Python Coursework

Logan Miller

Task 1

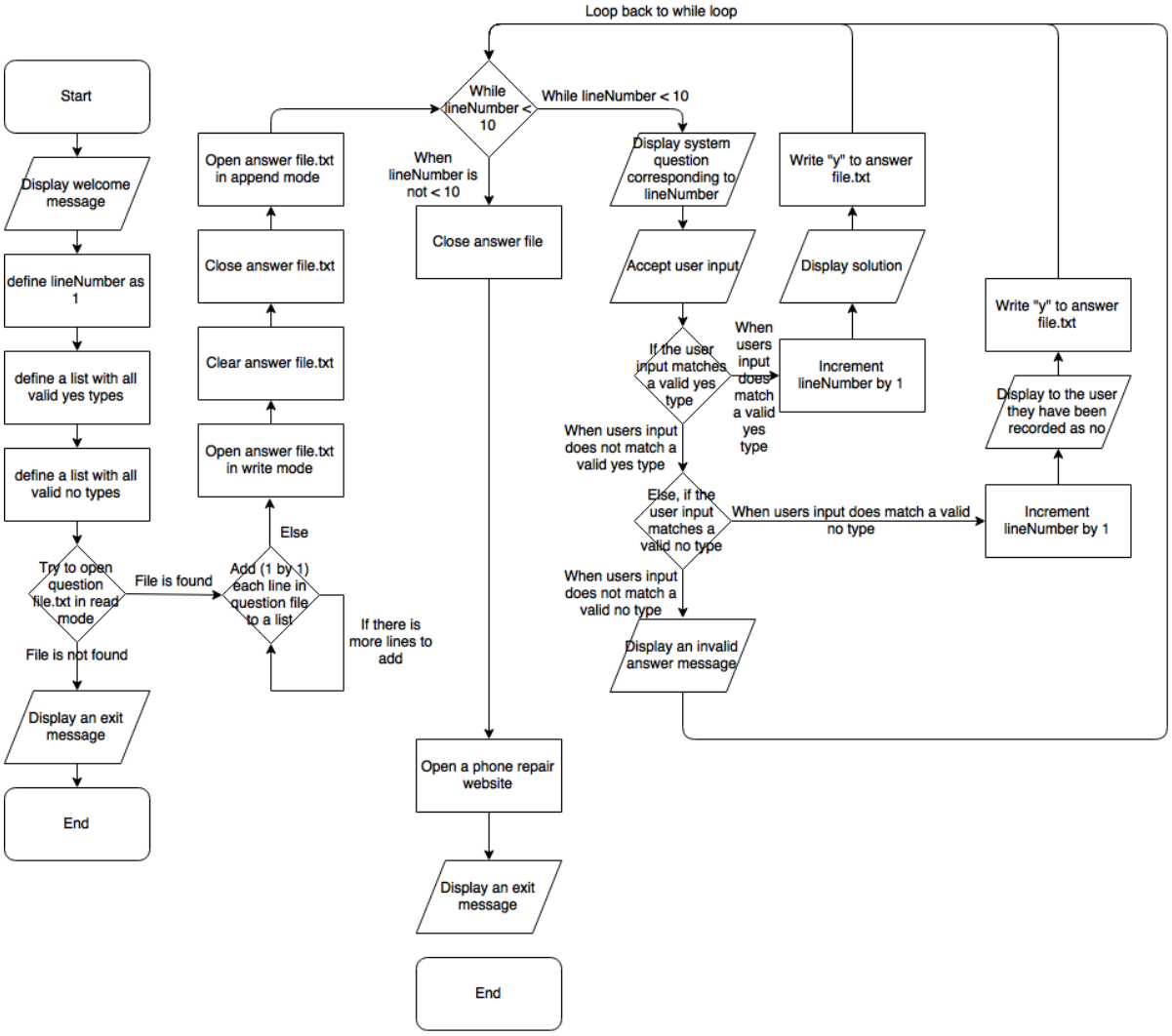
Design (9marks)

I am going to design an automated troubleshooting program that will ask the user yes or no questions about problems common with phones. My troubleshooting program will then display a solution to the problem if the user confirms that they have the problem. This will then be followed up by a confirmation, asking if their phone is now fixed, and will either exit the program (if it is fixed) or continue asking questions (if the phone is not fixed).

Success Criteria

- The system should introduce the program.
- The system should ask a question about the phone.
- The system should accept yes and no answers.
- The process should be repeated.
- The system should allow the user to exit if the problem was resolved.

Flow Chart



Validation

In my code, there will be validation needed when the user answers the program's questions. I plan to use a lookup check to validate this data, by looking up the user's input in 2 tuples which contain all the values the program will accept for a "yes" answer and a tuple which contain all the values the program will accept for a "no". For the program to accept the input the input must match one item in either of the tuples, if it does not the user will be required to re-enter its answer.

Pseudo-code

Display a welcome message
Define lineNumber as a 0 integer value
Define yesTypes as a list of acceptable yes values
Define noTypes as a list of acceptable no values
Try to open question file.txt: If the file can be opened, open it
If the file cannot be opened, display an error message and close the program
Append every line of the question file to questionFileList
Open answer file.txt
Clear answer file.txt
Close answer file.txt
Re-open answer file.txt
While the lineNumber is less than 10 print the systems question:
    Display a system question
    Request a user input
    Turn the user's input into all lower case
    If the user's input matches an acceptable value in the yesTypes
        Increment lineNumber by +1
     Display a solution to the problem
        Add a y to answer file.txt
    Else, if the user's input matches an acceptable value in the noTypes
        Increment lineNumber by +1
        Display a message saying the user's response was recorded as no
        Add an n to answer file.txt
    Else:
        Display an invalid response message and tell them to try again
Close answer file.txt
Open a phone repair website
Display an exit message and close the program

Identifying Data Types

Identifier	Type of variable	Why I used this variable type	What the variable will do	Definition
userInputCaseSensitive	String	Because the user input could consist of any combination of characters, by using a string the program will not crash if the user inputs an extreme response to the systems question.	Store the user's input.	A finite sequence of characters, which can include any characters.
userInput		Because this variable is *userInputCaseSensitive* after it has gone through the *.lower()* method. *.lower()* only works of strings.	Store the user's input after all the letters have been converted to lower case	
enterToExit		Because this variable is used to let the user exit the program by pressing enter. If they accidently enter a character before they press enter an error will not occur as a string accepts any character.	To allow the user to press enter when they wish to exit.	
lineNumber	Integer	Because this variable is used as a counter to decide which line to read from the text files used in the program. The variable cannot be a float as you cannot get fractions of a line in *.txt* text files and it cannot be a string as the main while loop is dependent on if it is less than a certain integer.	Store the number for which line they program should read from the text file.	A number which is not a fraction but is a whole number and may or may not become negative.
questionFileList	List	Because there needs to be an item for each line in the relevant file and the list needs to be able to be updated for when I append each line to the list.	Store each line the relevant text file as an item in the list.	A sequence data type which contains items separated by commas, enclosed in square brackets. Each item can be a different data type. You can update the contents of the tuple (e.g. you can add items, remove items, edit items or re-order items)
solutionFileList				
noTypes	Tuple	Because there needs to be multiple items which can be easily read, however, it does not need to be updated.	Store each string which the program recognises as a yes/no answer as items in the tuple.	A sequence data type which contains items separated by commas, enclosed in parentheses. Each item can be a different data type. You cannot update the contents of the tuple (e.g. you cannot add items, remove items, edit items or re-order items)
yesTypes				

questionFile *solutionFile*	File object	Because it is the easiest way to read data from an external location from the python file.	Store the data the program needs to read the relevant text file.	A TextIOWrapper which allows python to randomly access to text stored externally.

Test Strategy

What I am testing	How I will test it	Expected outcome
That my program will respond correctly to an expected (valid) input.	By typing in "*no*" when answering the program's question.	The program to interpret the user's input as no to the question by not providing a solution and moving on to the next question.
That my program will respond correctly to extreme inputs, which are valid but at the edge of what the program should accept.	By typing in "*aye*" when answering the program's question.	The program to interpret the user's input as yes to the question by providing a solution and asking if my problem was resolved.
That my program will respond correctly to invalid, erroneous, data; which may be a mistake from the user.	By typing in "*1NC0GN1T0*" when answering the program's question.	The program to interpret the user's input as an invalid answer and allow them to answer the same question again.
That my program will allow me to exit once my problem is solved.	By typing in "*yes*" when the program asks me if my problem is solved.	The program to interpret the user's input as yes to the question by allowing me to exit the program.
That my program will allow me to continue going through questions if my problem has not been solved by the solution provided.	By typing in "*no*" when the program asks me if my problem is solved.	The program to interpret the user's input as no to the question by continuing on to the next question on if I have a certain problem with my phone.
That my program will shut down correctly when there is a missing text file.	By deleting "*question file.txt*" from the directory the program is in and then running the program.	The program to realise a key file is missing, display a message saying it will now shut down and then close itself.
That my program will go through all the questions	By answering "*no*" until all the questions have been answered.	The program to redirect the user to a phone repair website, display a message saying it will now shut down and then close itself.

