CS433, Spring 2025
Homework: Cellular

This is an **individual** assignment. Submission is through Gradescope. You should submit a PDF with two reports, as described below.

The purpose of this assignment is to gain some understanding of how connectivity differs around the world. We are going to crowdsource information on cellular data plans from different countries. The goal is to get a diverse sampling of what communication options are available, through the lens of an IoT developer.

This is going to be interesting. It's definitely going to require some web searches and a little bit of reading between-the-lines in some cases. I clearly don't have exact answers here, so the goal is really for you to engage with the goals, do a reasonable investigation, and demonstrate that you've done so.

Note: NEVER email or call an actual human being. Investigation is great, but I don't want you to waste another human's time on a homework assignment.

Understanding Global Cellular Costs

Pick two different countries from <u>two different continents</u>.

- **Choose a different country + carrier from anyone else in class** (two people can do the same country, if they choose different wireless carriers). See the next page to claim your choices BEFORE you start doing the investigation.

Imagine you are an IoT application developer looking to deploy in this country. Your task is to figure out (a) whether this is feasible, (b) what management tasks you will have to undertake, and (c) how much it will cost.

Concretely, imagine you are setting up a 6-month pilot with 1,000 devices. For uplink, each device will send a 1 kB request once every 10 minutes, 24 hours a day. For downlink, let us also assume that once per month, you will update device firmware (a 10 MB operation; done 6 times total).

Your devices preferentially support 2G, LTE-M, and NB-IoT networks. In an emergency you could support 3G/4G (if it's the only option for that country/carrier).

Q1: Record Results [20pts]

A summary of your results should be included on the Cellular Costs spreadsheet:
https://docs.google.com/spreadsheets/d/1rV9tBadDVnZdKZDUfKFuJfJkPjP2_0ybVKF7Vhz98Fc

You MUST choose a different country + carrier from anyone else in class (two people can do the same country if they choose different wireless carriers). You should first reserve your "Country + Carrier" combination on that spreadsheet and validate that your choice is unique. You can fill in the data later after you figure it out.

Q2: Country 1 [40pts]

For your report, imagine you are writing up a summary to present to your project manager / engineering team on the feasibility and cost to deploy your pilot in this country. Keep the report to two pages maximum please. This is an engineering report, so the prose should be succinct and focus on explanations. Employ bullet points and figures from sources when helpful.

Make sure you include ALL information, even stuff you've recorded on the shared spreadsheet.

Information to include:

- Which network(s) are potentially available?
    - If there are multiple, choose the cheapest option that meets requirements.
- Data details
    - Is it possible to meet the throughput requirements (uplink and downlink)?
    - What about the total data amounts?
    - Are there any quality-of-service guarantees on this?
- Coverage details
    - Are any regions covered better or worse? (This information may be difficult or impossible to find. If you can't find it, say that.)
- Costs
    - Cost per SIM card
    - Cost for data and/or per device
    - Total costs for the deployment (including any other costs)
- Process to get SIM cards
    - Including any limitations or restrictions
- Citations, links, and potentially screenshots to validate your results.
    - Include citations **INLINE** adjacent to any specific details so it's clear where that detail comes from.

Q3: Country 2 [40pts]

Must be a separate continent from the previous question, but otherwise same idea as before with the same requirements.