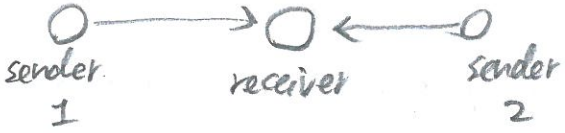
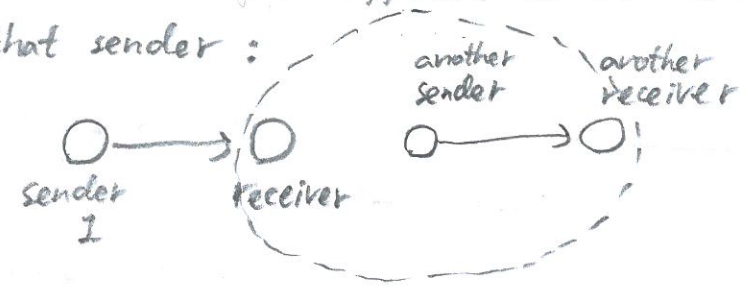
Name: Solution Student ID: CSC0056 Homework 5

(1.1) Primary interference refers to the case where there are multiple senders trying to send data to the same receiver at the same time:



(1.2) Secondary interference refers to the case where a receiver was interferred by a sender for someone else because the receiver happened to be within the transmission ranger of that sender:



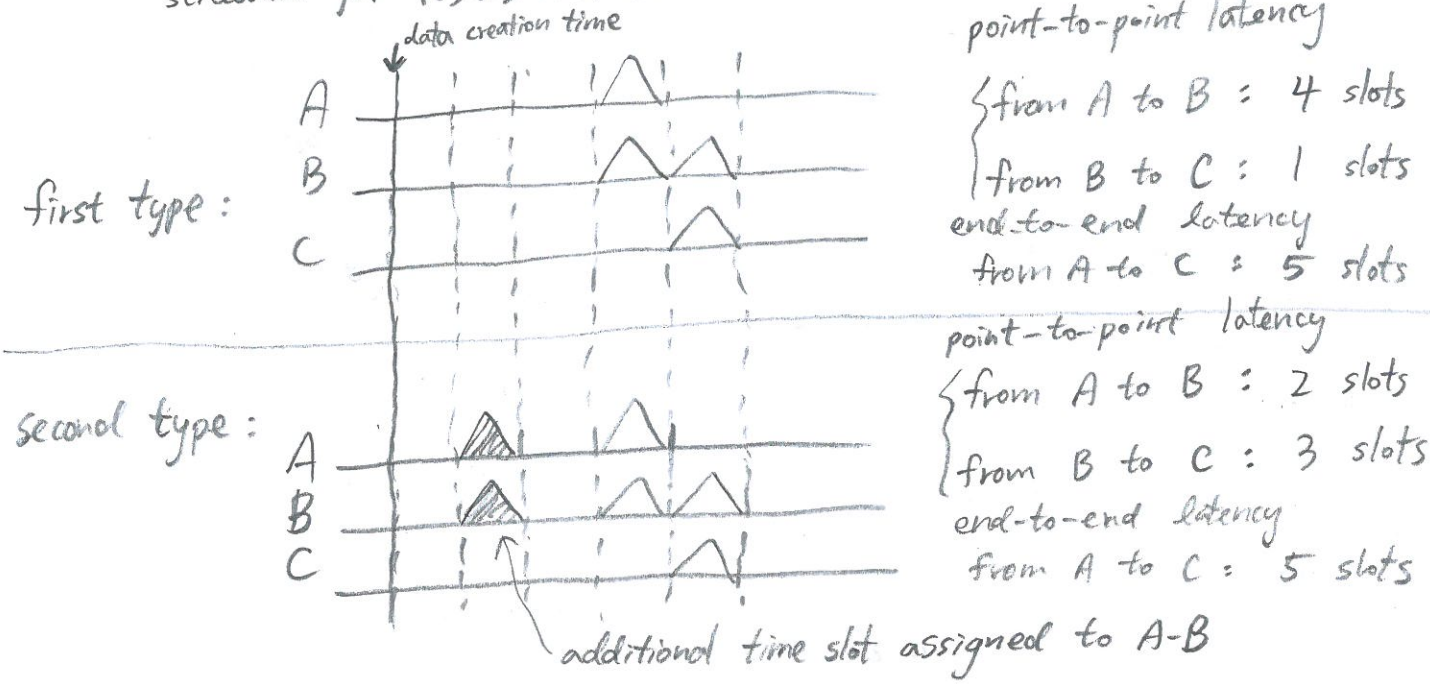
(1.3) Graph coloring algorithms try to assign mutual colors to adjacent entities (depending on the context, the entities may be vertices, links, geographic regions, etc.). The requirement of a collision-free data communication schedule is to assign mutual time slots to wireless links that may suffer from primary/secondary interferences (because they are adjacent in the sense that at least one wireless node from each link is within the transmission range of another).

Name: _____ Student ID: _____

(1.4) In general, reducing some point-to-point latencies may not reduce the end-to-end latency if the former reduction does not change the timing of future transmissions in the later part of the end-to-end path.

An example: consider sending data from A to C:

schedule for A, B, and C:



This situation is like that we managed to arrived at a bus stop earlier, but still, the previous bus had left already. It turns out that the time we saved will all be spent on waiting for the next bus. And we will arrive at the destination at the same time, as long as we missed the previous bus. #

ame: _____ Student ID: _____

(2.1) This is described in the related work section. With a higher workload it is likely that $T \uparrow$, and therefore from $N = \lambda T$ we see that $N \uparrow$, which implies (that) in average there will be more data in the system at any given point of time. So the system is more likely to have data losses should the primary IoT gateway fail to work.

(2.2) In scenarios such as temperature monitoring, provided that the sampling rate is high, we may use interpolation (內插法) to have a reasonable estimation of the lost data.

(2.3) In this case we have the assurance that the system can always recover some lost data so that there will be no two consecutive data missings, which by definition meets the application requirement "$L_i \geq 1$".

(3.2) @s prints the number of seconds since the Epoch.
@N prints the number of nanoseconds that have passed in the current second.

For the last question, the discrepancy could result from the fact that this public broker is very busy (people around the world are using it) and thus a message may need to wait for a while for the broker to complete processing those messages that have arrived earlier. #