Testing: (9 marks)

What I am testing	How I will test it	Expected outcome	Actual outcome	Changes made
That my program will respond correctly to an expected, valid, input.	By typing in "*no*" when answering the program's question.	The program to interpret the user's input as no to the question by not providing a solution and moving on to the next question.	The program said the answer was recorded as no and asked the next question.	None.
That my program will respond correctly to extreme inputs, which are valid but at the edge of what the program should accept.	By typing in "*aye*" when answering the program's question.	The program to interpret the user's input as yes to the question by providing a solution and asking if my problem was resolved.	The program provided a solution.	None.
That my program will respond correctly to invalid, erroneous, data; which may be a mistake from the user.	By typing in "*1NC0GN1T0*" when answering the program's question.	The program to interpret the user's input as an invalid answer and allow them to answer the same question again.	The program said the answer was invalid and repeated the question.	None.
That my program will allow me to exit once my problem is solved.	By typing in "*yes*" when the program asks me if my problem is solved.	The program to interpret the user's input as yes to the question by allowing me to exit the program.	The program thanked me for using the program and allowed me to press enter to exit the program.	None.
That my program will allow me to continue going through questions if my problem has not been solved by the solution provided.	By typing in "*no*" when the program asks me if my problem is solved.	The program to interpret the user's input as no to the question by continuing on to the next question on if I have a certain problem with my phone.	The program continued with the next question.	None.
That my program will shut down correctly when there is a missing text file.	By deleting "*question file.txt*" from the directory the program is in and then running the program.	The program to realise a key file is missing, display a message saying it will now shut down and then close itself.	The program displayed a custom error message saying there is a missing file and allowed me to press enter to exit the program.	None.
That my program will go through all the questions	By answering "*no*" until all the questions have been answered.	The program to redirect the user to a phone repair website, display a message saying it will now shut down and then close itself.	The program redirected me to a phone repair site, displayed an exit message and allowed me to press enter to exit the program.	None.

Criteria Check

Criteria	How it has been met
The system should introduce the program.	With a "*print*" command.
The system should ask a question about the phone.	With a "*print*" command.
The system should accept yes and no answers.	With an "*input*" command.
The process should be repeated.	With a "*while*" loop.
The system should allow the user to exit if the problem was resolved.	By using "*if*" and "*elif*" commands, along with the OS module for specifically exiting the program.

Full code (18 marks)

phone-repair.py:

```
#Importing module
import webbrowser
import os

#Intro message
print("Hello and welcome to LoganBerry phone repair services\nPlease answer 'yes' or 'no' to the following questions\n")

#Defining variables
lineNumber = 0
yesTypes = ("yes", "yea", "y", "yep", "aye", "true")
noTypes = ("no", "nah", "n", "nope")
questionFileList = []
solutionFileList = []

#Defining exit sequence:
def exitSequence():
    enterToExit = input("Press enter to exit the program")
    os._exit(0)

#Opening files
try:
    questionFile = open("question file.txt", "r")
    solutionFile = open("solution file.txt", "r")

#Terminating the program if file not found error (run time error) is found
except FileNotFoundError:
    print("ERROR: The LoganBerry phone repair service is unable to open due to 1 or more missing text files\n")

    #Terminating the program
    exitSequence()

#Putting files into lists
for lines in questionFile:
    questionFileList.append(lines)
for lines in solutionFile:
    solutionFileList.append(lines)

#Starting main loop
while lineNumber < 11:

    #Asking question
    print("SYSTEM: ", questionFileList[lineNumber], "\n")

    #Accepting answer
    userInputCaseSensitive = input("USER: ")
    #Converting answer to lower case
    userInput = userInputCaseSensitive.lower()

    #Dealing with yes answers
    if userInput in yesTypes:
        lineNumber += 1
        print(solutionFileList[lineNumber -1], "\n")

        #Checking if user has fixed phone or not
        print("Is your problem resolved?\n")

        #Accepting answer
        userInputCaseSensitive = input("USER: ")
        #Converting answer to lower case
        userInput = userInputCaseSensitive.lower()

        #If problem is solved
        if userInput in yesTypes:
            #Exit message
            print("Thank you for using our phone repair program\n")

            #Terminating the program
            exitSequence()

        #If problem is not solved
        elif userInput in noTypes:
            pass

    #Dealing with no answers
    elif userInput in noTypes:
        lineNumber += 1
        print("Your answer has been recorded as no\n")

    #Dealing with invalid answers
    else:
        print("Invalid answer, please try again\n")

#Redirecting to phone repair site
webbrowser.open("http://www.gomobile.co.uk/help/repairs")

#Exit message
print("Thank you for using our phone repair program\n")

#Terminating the program
exitSequence()
```

Task 2

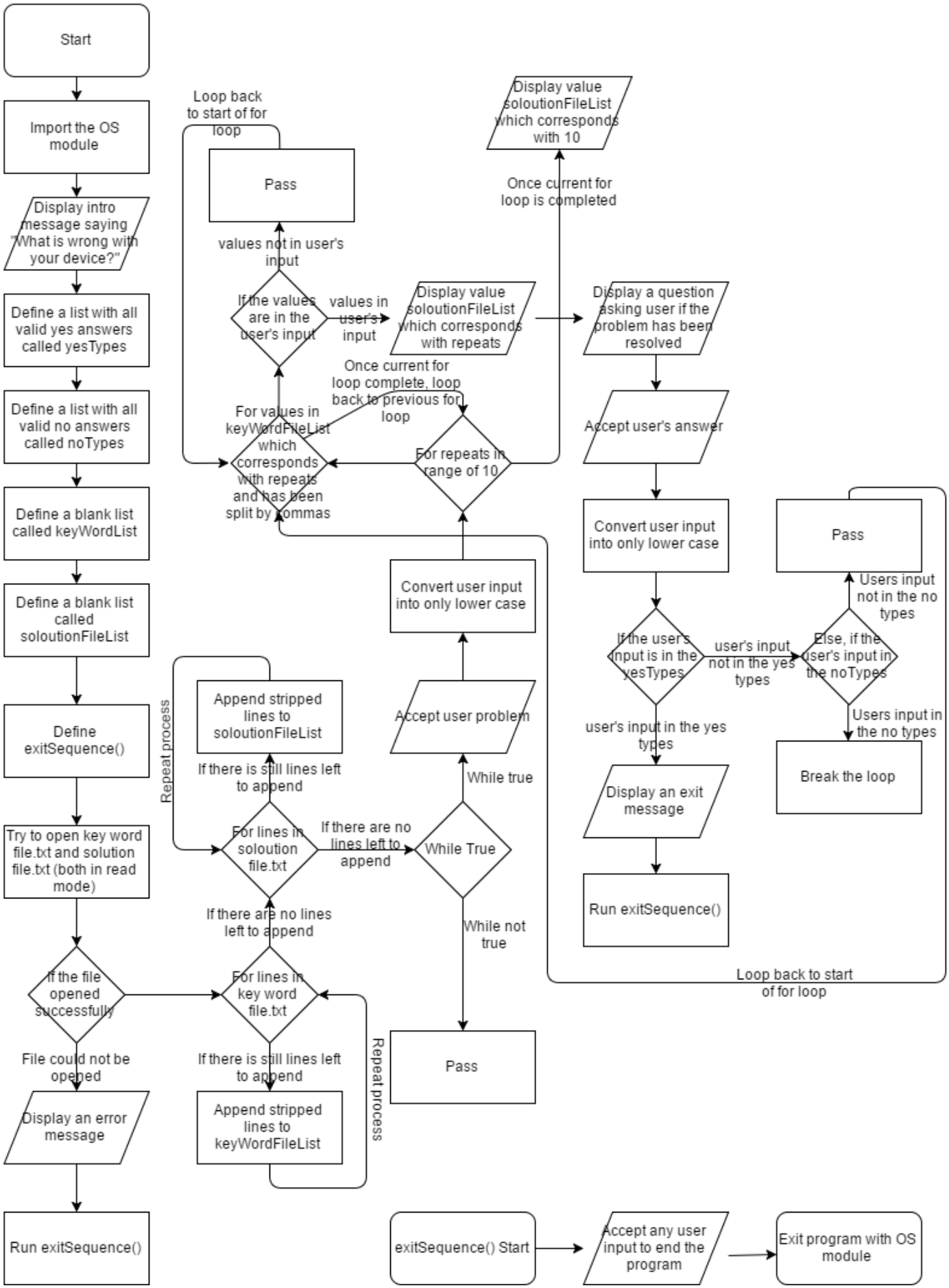
Design (9 marks)

I will design an automated troubleshooting program. This program will ask the user what problem they are experiencing with their mobile phone; the user will then enter their issue. After this, my troubleshooting program will scan the user's input for keywords and suggest a solution based on keywords it has found in user input. After this, my program will ask if their phone is fixed and will either exit the program (if it is fixed) or continue asking questions (if the phone is not fixed).

