignment dropbox on cuLearn. For example, if you use MS Word, save it as PDF and upload. Name the PDF file as:

"A#_FirstName_LastName_StudentNumber.pdf"

So if John Smith, whose number is 123456789, is uploading the solution for Assignment 3, John should name the file "A3_John_Smith_123456789.pdf".

Make sure you upload your solution before the deadline, which is at **11:59pm EST on Mar 22nd**. As usual, feel free to ask questions on our Brightspace forum.

Distribution of Marks

Question	Points	Score
1	9	
2	14	
Total:	23	

1. Consider a datagram networking using 8-bit host addresses. Suppose a router uses longest prefix matching.

   (a) (5 points) For each of the four interfaces, give the associated range of destination host addresses, and the number of addresses in the range.

Prefix Match	Interface
00	0
010	1
011	2
10	2
11	3

   (b) (4 points) Repeat part (a) for the following forwarding table:

Prefix Match	Interface
1	0
10	1
111	2
Otherwise	3

2. Consider the network 108.17.154/23.

   (a) (2 points) What is the maximum number of interfaces that this network can support?

   (b) (6 points) Suppose we like to divide this network using a router that interconnects four subnets. Suppose that each of the four subnets is required to support the following number of interfaces:

Subnet number	Required to support
1	60 interfaces
2	60 interfaces
3	125 interfaces
4	250 interfaces
Total	495

   Can these constraints be satisfied? If yes, provide four subnet addresses (of the form a.b.c.d/x) that satisfy these constraints. If no, justify your answer.

   (c) (6 points) Consider instead that we like to divide the network into two subnets, such that each support the following number of interfaces:

Subnet number	Required to support
1	5 interfaces
2	260 interfaces
Total	265

   Can these constraints be satisfied? If yes, provide four subnet addresses (of the form a.b.c.d/x) that satisfy these constraints. If no, justify your answer.