Isfahan University of Technology
Information Technology Fundamentals
Dr. Manshaei
Homework 1: Module 02 Networking
Deadline: Friday 29^{th} Farvardin, at 23 : 59

We only accept the homework **delivered via lms(lms.iut.ac.ir), before the deadline**.

1. Let us assume we use CDMA to share the same frequency and time slot between 3 users. Suppose these users want to send data simultaneously. Recall that we use -1 instead of 0 in CDMA and the transmission channel will add the encoded messages altogether. Answer the following questions.

- Provide an 8-bit code for each of these users, when they send data together.
- User 1 and User 3 would like to send two bit messages to the receiver, simultaneously. These messages are $(1, 1)$ and $(0, 1)$, respectively. Encode and decode these messages using the provided codes.

2. Answer the following questions briefly:

- Describe the role of beacon frames and probe frames in 802.11.
- What is the relation between BER and SNR?
- What are the differences between a master device in a Bluetooth network and a base station in an 802.11 network? **(Research Question)**

3. Consider the scenario shown in the Figure 1, in which there are four wireless nodes A, B, C, D. the radio coverage of the four nodes is shown via the shaded ovals, all nodes share the same frequency.

- What happens if node A wants to send data to B and C to D, simultaneously?
- What happens if node A wants to send data to B and D to C, simultaneously?

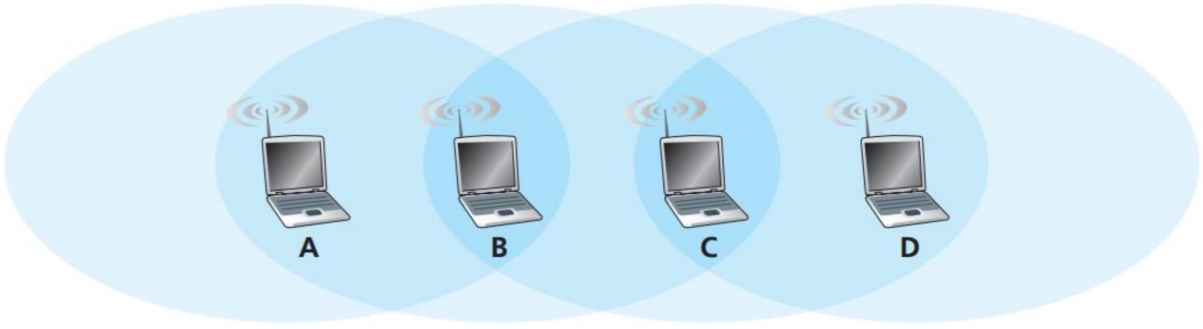

Figure 1: Position and coverage of wireless nodes

4. Consider the scenario shown in Figure 2. Suppose that the correspondent wants to send data to mobile node, and vice versa.

- Explain the packet flow in the aforementioned scenario. (for both direct routing and indirect routing)
- What would be the source and destination IP address in each stage? (for both direct routing and indirect routing)

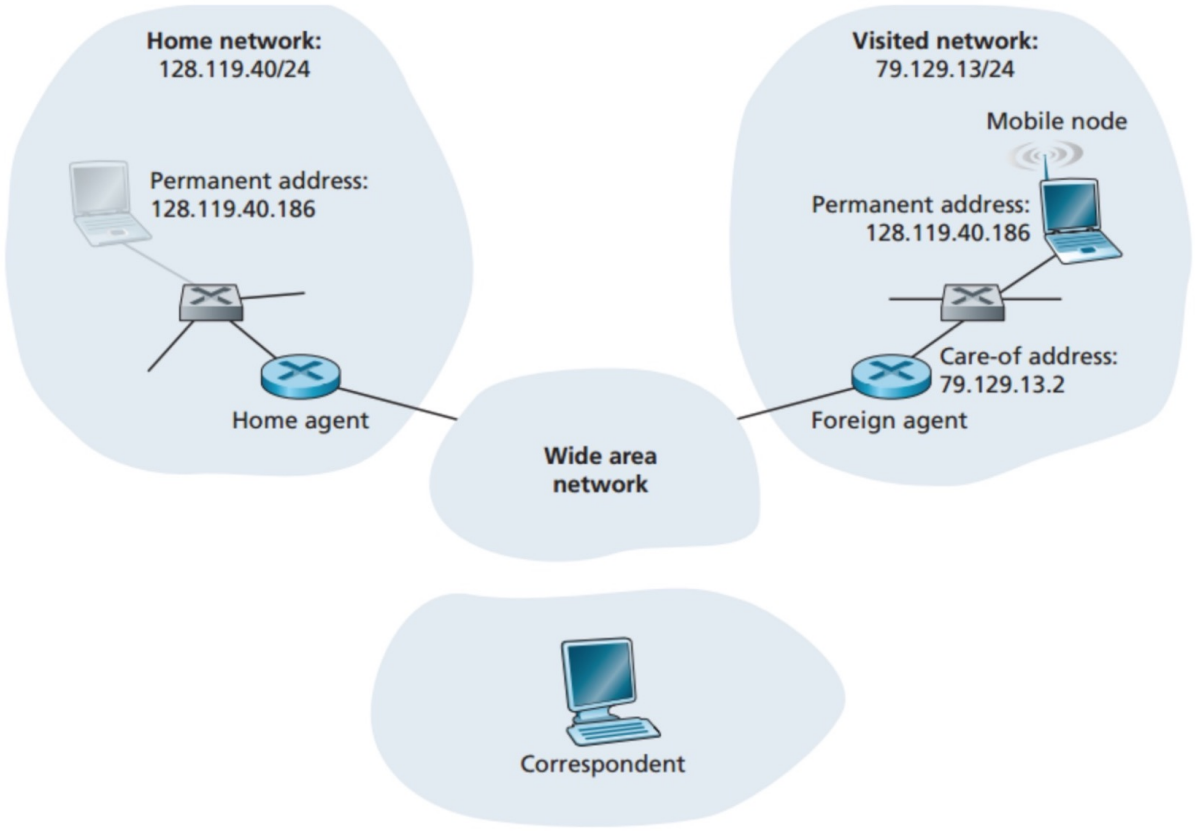

Figure 2: Scenario of mobility management

5. Consider two mobile nodes in a foreign network having a foreign agent. Is it possible for the two mobile nodes to use the same care-of address in mobile IP? Explain your answer.