CS 4230

Project 1

Telephone Switching Simulation

This project simulates basic telephone functions. You will not be hooked up to real phones, but instead will input commands from the keyboard, and display results.

Your system will make phone calls, as well as perform three-way conferences and transfers.

The requirements are as follows:

1. At startup, the program will read a file containing phone numbers and names. There may be up to 20 such pairs, one per line.
2. The phone numbers are 5 digits long, all numbers. A phone number may begin with 0.
3. The names are a single name field up to 12 characters. Names are a single word (no first name, last name; let's keep it simple.) Names are all alphabetic: A-Za-z.
4. The program will output a welcome message and display the phone directory, including the initial status of the phones as 'Onhook'.
5. The program will prompt the user to enter a name or a number.
6. If a valid name or number is entered the program will print a success message, followed by the command menu. Otherwise the program will notify the user that the name or number can't be found and ask the user to try again.
7. Whichever command entered will be performed on the current phone selected. For example if phone1 is calling phone2, you must switch to phone2 to answer the call.
8. Commands are:
    1. Call
    2. Offhook
    3. Onhook
    4. Transfer
    5. Conference
    6. Phone Status
    7. Switch Phone
    8. Quit
9. To input a command simply type the number that is associated with the command and then hit enter.
10. Possible responses are as follows. See later requirements for the conditions for each response.
    ● Please select the phone using Name or Number:
    ● A phone with that name or number could not be found, try again!
    ● phone hears dialtone
    ● phone hears ringback

- phone hears ringing
- phone hears denial
- phone hears busy
- phone hears silence
- phone and phone are talking
- phone and phone and phone are talking
- phone transferred to phone
- Input Command for phone
- Phone Successfully Switched:
  Name    | [phone name]
  Number  | [phone number]

11. Normal call (After selecting John):
    1. Input Command for John: (Response from computer)
    2. 2 (command from user)
    3. John hears dialtone
       *Displays command menu*
       Input Command for John: (response from computer)
    4. 1 (command from user)
    5. Please select the phone using Name or Number: (response from computer)
    6. Bill (command from user)
    7. Bill hears ringing
       John hears ringback
       *Displays command menu*
       Input Command for John: (response from computer)
    8. 7 (command from user)
    9. Please select the phone using Name or Number: (response from computer)
    10. Bill (command from user)
    11. Phone Successfully Switched:
        Name    | Bill
        Number  | 12347
        *Displays command menu*
        Input Command for Bill: (response from computer)
    12. 2 (command from user)
    13. John and Bill are talking
        *Displays command menu*
        Input Command for Bill: (response from computer)
    14. 3 (command from user)
    15. John hears silence
        *Displays command menu*
        Input command for Bill: (response from computer)
    16. In general: the menu list of commands will be printed out after every input command has been executed
12. Conference call: After John and Bill are talking
    1. 5 (Either John or Bill)
    2. Please select the phone using Name or Number:

3. Todd
4. Todd hears ringing
5. John (or Bill) hears ringback
6. 7
7. Please select the phone using Name or Number:
8. Todd
9. Phone Successfully Switched:
   Name    | Todd
   Number  | 12357
10. 2
11. John and Bill and Todd are talking
12. 7
13. Please select the phone using Name or Number:
14. John
15. Phone Successfully Switched:
    Name    | John
    Number  | 01234
16. 3
17. Todd hears silence
    Bill hears silence
18. When someone hangs up a conference call it disconnects everyone from the call.

13. Transfer: After John and Bill are talking (with John being selected to transfer Bill to Todd)
    1. 4
    2. Please select the phone using Name or Number:
    3. Todd
    4. Todd hears ringing
       Bill hears ringback
       Bill transferred to Todd
    5. 7
    6. Please select the phone using Name or Number:
    7. Todd
    8. Phone Successfully Switched:
       Name    | Todd
       Number  | 12357
    9. 2
    10. Bill and Todd are talking

14. If John and Bill are on a call together (with Todd being selected):
    1. 2
    2. Todd hears dialtone
    3. 1
    4. Please select the phone using Name or Number:
    5. John
    6. Todd hears busy

7. In general: if a phone is offhook or on a call and tries to call/conference/transfer (and it's valid to do so) a phone that is not onhook, the phone will hear busy.

15. Illegal cases: Calling an invalid phone (Selected John):
    1. 2
    2. John hears dialtone
    3. 1
    4. Please select the phone using Name or Number:
    5. test
    6. A phone with that name or number could not be found, try again!
    7. Please select the phone using Name or Number:

16. Another one (Selected John, calling without going offhook):
    1. 1
    2. Please select the phone using Name or Number:
    3. Bill
    4. Invalid action. Try again
    5. In general: If the phone is onhook and tries to do anything except going offhook, the console prints "Invalid action. Try again". Actions that require inputting an additional phone (Call, Transfer, and Conference) will ask for the other phone name or number first before printing the invalid statement.

17. When a phone is already onhook, the following commands will result in an invalid statement being printed:
    1. onhook
    2. call
    3. conference
    4. transfer

18. When a phone is already offhook, the following commands will result in an invalid statement being printed:
    1. offhook
    2. conference
    3. transfer

19. When a phone is on a call, the following commands will result in an invalid statement being printed:
    1. offhook
    2. call

20. When a phone is ringing (actively being called by another phone), the following commands will result in an invalid statement being printed:
    1. onhook
    2. call
    3. conference
    4. transfer

21. When a phone is in the process of calling another phone, the following commands will print an invalid statement:
    1. offhook
    2. call

       3. conference
       4. transfer
22. Whenever the user tells a phone to go onhook, and the command is valid (not in the above list) the phone will hear silence, indicating the transition was successful.
23. If a phone is on a 3-way conference call and tries to conference or transfer another phone, the phone hears denial.
24. One more important command: "Status"
       1. Displays the status of the system. Lists each phone's status, and if it is on a call, who it is talking to (could be more than one other phone.)