Success Criteria

- The system should introduce the program.
- The system should accept the user entering a problem with the phone.
- The system should scan the input and correctly identify keywords.
- The system should correctly link certain keywords to certain problems and provide a solution for the relevant problem.
- The system should allow the user to re-phrase the question if the correct solution was not provided .
- The system should allow the user to exit if the problem was resolved.

Flow Chart


Start
Import the OS module
Display intro message saying "What is wrong with your device?"
Define a list with all valid yes answers called yesTypes
Define a list with all valid no answers called noTypes
Define a blank list called keyWordList
Define a blank list called soloutionFileList
Define exitSequence()
Try to open key word file.txt and solution file.txt (both in read mode)
If the file opened successfully
File could not be opened
Display an error message
Run exitSequence()
For lines in key word file.txt
If there is still lines left to append
Append stripped lines to keyWordFileList
Repeat process
If there are no lines left to append
For lines in soloution file.txt
If there is still lines left to append
Append stripped lines to soloutionFileList
Repeat process
If there are no lines left to append
While True
While not true
Pass
Accept user problem
While true
Convert user input into only lower case
For values in keyWordFileList which corresponds with repeats and has been split by commas
If the values are in the user's input
values not in user's input
Pass
Loop back to start of for loop
values in user's input
Display value soloutionFileList which corresponds with repeats
Once current for loop complete, loop back to previous for loop
For repeats in range of 10
Once current for loop is completed
Display value soloutionFileList which corresponds with 10
Display a question asking user if the problem has been resolved
Accept user's answer
Convert user input into only lower case
If the user's input is in the yesTypes
user's input in the yes types
Display an exit message
Run exitSequence()
user's input not in the yes types
Else, if the user's input in the noTypes
Users input in the no types
Break the loop
Users input not in the no types
Pass
Loop back to start of for loop
exitSequence() Start
Accept any user input to end the program
Exit program with OS module

Validation

Validation in my program will be required when the user confirms or denies whether their problem has been resolved. Their answer will only be accepted if their answer is in a tuple containing valid yes answers or a tuple containing valid no answers. If the input is not valid, the user will be required to re-enter its answer.

Pseudo-code

```
#Importing module
import os
#Intro message
OUTPUT "Hello and welcome to LoganBerry phone repair services\nPlease tell us what is wrong with your phone\n"
#Defining variables
yesTypes SET TO ("yes", "yea", "y", "yep", "aye", "true")
noTypes SET TO ("no", "nah", "n", "nope")
keyWordFileList SET TO []
solutionFileList SET TO []
#Defining exit sequence:
FUNCTION exitSequence():
    enterToExit SET TO input("Press enter to exit the program")
    os._exit(0)
#Opening files
ENDFUNCTION

try:
    keyWordFile SET TO open("key word file.txt", "r")
    solutionFile SET TO open("solution file.txt", "r")
#Terminating the program IF file not found error (run time error) is found
                        ENDIF
except FileNotFoundError:
    OUTPUT "ERROR: The LoganBerry phone repair service is unable to open due to 1 OR more missing question files\n"
    #Terminating the program
    exitSequence()
#Putting files into lists
for lines in keyWordFile:
    keyWordFileList.append(lines.strip())
ENDFOR
for lines in solutionFile:
    solutionFileList.append(lines)
#Starting main loop
ENDFOR
while True:
    #Accepting problem
    userInputCaseSensitive SET TO input("USER: ")
    #Converting answer to lower case
    userInput SET TO userInputCaseSensitive.lower()
    #Repeating answer check 10 times
    for repeats in range(10):
        #Split up the keywords
        for values in keyWordFileList[repeats].split(","):
            #Displaying solution IF keyword is found
                                ENDIF
            IF values in userInput:
                OUTPUT solutionFileList[repeats], "\n"
                #Checking IF user has fixed phone OR not
                                ENDIF
                OUTPUT "Is your problem resolved?\n"
                #Accepting answer
                userInputCaseSensitive SET TO input("USER: ")
                #Converting answer to lower case
                userInput SET TO userInputCaseSensitive.lower()
                #If problem is solved
                IF userInput in yesTypes:
                    #Exit message
                    OUTPUT "Thank you for using our phone repair program\n"
                                        ENDFOR
                    #Terminating the program
                    exitSequence()
                #If problem is not solved
                ELSEIF userInput in noTypes:
                    break
                ELSE:
                    pass
                ENDIF
            ELSE:
                pass
            ENDIF
        ENDFOR
    #Displaying message saying we cannot solve problem
    ENDFOR
    OUTPUT solutionFileList[10], "\n"
ENDWHILE
pass
```

Identifying Data Types

Identifier	Type of variable	Why I used this variable type	What the variable will do	Definition
userInputCaseSensitive	String	Because the user input could consist of any combination of characters, by using a string the program will not crash if the user inputs an extreme response to the systems question.	Store the user's input.	A finite sequence of characters, which can include any characters.
userInput		Because this variable is *userInputCaseSensitive* after it has gone through the *.lower()* method. *.lower()* only works of strings.	Store the user's input after all the letters have been converted to lower case	
enterToExit		Because this variable is used to let the user exit the program by pressing enter. If they accidently enter a character before they press enter an error will not occur as a string accepts any character.	To allow the user to press enter when they wish to exit.	
questionFileList	List	Because there needs to be an item for each line in the relevant file and the list needs to be able to be updated for when I append each line to the list.	Store each line the relevant text file as an item in the list.	A sequence data type which contains items separated by commas, enclosed in square brackets. Each item can be a different data type. You can update the contents of the tuple (e.g. you can add items, remove items, edit items or re-order items)
solutionFileList				
noTypes	Tuple	Because there needs to be multiple items which can be easily read, however, it does not need to be updated.	Store each string which the program recognises as a yes/no answer as items in the tuple.	A sequence data type which contains items separated by commas, enclosed in parentheses. Each item can be a different data type. You cannot update the contents of the tuple (e.g. you cannot add items, remove items, edit items or re-order items)
yesTypes				
questionFile	File object	Because it is the easiest way to read data from an external location from the python file.	Store the data the program needs to read the relevant text file.	A TextIOWrapper which allows python to randomly access to text stored externally.
solutionFile				

Test Strategy

What I am testing	How I will test it	Expected outcome
That my program will respond correctly when the user's input contains a keyword.	By typing in "*my screen is frozen*" when entering in my input.	The program to detect the keyword "*frozen*" and provide a solution for if the screen if frozen.
That my program will respond correctly when the user's input does not contain any keywords.	By typing in "*How long is a piece of string?*" when entering in my input.	The program to not detect any keywords, inform the user that it could not, and allow me to re-phrase the question.
That my program will respond correctly if the user's input is blank.	By typing in nothing followed by enter when entering in my input.	The program to detect there is nothing in the input, inform me of what I am meant to type and allow me to try again.
That my program will allow me to exit once my problem is solved.	By typing in "*yes*" when the program asks me if my problem is solved.	The program to interpret the user's input as yes to the question by allowing me to exit the program.
That my program will allow me to re-phrase my input if a solution is not found	By firstly typing in "*The phone's display is chilled?"* and then (if it allows me) re-phrase my question to "*The phone's display is frozen?".*	The program to not detect any keywords, inform the user that it could not, and allow me to re-phrase the question and then detect the keyword "*frozen*" in the re-phrased question and provide a solution for if the screen if frozen.
That my program will shut down correctly when there is a missing text file.	By deleting "*key word file.txt*" from the directory the program is in and then running the program.	The program to realise a key file is missing, display a message saying it will now shut down and then close itself.

Testing: (9 marks)

What I am testing	How I will test it	Expected outcome	Actual outcome	Changes made
That my program will respond correctly when the user's input contains a keyword.	By typing in "*my screen is frozen*" when entering in my input.	The program to detect the keyword "*frozen*" and provide a solution for if the screen if frozen.	The program provided a solution for having a frozen screen.	None.
That my program will respond correctly when the user's input does not contain any keywords.	By typing in "*How long is a piece of string?*" when entering in my input.	The program to not detect any keywords, inform the user that it could not, and allow me to re-phrase the question.	The program told me to rephrase my input as it could not detect any keywords.	None.
That my program will respond correctly if the user's input is blank.	By typing in nothing followed by enter when entering in my input.	The program to detect there is nothing in the input, inform me of what I am meant to type and allow me to try again.	The program told me to rephrase my input as it could not detect any keywords.	I added an if statement saying if the input is blank then repeat the instructions said at the start of the program.
That my program will allow me to exit once my problem is solved.	By typing in "*yes*" when the program asks me if my problem is solved.	The program to interpret the user's input as yes to the question by allowing me to exit the program.	The program thanked me for using the program and allowed me to press enter to exit the program.	None.
That my program will allow me to re-phrase my input if a solution is not found	By firstly typing in "*The phone's display is chilled"* and then (if it allows me) re-phrase my question to "*The phone's display is frozen".*	The program to not detect any keywords, inform the user that it could not, and allow me to re-phrase the question and then detect the keyword "*frozen*" in the re-phrased question and provide a solution for if the screen if frozen.	The program first told me to re-phrase my question, allowed me to enter a new response and then provided a solution for having a frozen screen.	None.

