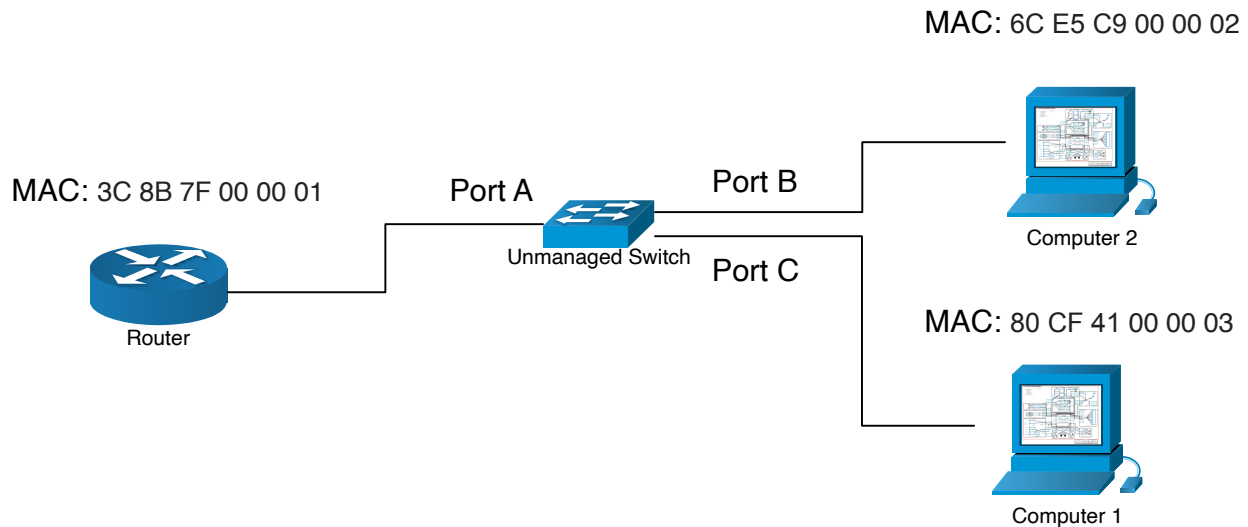# Homework 4

Due October 1, 2022

## Problem 1:

How long would the critical time be in the Aloha protocol if it were to be used by the University of Indonesia (with branch campuses from Banda Aceh to South Papua), if frames would be 1500 bits long, and if the radio link would offer a bandwidth of 10 Mb/sec?

## Problem 2:

Assume you are designing an improved version of (switched) Ethernet over fibre optical cable of length up to two kilometers. The connection is only half duplex, so collisions can occur. The desired bandwidth is 20Gb/sec. What is the minimum size of the frame so that collisions can be detected?

## Problem 3:

Consider the following small LAN. It consists of an unmanaged switch and two computers, connected to a router.  Port A is the designated router port and the default port.

MAC: 6C E5 C9 00 00 02

MAC: 3C 8B 7F 00 00 01          Port A          Port B

Unmanaged Switch          Port C

Router

Computer 2

MAC: 80 CF 41 00 00 03

Computer 1

The switch starts out with an MAC table with no entries. The router sends a message to Computer 1 and eventually, Computer 1 will respond with an acknowledgment message to the router. What are the actions of the switch when it receives a message with destination MAC 80 CF 41 00 00 03 and source MAC 3C 8B 7F 00 00 01? What happens to the MAC table. What happens when the computer sends the answer to the router?

# Problem 4:

Find the MAC address of your device.  (Hand-in: A screen shot of the relevant window / terminal.) Compare this in writing with the output of ipconfig /all (windows) or ifconfig (Unix including Mac).