Assignment 4 – Mobile Phones

(Submit all the .h and .cpp files, as well as a text file with the output.)

Let's try to model information about mobile phones we have in a small network.

Mobile phones are either smartphones or feature phones. Both of them have one or more modems each. The number of available modems is a property of the mobile phone (1, 2, or 4 implying single SIM, dual SIM, quad SIM etc).

Smartphones also have a computer (or rather, a computer platform) in them, as well as one or more cameras.

Modems have two important properties – the wireless technology (GSM, GPRS, WCDMA, LTE, etc), and an IMEI number. IMEI numbers are unique for each modem and cannot be changed after manufacture.

You can add a SIM card to a modem – or leave it empty. The SIM card defines the operator and the number.

You can also add an SD Card to a mobile phone. Each SD card has a specified capacity.

Mobile phones are similar to landline phones in that they both support the following:

1. Get the number of the phone
2. Add a phone to a network – this registers the specific device and its number with the network
3. Make a call to another phone
4. Receive a call from another phone. (Imagine that the network can identify a phone given a number and invokes a receiveCall(fromNumber) on the identified phone.

A phone has a model name and is made by a manufacturer, who is in turn identified by a name and a country.

The computer platform comprises a set of integrated chips – identified by a manufacturer and model name.

Assume you cannot replace internal parts of a mobile phone (i.e. apart from SIMs and SD Cards). So, when you "throw away" a phone, you are not interested in tracking any of the internal parts.

Design classes to model this and to support the following operations:

1. Create a new phone based on data read in
2. Add the i'th SIM of a phone. Similarly, remove the i'th SIM.

3. Add a phone to the network
4. Any phone should be able to call any other phone by using its makeCall method which takes the other phone number as argument (assume a phone number is an int). This should invoke the receiveCall method of the other phone with the calling number as argument. You can keep this implementation very simple. For example, the network can maintain a list of phones, and it searches through all of them till it finds a phone with the desired number.
5. Various queries of the kind listed later on down.

Your main program should do the following:

1. Read in the data in the input file (format defined later)
   a. create the appropriate kind of phones, and add them to the network
   b. Reads the SIM information and add them, one each to the phones that were created (the 1st SIM to the 1st phone, 2nd to the 2nd phone …)
2. Phone with number 9876543210 calls phone with number 8729391018. When a phone is called, the called phone should print out details of the caller – phone number, model, manufacturer etc
3. Remove SIM from phone 2 (phones are numbered 0 to n) and add that SIM to phone 0
4. Phone 3 calls phone number 8729391018
5. List the <manufacturer name, country> of all the phones in the network.
6. List the numbers of all LTE phones in the network
7. List the wireless technology of all phones that have the computer platform from manufacturer Q.
8. List the number of phones in the network of each type: GSM, GPRS, WCDMA, LTE

The input data consists of lines of data, each line is the data for one phone. The first line specifies the number of phones (say n), the next n lines contains information for each phone.
The next line specifies the number of SIM cards(say m). The next m lines provide information on the SIM cards.

Each line of phone information consists of the following fields:

<S or F> <Phone Manufacturer info> <Model> <computer info> <Modem Info> <num Modems> <list of IMEI numbers>

Where
<S or F> : one char, smartphone or feature phone
<Phone Manufacturer Info> : Name Country (both strings)
<Model>: string
<computer info>: manufacturer-name model-name (both strings). Only Smartphones have computers, this field is skipped for feature phones
<Modem Info> <GSM/GPRS/WCDMA/LTE>

<num Modems> : int, the number of modems in the phone. At least 1 per phone
<list of IMEI numbers> one integer for each IMEI number.

The input data for each SIM card consists of the following:
<Operator> <number>

Where
<Operator> is the operator's name (a string)
<number> is the assigned phone number (an int)

Test with the following data:
6
S Sam China Fire3 Q 4340 WCDMA 2 1234567890 2345678901
F Nok Denmark B71 GSM 1 9876543210
S Son India Sun1 I Proton1 LTE 1 8729391018
S Luck Japan P2345 WCDMA 1 97287018290
S Sam China Fire5 S Q234 LTE 2 9904098124 4881248234
F Mic India X234 GSM 22902348 90234823904
4
Sp 9876543210
Or 9123456789
Sp 9001234567
Or 7890123456