Criteria Check

Criteria	How it has been met
The system should introduce the program.	With a "*print*" command.
The system should accept the user entering a problem with the phone.	With an "*input*" command.
The system should scan the input and correctly identify keywords.	By using a "*for*" loop and ".*split()*" to separate a list of keywords and an "*if*" statement to detect any keywords.
The system should correctly link certain keywords to certain problems and provide a solution for the relevant problem.	By having an integer ("*repeats*") be linked to both the key word and the solution (which is specific to the problem).
The system should allow the user to re-phrase the question if the correct solution was not provided.	By using "*print*" and "*input*" commands to ask and receive an answer to if their problem was solved, and an "*if*" statement to detect if they responded yes or no to the question.

Full code (18 marks)

```
#Importing module
import os

#Intro message
print("Hello and welcome to LoganBerry phone repair services\nPlease tell us what is wrong with your phone\n")

#Defining variables
yesTypes = ("yes", "yea", "y", "yep", "aye", "true")
noTypes = ("no", "nah", "n", "nope")
keyWordFileList = []
solutionFileList = []

#Defining exit sequence:
def exitSequence():
    enterToExit = input("Press enter to exit the program")
    os._exit(0)

#Opening files
try:
    keyWordFile = open("key word file.txt", "r")
    solutionFile = open("solution file.txt", "r")

#Terminating the program if file not found error (run time error) is found
except FileNotFoundError:
    print("ERROR: The LoganBerry phone repair service is unable to open due to 1 or more missing text files\n")

    #Terminating the program
    exitSequence()

#Putting files into lists
for lines in keyWordFile:
    keyWordFileList.append(lines.strip())
for lines in solutionFile:
    solutionFileList.append(lines)

#Starting main loop
while True:

    #Accepting problem
    userInputCaseSensitive = input("USER: ")
    #Converting answer to lower case
    userInput = userInputCaseSensitive.lower()

    #Repeating answer check 10 times
    for repeats in range(10):

        #Split up the keywords
        for values in keyWordFileList[repeats].split(","):

            #Displaying solution if keyword is found
            if values in userInput:
                print(solutionFileList[repeats], "\n")

                #Checking if user has fixed phone or not
                print("Is your problem resolved?\n")
                #Accepting answer
                userInputCaseSensitive = input("USER: ")
                #Converting answer to lower case
                userInput = userInputCaseSensitive.lower()

                #If problem is solved
                if userInput in yesTypes:
                    #Exit message
                    print("Thank you for using our phone repair program\n")

                    #Terminating the program
                    exitSequence()

                #If problem is not solved
                elif userInput in noTypes:
                    break

                else:
                    pass

            else:
                pass

    #Repeating instructions if user's input was blank
    if userInput == "":
        print("Please tell us what is wrong with your phone\n")

    #Displaying message saying we cannot solve problem if the user's input was not blank
    else:
        print(solutionFileList[10], "\n")

pass
```

Task 3

Design (9 marks)

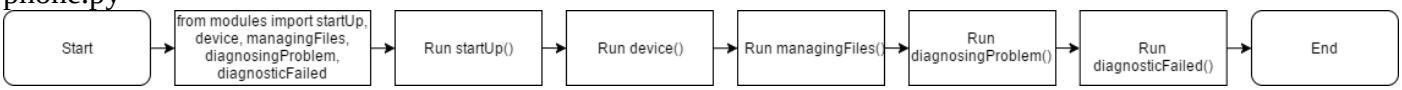
I aim to design a troubleshooting program that will identify the device and then load a custom set of solutions specific to that device. The program should also be able to scan the user's input for keywords related to a problem. Furthermore, my program will allocate the user a case number (that will theoretically be sent to a technician) if a solution cannot be found to the phone's problem. In addition to this, I plan to make the program modular, to improve program upgradability and stability, and have two outputs for the user to improve user accessibility. These outputs will be text displayed on the screen and audio.

Success Criteria

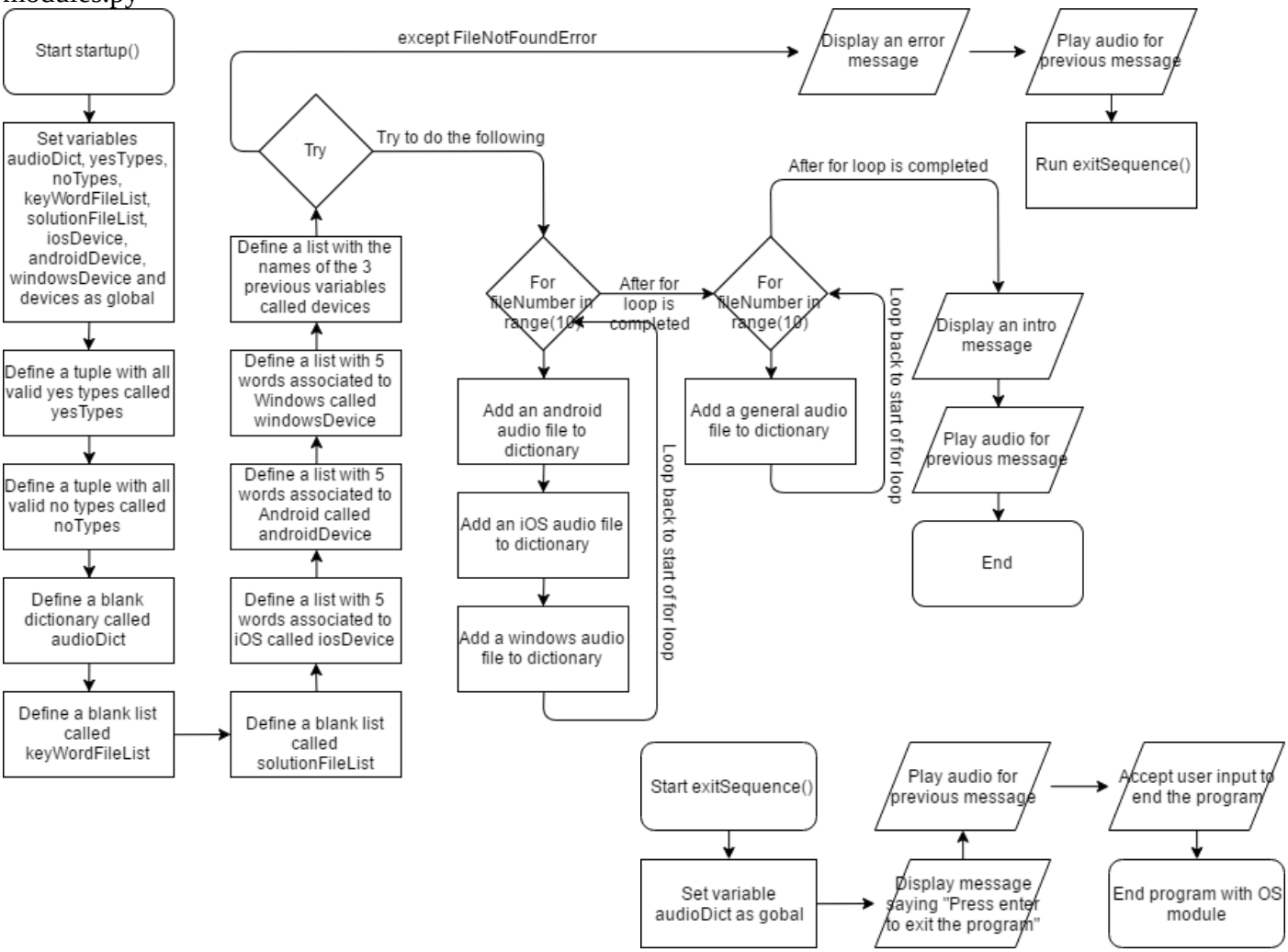
- The system should introduce the program.
- The system should find out the user's device.
- The system should load a set of solutions relevant to the user's device.
- The system should scan the input and correctly identify keywords.
- The system should correctly link certain keywords to certain problems and provide a solution for the relevant problem.
- The system should allocate the user a case number if a solution has not been found.
- The system should allow the user to exit if the problem was resolved.
- The system should provide both audio and visual outputs.
- The system should be modular.

