ESS 201 Programming II
Java Lab Assignment 3
11 Sept 2019

Inheritance

We would like to model a phone network where different kinds of phones can interoperate. We have the notion of a Phone - a device than can make calls to other phones in the Network, and receive calls from other phones. A phone is attached to a particular network at a time, and has a unique number on that network. A phone can also be queried for its modem manufacturer (in case we do not want certain modems to be connected to the network!)
To make a call, the phone sends a message to the network with the number of the phone to be called. The network checks its list of connected phones, and if that number exists, connects to that phone. Thus, we have the following classes and related functionality:

Phone:

- assign a number to a phone (is part of the constructor)
- get its number
- gets its modem manufacturer (String)
- attach to a network passing in the network object
- call a number (assume numbers are integers). Returns whether it succeeds or not
- Hang up a call. Can be called by the user or by the network. If it is initiated by the user, and if a call is active, it informs the network that it is hanging up the current call.
- recieve a call from a number (this method is accessible only by the network)

Network:

- add a phone object to its network
- handle a call request from a phone. The network, in turn, searches for this number and calls the appropriate phone. Sends a response to the caller indicating if the call succeeded or not
- Handle a hang-up request from a phone to terminate a conversation. If this is a valid request, it informs the other phone (of that conversation) to hang up.
- Note that, apart from the constructor, the other methods of a network are not accessible publicly.

Phones themselves are of multiple kinds - feature phones, smart phones, other communicating devices, etc. Any of these can be used to connect to a network and to call each other. Note that the Network should not worry about the specific type of phone - any device that satisfies the behaviour of the Phone should work on the network.

For our purposes, we will consider two types of phones:
Feature phones:

- It has all the properties of a phone, and has a modem (which we identify by its manufacturer)

Smart phone:

- Has separate CPU and modem chips. For simplicity, we assume that we only need to store the names of the manufacturers of these chips.

Model these appropriately as base classes and derived classes, put together in packages as relevant. Identify the methods of the base class, if any, that can/should be abstract. You will also need to see what information the network should maintain in order to connect and hang up calls.

The **main** program does the following:

1. Instantiates the network
2. Creates a feature phone with number 12345 and modem TI
3. Creates a smart phone with number 23456, CPU from Samsung and modem from Mediatek
4. Creates a smartphone with number 13452, CPU and modem from Apple
5. Attaches all these to the network.
6. Makes a call from phone 12345 to phone 23456
7. Makes a call from 13542 to 12345
8. Hangs up phone 23456
9. Makes a call from 13542 to 12345

for steps 6, 7, 9, Prints “successful” or “not successful” as per the response.

Expected output:

successful
not successful
successful