Tutorial Sheet 3
Warming Up To Space Networks

Hint: These exercises were created by the tutors for the tutorials. They are neither relevant nor irrelevant for the exam. The evaluation of the difficulty corresponds to the assessment of the tutors.

Exercise T3.1 *(CDMA Choice)*
You want to use CDMA and you need to pick the chipping sequences. What chipping sequences from the following selection do you have to drop to archive orthogonality?

☐ $(-1,-1,+1,-1)$ ☐ $(1,-1,1,-1)$ ☐ $(1,1,-1,-1)$ ☐ $(1,-1,1,1)$ ☐ $(1,-1,-1,1)$

Exercise T3.2 *(CDMA)*
Giving the chipping sequence $(1,-1,1,1)$ you want so send the following message $(1,-1,1)$. What is the resulting CDMA encoding?

Exercise T3.3 *(CDMA)*
You received the following CMDB encoded bit: $(4,-3,-2)$. The sender S for which you want to decode the message used chipping code $(-1,-1,1)$. What message bit did he send?

Exercise T3.4 *(CMAT)*
In the lecture, we have shown four conflict-free protocols to archive centralized multiple access. Name and explain each one briefly with its Pros and Cons.

Exercise T3.5 *(CSMA/CD: Hidden node problem)*
Recall the Hidden Node problem from the lecture. Assume each note has a range of 200 km and the nodes are located on a line with 80km separation. How many nodes n can you place on that line until the hidden node problem occurs? Draw a CSMA scenario with n+1 nodes where a collision occurs.