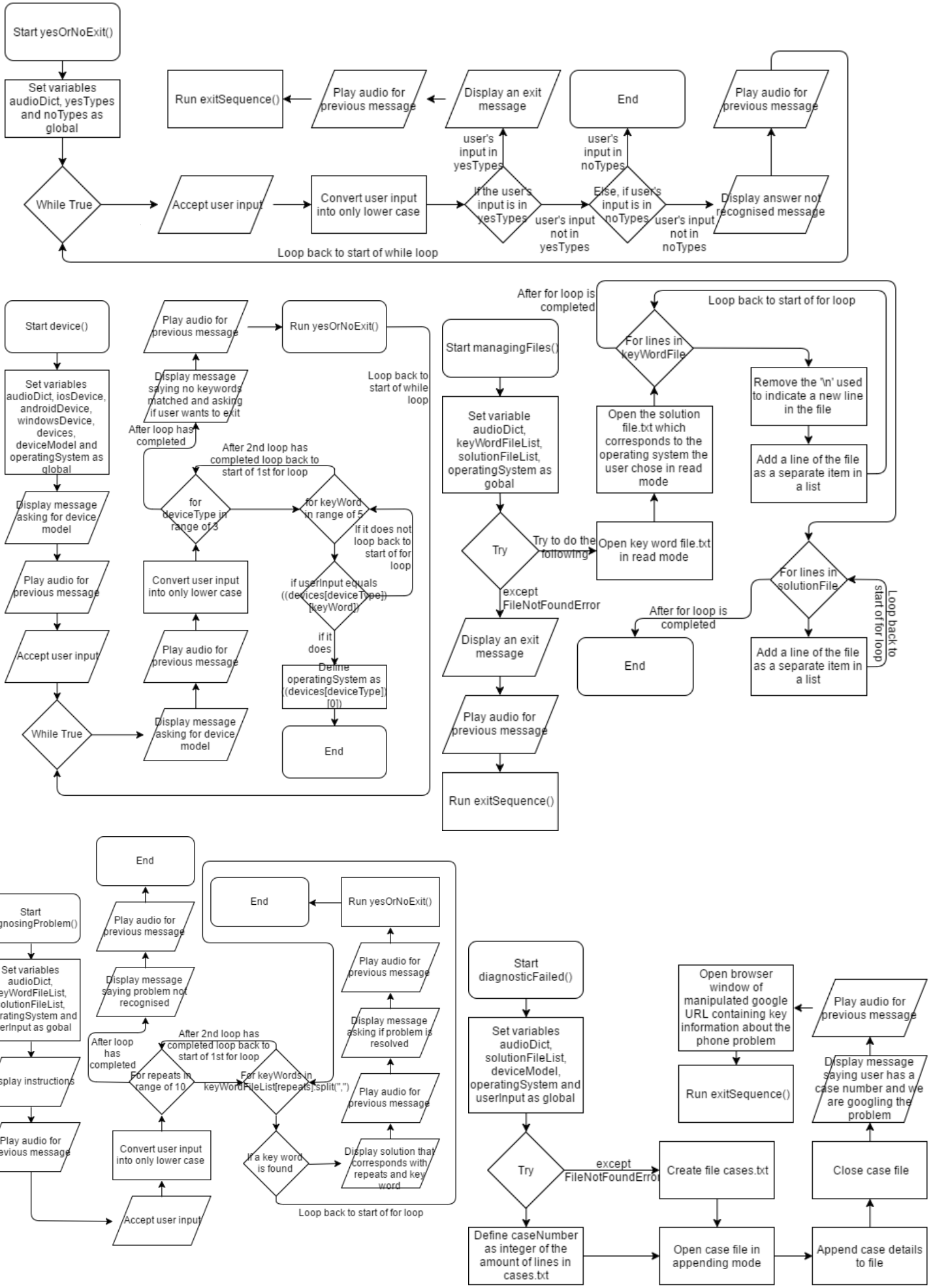
Flow Chart

phone.py



modules.py




Start yesOrNoExit()
Set variables audioDict, yesTypes and noTypes as global
While True
Accept user input
Convert user input into only lower case
If the user's input is in yesTypes
user's input not in yesTypes
Else, if user's input is in noTypes
user's input not in noTypes
Display answer not recognised message
Play audio for previous message
Loop back to start of while loop
user's input in yesTypes
Display an exit message
Play audio for previous message
Run exitSequence()
user's input in noTypes
End
Start device()
Set variables audioDict, iosDevice, androidDevice, windowsDevice, devices, deviceModel and operatingSystem as global
Display message asking for device model
Play audio for previous message
Accept user input
While True
Display message asking for device model
Play audio for previous message
Convert user input into only lower case
for deviceType in range of 3
After loop has completed
Display message saying no keywords matched and asking if user wants to exit
Play audio for previous message
Run yesOrNoExit()
Loop back to start of while loop
After 2nd loop has completed loop back to start of 1st for loop
for keyWord in range of 5
If it does not loop back to start of for loop
if userInput equals ((devices[deviceType])[keyWord])
if it does
Define operatingSystem as (devices[deviceType])[0])
End
Start managingFiles()
Set variable audioDict, keyWordFileList, solutionFileList, operatingSystem as gobal
Try
Try to do the following
except FileNotFoundError
Display an exit message
Play audio for previous message
Run exitSequence()
Open key word file.txt in read mode
Open the solution file.txt which corresponds to the operating system the user chose in read mode
For lines in keyWordFile
After for loop is completed
End
Remove the '\n' used to indicate a new line in the file
Add a line of the file as a separate item in a list
Loop back to start of for loop
For lines in solutionFile
After for loop is completed
Add a line of the file as a separate item in a list
Loop back to start of for loop
Start diagnosingProblem()
Set variables audioDict, keyWordFileList, solutionFileList, operatingSystem and userInput as gobal
Display instructions
Play audio for previous message
Accept user input
Convert user input into only lower case
For repeats in range of 10
After loop has completed
Display message saying problem not recognised
Play audio for previous message
End
After 2nd loop has completed loop back to start of 1st for loop
For keyWords in keyWordFileList[repeats].split(",")
If a key word is found
Display solution that corresponds with repeats and key word
Play audio for previous message
Display message asking if problem is resolved
Play audio for previous message
Run yesOrNoExit()
End
Loop back to start of for loop
Start diagnosticFailed()
Set variables audioDict, solutionFileList, deviceModel, operatingSystem and userInput as global
Try
except FileNotFoundError
Define caseNumber as integer of the amount of lines in cases.txt
Create file cases.txt
Open case file in appending mode
Append case details to file
Close case file
Open browser window of manipulated google URL containing key information about the phone problem
Run exitSequence()
Play audio for previous message
Display message saying user has a case number and we are googling the problem

Validation

Validation is vital in many aspects of my task 3 code. It will be used in the "*yesOrNoExit()*" function when the user confirms or denies whether they want to exit the program. Their input will only be accepted if their answer is found in a tuple containing valid yes answers or a tuple containing valid no answers. The user will have to re-enter their answer if it is not found.

Moreover, in the "device()" function the user will be asked what operating system their device is running. Their answer is required to be either in "*iosDevice*", "*androidDevice*" or "*windowsDevice*". If their input is not in any of the aforementioned lists they will be asked if they wish to exit the program.

Finally, validation will be required when the user confirms or denies whether their problem has been resolved. If their answer is not located in "yesTypes" or "noTypes" they will be required to type in their input again.

Pseudo-code

phone.py

```
#Importing code from seperate file
from modules import startUp, device, managingFiles, diagnosingProblem, diagnosticFailed
#Running key functions
call startUp()
call device()
call managingFiles()
call diagnosingProblem()
call diagnosticFailed()
```

modules.py

```
#Importing external modules
import os, webbrowser, winsound
FUNCTION startUp():
    #Setting global variables
    global audioDict, yesTypes, noTypes, keyWordFileList, solutionFileList, iosDevice, androidDevice, windowsDevice, devices
    #Defining variables
    yesTypes SET TO ("yes", "yea", "y", "yep", "aye", "true")
    noTypes SET TO ("no", "nah", "n", "nope", "false")
    audioDict SET TO {}
    keyWordFileList SET TO []
    solutionFileList SET TO []
    iosDevice SET TO ["ios", "apple","iphone", "ipad", "ipod"]
    androidDevice SET TO ["android", "samsung", "google", "nexus", "pixel"]
    windowsDevice SET TO ["windows", "microsoft", "nokia", "lumia", "zune"]
    devices SET TO [iosDevice, androidDevice, windowsDevice]
    #Trying to open audio files
    try:
        #Repeat process for each audio file
                        ENDFOR
        for fileNumber in range(10):
            #Add android audio files to dictionary
            audioDict["android{0}".format(fileNumber)] SET TO "audio/android" + str(fileNumber)
                                    ENDFOR
            #Add iOS audio files to dictionary
            audioDict["ios{0}".format(fileNumber)] SET TO "audio/ios" + str(fileNumber)
                                ENDFOR
            #Add windows audio files to dictionary
            audioDict["windows{0}".format(fileNumber)] SET TO "audio/windows" + str(fileNumber)
                                    ENDFOR
        #Repeat process for each audio file
        ENDFOR
                        ENDFOR
        for fileNumber in range(12):
            #Add generic audio files to dictionary
            audioDict["generic{0}".format(fileNumber)] SET TO "audio/generic" + str(fileNumber)
        ENDFOR
                                    ENDFOR
    #Terminating the program IF FileNotFoundError (a run time error) is found
                            ENDIF
    except FileNotFoundError:
        #Displaying exit message
        OUTPUT "ERROR: The LoganBerry phone repair service is unable to open due to 1 OR more missing files\n"
        #Playing above message
        winsound.PlaySound(audioDict.get("generic0"),winsound.SND_FILENAME)
        #Running exitSequence
        exitSequence()
    #Displaying intro message
    OUTPUT "Hello AND welcome to LoganBerry phone repair services, please note we only support devices running iOS, Android or Windows\n"
    #Playing above message
    winsound.PlaySound(audioDict.get("generic1"),winsound.SND_FILENAME)
ENDFUNCTION

FUNCTION exitSequence():
    #Setting global variables
    global audioDict
    #Allowing user to choose to exit
    OUTPUT "Press enter to exit the program\n"
    #Playing above message
    winsound.PlaySound(audioDict.get("generic2"),winsound.SND_FILENAME)
    enterToExit SET TO input()
    #Exiting program
    os._exit(0)
ENDFUNCTION
```

```
FUNCTION yesOrNoExit():
    #Setting global variables
    global audioDict, yesTypes, noTypes
    #Starting yes OR no loop
    while True:
        #Accepting answer
        userInputCaseSensitive SET TO input("USER: ")
        #Converting answer to lower case
        userInput SET TO userInputCaseSensitive.lower()
        #If the user wants to exit
        IF userInput in yesTypes:
            #Displaying exit message
            OUTPUT "Thank you for using our phone repair program\n"
                            ENDFOR
            #Playing above message
            winsound.PlaySound(audioDict.get("generic3"),winsound.SND_FILENAME)
            #Running exitSequence
            exitSequence()
        #Else, IF the user wants to try again
                ENDIF
        ELSEIF userInput in noTypes:
            #Exiting function
            RETURN
        #Else yes OR no answer not recognised
        ELSE:
            OUTPUT "Answer not recognised, please answer either yes OR no\n"
            #Playing above message
            winsound.PlaySound(audioDict.get("generic4"),winsound.SND_FILENAME)
        ENDIF
ENDFUNCTION

    ENDWHILE
FUNCTION device():
    #Setting global variables
    global audioDict, iosDevice, androidDevice, windowsDevice, devices, deviceModel, operatingSystem
    #Asking for device model
            ENDFOR
    OUTPUT "Please tell us your device name/model (e.g. 'iPhone 5C 16GB Blue')\n"
    #Playing above message
    winsound.PlaySound(audioDict.get("generic5"),winsound.SND_FILENAME)
    #Accepting answer AND storing answer under variable, deviceModel
    deviceModel SET TO input("DEVICE NAME/MODEL: ")
    #Starting main device loop
    while True:
        #Asking for operating system
                ENDFOR
        OUTPUT "Please tell us what operating system your phone has (either iOS, Android OR Windows)\n"
        #Playing above message
        winsound.PlaySound(audioDict.get("generic6"),winsound.SND_FILENAME)
        #Accepting answer
        userInputCaseSensitive SET TO input("USER: ")
        #Converting answer to lower case
        userInput SET TO userInputCaseSensitive.lower()
        #Repeating process 3 times for the 3 operating systems / device types
                                ENDFOR
        for deviceType in range(3):
            #Repeating process 5 times for the 5 key words linked to each operating system / device type
                                    ENDFOR
            for keyWord in range(5):
                #If the user's input equals the list in the devices list that corresponds with the deviceType integer AND the string in the
devices[deviceType] list that corresponds with the keyWord integer
                IF userInput IS EQUAL TO ((devices[deviceType])[keyWord]):
                    #Define operatingSystem as the string that corresponds with the integer 0, which is found in the list that corresponds with
the deviceType integer in the devices list
                    operatingSystem SET TO ((devices[deviceType])[0])
                    #Exiting function
                    RETURN
                ENDIF
            ENDFOR
        #Inform user that their input did not match any keywords AND asking IF they want to exit
                                                                        ENDIF
        ENDFOR
           ENDFOR
        OUTPUT "Operating system not supported or recognised, would you like to exit the program (IF you answer no we will allow you to re-type /
re-phrase your previous answer)?\n"
                                                                                ENDIF
        #Playing above message
        winsound.PlaySound(audioDict.get("generic7"),winsound.SND_FILENAME)
        #Running yesOrNoExit
        yesOrNoExit()
ENDFUNCTION

    ENDWHILE
FUNCTION managingFiles():
    #Setting global variables
    global audioDict, keyWordFileList, solutionFileList, operatingSystem
    #Trying to open files in read mode
    try:
        keyWordFile SET TO open("key word file.txt", "r")
        #Opening solution file specific to one chosen by user
                                ENDIF
        solutionFile SET TO open(operatingSystem + " solution file.txt", "r")
    #Terminating the program IF FileNotFoundError (a run time error) is found
                            ENDIF
    except FileNotFoundError:
        #Displaying exit message
        OUTPUT "ERROR: The LoganBerry phone repair service is unable to open due to 1 OR more missing files\n"
        #Playing above message
        winsound.PlaySound(audioDict.get("generic0"),winsound.SND_FILENAME)
        #Running exitSequence
        exitSequence()
    #Putting each line of the file as a separate item into a list
    for lines in keyWordFile:
        #.strip() used to remove the '\n' used to indicate a new line
        keyWordFileList.append(lines.strip())
    #Putting each line of the file as a separate item into a list
    ENDFOR
    for lines in solutionFile:
        solutionFileList.append(lines)
ENDFUNCTION
```

```
    ENDFOR
FUNCTION diagnosingProblem():
    #Setting global variables
    global audioDict, keyWordFileList, solutionFileList, operatingSystem, userInput
    #Displaying instructions
    OUTPUT "Please tell us what is wrong with your", operatingSystem, "phone\n"
    #Playing above message
    winsound.PlaySound(audioDict.get("generic8"),winsound.SND_FILENAME)
    #Accepting problem
    userInputCaseSensitive SET TO input("USER: ")
    #Converting answer to lower case
    userInput SET TO userInputCaseSensitive.lower()
    #Repeating process 10 times for 10 problems program can diagnose
                                ENDFOR
    for repeats in range(10):
        #Repeating process for each key word (separated by a comma) in the keyWordFileList that corresponds with the integer repeats
                            ENDFOR
        for keyWords in keyWordFileList[repeats].split(","):
            #If a key word is found
            IF keyWords in userInput:
                #Displaying solution the corresponds with the integer repeats (AND with the key word found)
                OUTPUT solutionFileList[repeats], "\n"
                #Playing above message
                IF operatingSystem IS EQUAL TO "android":
                    winsound.PlaySound(audioDict.get("android" + str(repeats)),winsound.SND_FILENAME)
                ELSEIF operatingSystem IS EQUAL TO "ios":
                    winsound.PlaySound(audioDict.get("ios" + str(repeats)),winsound.SND_FILENAME)
                ELSEIF operatingSystem IS EQUAL TO "windows":
                    winsound.PlaySound(audioDict.get("windows" + str(repeats)),winsound.SND_FILENAME)
                #Checking IF the user has resolved the problem
                ENDIF
                            ENDIF
                OUTPUT "Is your problem resolved?\n"
                #Playing above message
                winsound.PlaySound(audioDict.get("generic9"),winsound.SND_FILENAME)
                #Running yesOrNoExit
                yesOrNoExit()
                #Exiting function
                RETURN
            ENDIF
        ENDFOR
    #Display message
    ENDFOR
    OUTPUT "Sorry, your problem was not recognised\n"
    #Playing above message
    winsound.PlaySound(audioDict.get("generic10"),winsound.SND_FILENAME)
    #Exiting function
    RETURN
ENDFUNCTION

FUNCTION diagnosticFailed():
    #Setting global variables
    global audioDict, solutionFileList, deviceModel, operatingSystem, userInput
    #Trying to assign this case the next case number in the cases.txt file
    try:
        #Defines caseNumber as integer of amount of lines in cases.txt
        caseNumber SET TO len(open("cases.txt").readlines())
    #Creating a case file (using write mode) IF FileNotFoundError (a run time error) is found
                                        ENDIF
    except FileNotFoundError:
        cases SET TO open("cases.txt", "w")
        #Closing case file so it can be used in a different mode
                                            ENDIF
        cases.close()

    #Opening case file in appending mode
    cases SET TO open("cases.txt", "a")
    #Appending case details to file
    cases.write("CASE NUMBER: " + str(caseNumber) + " = DEVICE TYPE: " + operatingSystem + " = DEVICE MODEL:" + deviceModel + " = USER'S PROBLEM:
"  + userInput + "\n")
    #Closing case file
    cases.close()
    #Telling user they have a case number AND we are googling the problem for them
                                                                ENDFOR
    OUTPUT "You have been assigned case number " + str(caseNumber) + ". A technician will be with you shortly\nWe will also show you google
results related to your problem."
    #Playing above message
    winsound.PlaySound(audioDict.get("generic11"),winsound.SND_FILENAME)
                                            ENDFOR
    webbrowser.open("https://google.com/?q=" + operatingSystem + "+" + deviceModel + "+" + userInput)
    #Running exitSequence
    exitSequence()
```

Identifying Data Types

Identifier	Type of variable	Why I used this variable type	What the variable will do	Definition
userInputCaseSensitive	String	Because the user input could consist of any combination of characters, by using a string the program will not crash if the user inputs an extreme response to the systems question.	Store the user's input.	A finite sequence of characters, which can include any characters.
deviceModel			Store the device model.	
operatingSystem		By using a string instead of assigning integers to each operating system, I can mention the operating system in outputs or file names without using if statements.	Store the user's operating system name.	
userInput		Because this variable is *userInputCaseSensitive* after it has gone through the *.lower()* method. *.lower()* only works of strings.	Store the user's input after all the letters have been converted to lower case	
enterToExit		Because this variable is used to let the user exit the program by pressing enter. If they accidently enter a character before they press enter an error will not occur as a string accepts any character.	To allow the user to press enter when they wish to exit.	
caseNumber	Integer	Apart from the case number needing to (obviously) be a number it must also be defined from the number of lines in cases.txt. The variable cannot be a float as you cannot get fractions of a line in a *.txt.*	Store the user's case number.	A number which is not a fraction but is a whole number and may or may not become negative.
keyWordFileList	List	Because there needs to be an item for each line in the relevant file and the list needs to be able to be updated for when I append each line to the list.	Store each line the relevant text file as an item in the list.	A sequence data type which contains items separated by commas, enclosed in square brackets. Each item can be a different data type. You can update the contents of the tuple (e.g. you can add items, remove items, edit items or re-order items)
solutionFileList				
iosDevice		Because there are multiple strings that are related to iOS devices.	Store strings that are related to the relevant type of device.	
androidDevice		Because there are multiple strings that are related to android devices.		
windowsDevice		Because there are multiple strings that are related to windows devices.		

devices		It is the easiest way to store all the type of devices my program supports in one variable.	Store all the types of devices my program supports as individual items.	
noTypes	Tuple	Because there needs to be multiple items which can be easily read, however, it does not need to be updated.	Store each string which the program recognises as a yes/no answer as items in the tuple.	A sequence data type which contains items separated by commas, enclosed in parentheses. Each item can be a different data type. You cannot update the contents of the tuple (e.g. you cannot add items, remove items, edit items or re-order items)
yesTypes				
keyWordFile	File object	Because it is the easiest way to read data from an external location from the python file.	Store the data the program needs to read the relevant text file.	A TextIOWrapper which allows python to randomly access to text stored externally.
solutionFile				
cases				
audioDict	Dictionary	Because it is the easiest way to associate two separate items together in one variable (e.g. '*android solution 8*' and '*audio\android8.wav*')	Store the file path to all audio files used in the program.	An unordered hash table with each key having a value assigned to it. The key is unique within the dictionary, whereas the values may or may not be.

Test Strategy

What I am testing	How I will test it	Expected outcome
That my program will allow me to select android as my operating system.	By typing "*android*" when asked what operating system I run.	The program to obtain its solutions from "*android solution file.txt*"
That my program will respond correctly when the user's input contains a keyword.	By typing in "*my sd card does not work*" when entering in my problem.	The program to detect the keyword "*frozen*" and provide a solution for if the screen if frozen.
That my program will respond correctly when the user's input does not contain any keywords.	By typing in "*Who is Incognito?*" when entering in my problem.	The program not to find a solution and allocate the user a case number, as well as Googling the issue for the user.
That my program will create a case file if one does not already exist.	By deleting "*cases.txt*" from the directory the program is in and then running the program.	The program to create cases.txt and allocate the user case number 0.
That my program will allow me to exit if the user's operating system is not supported.	By typing "*ubuntu*" when asked what operating system I run and then "*yes*" when asked if I wish to exit.	The program to ask if I wish to exit the program and after I say "*yes*", close itself.
That my program will allow me to exit once my problem is solved.	By typing in "*yes*" when the program asks me if my problem is solved.	The program to interpret the user's input as yes to the question by allowing me to exit the program.
That my program will shut down correctly when there is a missing text file.	By deleting "*key word file.txt*" from the directory the program is in and then running the program.	The program to realise a key file is missing, display a message saying it will now shut down and then close itself.

Testing: (9 marks)

What I am testing	How I will test it	Expected outcome	Actual outcome	Changes made
That my program will allow me to select android as my operating system.	By typing "*android*" when asked what operating system I run.	The program to obtain its solutions from "*android solution file.txt*"	The program said "*Please tell us what is wrong with your android phone*" and loaded "*android solution file.txt*"	None.
That my program will respond correctly when the user's input contains a keyword.	By typing in "*my sd card does not work*" when entering in my problem.	The program to detect the keyword "*sd*" and provide a solution for if the SD card is corrupt.	The program advised me to format my SD card on a PC.	None.
That my program will respond correctly when the user's input does not contain any keywords.	By typing in "*Who is Incognito?*" when entering in my problem.	The program not to find a solution and allocate the user a case number, as well as Googling the issue for the user.	The program did not recognise my problem, allocated me a case number and opened my default web browser with the problem Googled.	None.
That my program will create a case file if one does not already exist.	By deleting "*cases.txt*" from the directory the program is in and then running the program.	The program to create "*cases.txt*" and allocate the user case number 0.	An UnboundLocalError message appeared.	I added a line which defines "*caseNumber*" as 0 if "*cases.txt*" does not exist
That my program will allow me to exit if the user's operating system is not supported.	By typing "*ubuntu*" when asked what operating system I run and then "*yes*" when asked if I wish to exit.	The program to ask if I wish to exit the program and after I say "*yes*", close itself.	The program asked if I would like to exit and after I said yes it closed itself.	None.
That my program will allow me to exit once my problem is solved.	By typing in "*yes*" when the program asks me if my problem is solved.	The program to interpret the user's input as yes to the question by allowing me to exit the program.	The program closed itself.	None.
That my program will shut down correctly when there is a missing text file.	By deleting "*key word file.txt*" from the directory the program is in and then running the program.	The program to realise a key file is missing, display a message saying it will now shut down and then close itself.	After telling the program my operating system an error message was displayed and the program closed itself.	None.

Criteria Check

Criteria	How it has been met
The system should introduce the program.	With a "*print*" command.
The system should find out the user's device.	With an "*input*" command.
The system should load a set of solutions relevant to the user's device.	With "*print*" and "*input*" commands, as well as "*if*" statements and "*for*" loops to find out the user's operating system, followed by the "*open*" command to open a text file full of solutions for a specific operating system.
The system should scan the input and correctly identify keywords.	By using a "*for*" loop and "*.split()*" to separate a list of keywords and an "*if*" statement to detect any keywords.
The system should correctly link certain keywords to certain problems and provide a solution for the relevant problem.	By having an integer ("*repeats*") be linked to both the key word and the solution (which is specific to the problem).
The system should allocate the user a case number if a solution has not been found.	With the "*len*", "*open*" and "*.readlines()*" commands to set the case number as the amount of lines used in cases.txt; this prevents two or more user's having the same case number. Additionally, if no cases.txt is found a simple "*caseNumber = 0*" command is used.
The system should allow the user to exit if the problem was resolved.	By using "*if*" and "*elif*" commands, along with the OS module for specifically exiting the program.
The system should provide both audio and visual outputs.	With the "*print*" command and the winsound module.
The system should be modular.	By using multiple functions in modules.py. The user launches the program from phones.py

Full code (18 marks)

phone.py

```
#Importing code from seperate file
from modules import startUp, device, managingFiles, diagnosingProblem, diagnosticFailed

#Running key functions
startUp()
device()
managingFiles()
diagnosingProblem()
diagnosticFailed()
```

modules.py

```
#Importing external modules
import os, webbrowser, winsound

def startUp():
    #Setting global variables
    global audioDict, yesTypes, noTypes, keyWordFileList, solutionFileList, iosDevice, androidDevice, windowsDevice, devices
    #Defining variables
    yesTypes = ("yes", "yea", "y", "yep", "aye", "true")
    noTypes = ("no", "nah", "n", "nope", "false")
    audioDict = {}
    keyWordFileList = []
    solutionFileList = []
    iosDevice = ["ios", "apple","iphone", "ipad", "ipod"]
    androidDevice = ["android", "samsung", "google", "nexus", "pixel"]
    windowsDevice = ["windows", "microsoft", "nokia", "lumia", "zune"]
    devices = [iosDevice, androidDevice, windowsDevice]
    #Trying to open audio files
    try:
        #Repeat process for each audio file
        for fileNumber in range(10):
            #Add android audio files to dictionary
            audioDict["android{0}".format(fileNumber)] = "audio/android" + str(fileNumber)
            #Add iOS audio files to dictionary
            audioDict["ios{0}".format(fileNumber)] = "audio/ios" + str(fileNumber)
            #Add windows audio files to dictionary
            audioDict["windows{0}".format(fileNumber)] = "audio/windows" + str(fileNumber)
        #Repeat process for each audio file
        for fileNumber in range(12):
            #Add generic audio files to dictionary
            audioDict["generic{0}".format(fileNumber)] = "audio/generic" + str(fileNumber)
    #Terminating the program if FileNotFoundError (a run time error) is found
    except FileNotFoundError:
        #Displaying exit message
```

```
        print("ERROR: The LoganBerry phone repair service is unable to open due to 1 or more missing files\n")
        #Playing above message
        winsound.PlaySound(audioDict.get("generic0"),winsound.SND_FILENAME)
        #Running exitSequence
        exitSequence()
    #Displaying intro message
    print("Hello and welcome to LoganBerry phone repair services, please note we only support devices running iOS, Android or Windows\n")
    #Playing above message
    winsound.PlaySound(audioDict.get("generic1"),winsound.SND_FILENAME)
def exitSequence():
    #Setting global variables
    global audioDict
    #Allowing user to choose to exit
    print("Press enter to exit the program\n")
    #Playing above message
    winsound.PlaySound(audioDict.get("generic2"),winsound.SND_FILENAME)
    enterToExit = input()
    #Exiting program
    os._exit(0)
def yesOrNoExit():
    #Setting global variables
    global audioDict, yesTypes, noTypes
    #Starting yes or no loop
    while True:
        #Accepting answer
        userInputCaseSensitive = input("USER: ")
        #Converting answer to lower case
        userInput = userInputCaseSensitive.lower()
        #If the user wants to exit
        if userInput in yesTypes:
            #Displaying exit message
            print("Thank you for using our phone repair program\n")
            #Playing above message
            winsound.PlaySound(audioDict.get("generic3"),winsound.SND_FILENAME)
            #Running exitSequence
            exitSequence()
        #Else, if the user wants to try again
        elif userInput in noTypes:
            #Exiting function
            return
        #Else yes or no answer not recognised
        else:
            print("Answer not recognised, please answer either yes or no\n")
            #Playing above message
            winsound.PlaySound(audioDict.get("generic4"),winsound.SND_FILENAME)
def device():
    #Setting global variables
    global audioDict, iosDevice, androidDevice, windowsDevice, devices, deviceModel, operatingSystem
    #Asking for device model
    print("Please tell us your device name/model (e.g. 'iPhone 5C 16GB Blue')\n")
    #Playing above message
    winsound.PlaySound(audioDict.get("generic5"),winsound.SND_FILENAME)
    #Accepting answer and storing answer under variable, deviceModel
    deviceModel = input("DEVICE NAME/MODEL: ")
    #Starting main device loop
    while True:
        #Asking for operating system
        print("Please tell us what operating system your phone has (either iOS, Android or Windows)\n")
        #Playing above message
        winsound.PlaySound(audioDict.get("generic6"),winsound.SND_FILENAME)
        #Accepting answer
        userInputCaseSensitive = input("USER: ")
        #Converting answer to lower case
        userInput = userInputCaseSensitive.lower()
        #Repeating process 3 times for the 3 operating systems / device types
        for deviceType in range(3):
            #Repeating process 5 times for the 5 key words linked to each operating system / device type
            for keyWord in range(5):
                #If the user's input equals the list in the devices list that corresponds with the deviceType integer and the string in the
devices[deviceType] list that corresponds with the keyWord integer
                if userInput == ((devices[deviceType])[keyWord]):
                    #Define operatingSystem as the string that corresponds with the integer 0, which is found in the list that corresponds with
the deviceType integer in the devices list
                    operatingSystem = ((devices[deviceType])[0])
                    #Exiting function
                    return
        #Inform user that their input did not match any keywords and asking if they want to exit
        print("Operating system not supported or recognised, would you like to exit the program (if you answer no we will allow you to re-type /
re-phrase your previous answer)?\n")
        #Playing above message
        winsound.PlaySound(audioDict.get("generic7"),winsound.SND_FILENAME)
        #Running yesOrNoExit
        yesOrNoExit()
def managingFiles():
    #Setting global variables
    global audioDict, keyWordFileList, solutionFileList, operatingSystem
    #Trying to open files in read mode
    try:
        keyWordFile = open("key word file.txt", "r")
        #Opening solution file specific to one chosen by user
        solutionFile = open(operatingSystem + " solution file.txt", "r")
    #Terminating the program if FileNotFoundError (a run time error) is found
    except FileNotFoundError:
        #Displaying exit message
        print("ERROR: The LoganBerry phone repair service is unable to open due to 1 or more missing files\n")
        #Playing above message
        winsound.PlaySound(audioDict.get("generic0"),winsound.SND_FILENAME)
        #Running exitSequence
        exitSequence()
    #Putting each line of the file as a separate item into a list
    for lines in keyWordFile:
        #.strip() used to remove the '\n' used to indicate a new line
        keyWordFileList.append(lines.strip())
    #Putting each line of the file as a separate item into a list
    for lines in solutionFile:
        solutionFileList.append(lines)
def diagnosingProblem():
    #Setting global variables
    global audioDict, keyWordFileList, solutionFileList, operatingSystem, userInput
    #Displaying instructions
    print("Please tell us what is wrong with your", operatingSystem, "phone\n")
```

```
    #Playing above message
    winsound.PlaySound(audioDict.get("generic8"),winsound.SND_FILENAME)
    #Accepting problem
    userInputCaseSensitive = input("USER: ")
    #Converting answer to lower case
    userInput = userInputCaseSensitive.lower()
    #Repeating process 10 times for 10 problems program can diagnose
    for repeats in range(10):
        #Repeating process for each key word (separated by a comma) in the keyWordFileList that corresponds with the integer repeats
        for keyWords in keyWordFileList[repeats].split(","):
            #If a key word is found
            if keyWords in userInput:
                #Displaying solution the corresponds with the integer repeats (and with the key word found)
                print(solutionFileList[repeats], "\n")
                #Playing above message
                if operatingSystem == "android":
                    winsound.PlaySound(audioDict.get("android" + str(repeats)),winsound.SND_FILENAME)
                elif operatingSystem == "ios":
                    winsound.PlaySound(audioDict.get("ios" + str(repeats)),winsound.SND_FILENAME)
                elif operatingSystem == "windows":
                    winsound.PlaySound(audioDict.get("windows" + str(repeats)),winsound.SND_FILENAME)
                #Checking if the user has resolved the problem
                print("Is your problem resolved?\n")
                #Playing above message
                winsound.PlaySound(audioDict.get("generic9"),winsound.SND_FILENAME)
                #Running yesOrNoExit
                yesOrNoExit()
                #Exiting function
                return
    #Display message
    print("Sorry, your problem was not recognised\n")
    #Playing above message
    winsound.PlaySound(audioDict.get("generic10"),winsound.SND_FILENAME)
    #Exiting function
    return
def diagnosticFailed():
    #Setting global variables
    global audioDict, solutionFileList, deviceModel, operatingSystem, userInput
    #Trying to assign this case the next case number in the cases.txt file
    try:
        #Defines caseNumber as integer of amount of lines in cases.txt
        caseNumber = len(open("cases.txt").readlines())
    #Creating a case file (using write mode) if FileNotFoundError (a run time error) is found
    except FileNotFoundError:
        cases = open("cases.txt", "w")
        #Closing case file so it can be used in a different mode
        cases.close()
        #Defines caseNumber as 0
        caseNumber = 0
    #Opening case file in appending mode
    cases = open("cases.txt", "a")
    #Appending case details to file
    cases.write("CASE NUMBER: " + str(caseNumber) + " | DEVICE TYPE: " + operatingSystem + " | DEVICE MODEL:" + deviceModel + " | USER'S PROBLEM:
"  + userInput + "\n")
    #Closing case file
    cases.close()
    #Telling user they have a case number and we are googling the problem for them
    print("You have been assigned case number " + str(caseNumber) + ". A technician will be with you shortly\nWe will also show you google
results related to your problem.")
    #Playing above message
    winsound.PlaySound(audioDict.get("generic11"),winsound.SND_FILENAME)
    #Opening manipulated Google URL containing key information about phone problem
    webbrowser.open("https://google.com/?q=" + operatingSystem + "+" + deviceModel + "+" + userInput)
    #Running exitSequence
    exitSequence()
```