Assignment #1
Worth: 10% of final grade

Account Ticketing System

Milestone	Worth	Due Date	Submission Required
1	*10%*	*(Suggested Target: March 5th)*	*NO*
2	**40%**	**March 12th (23:59 EST)**	**YES**
3	*10%*	*(Suggested Target: March 15th / 16th)*	*NO*
4	**40%**	**March 19th (23:59 EST)**	**YES**

Introduction

This is the first of two assignments. Assignment #2 builds upon and extends Assignment #1. Each assignment is broken down into critical deadlines called milestones. Implementing projects using milestones will help you stay on target with respect to timelines and balancing out the workload.

By the end of assignment #2 (milestone #4), you will have created a basic ticketing system. Think of this as a tracking system for customer reported problems. When a customer has a problem they will phone or email for support. The person handling the support request will create a ticket for the request that contains the details of the problem and the customer contact information so that the customer can be notified when there is a solution. The application will be incrementally built (adding more functionality and components) with each assignment milestone.

Assignment #1 milestones 1-2 are focused on providing helper functions that will aid you the development of the overall solution in future milestones. These functions will streamline your logic and simplify the overall readability and maintainability of your program by providing you with established routines that have been thoroughly tested for reliability and eliminate unnecessary code redundancy.

Preparation

Download or clone the Assignment 1 (**A1**) from https://github.com/Seneca-144100/IPC-Project

In the directory: A1/MS1 you will find the Visual Studio project files ready to load. Open the project (**a1ms1.vcxproj**) in Visual Studio.

Note: the project will contain only one source code file which is the main tester "**a1ms1.c**".

Milestone – 1 *(Worth 10%, Target Due Date: March 5th)*

Milestone – 1 does not require a submission and does not have a specific deadline, however, you should target to have this part completed no later than **March 5th** to ensure you leave enough time to complete Milestone – 2 which must be submitted and is due **March 12th**.

Milestone-1 includes a unit tester (**a1ms1.c**). A unit tester is a program which invokes your functions, passing them known parameter values. It then compares the results returned by your functions with the correct results to determine if your functions are working correctly. The tester should be used to

confirm your solution meets the specifications for each "helper" function. The helper functions should be thoroughly tested and fail-proof (100% reliable) as they will be used throughout your assignment milestones. An optional matrix submitter tester is also at your disposal so you can receive additional confirmation that your solution meets the minimum milestone requirements.

Note: Inevitably, all these functions will be tested as part of the Milestone #2 submission

Development Suggestions

You will be developing several functions for this milestone. The unit tester in the file "***a1ms1.c***" assumes these functions have been created and, until they exist, the program will not compile.

Strategy – 1
You can comment out the lines of code in the "***a1ms1.c***" file where you have not yet created and defined the referenced function. You can locate these lines in the function definitions (after the main function) and for every test function, locate the line that calls the function you have not yet developed and simply comment the line out until you are ready to test it.

Strategy – 2
You can create "empty function shells" to satisfy the existence of the functions but give them no logic until you are ready to program them. These empty functions are often called *stubs*.

Review the specifications below and identify every function you need to develop. Create the necessary function prototypes (placed in the .h header file) and create the matching function definitions (placed in the .c source file), only with empty code blocks (don't code anything). In cases where the function MUST return a value, hardcode (temporarily until you code the function later) a return value so your application can compile.

Specifications

Milestone-1 will establish the function "helpers" we will draw from as needed throughout these two assignments. These functions will handle routines that are commonly performed (greatly reduces code redundancy) and provide assurance they accomplish what is expected without fail (must be reliable).

1. Create a module called "commonHelpers". To do this, you will need to create two files: "***commonHelpers.h***" and "***commonHelpers.c***" and add them to the Visual Studio project.

2. The **header file (.h)** will contain the function prototypes, while the **source file (.c)** will contain the function definitions (the logic and how each function works).
   - For each of these files, create a **commented section at the top** containing the following information (you may want to use what was similarly provided to you in the workshops):
     - Assignment #1 Milestone #1
     - Your full name
     - Your student ID number
     - Your Seneca email address
     - Your course section code

3. The "***commonHelpers.c***" file will require the usual **standard input output** system library as well as the new user library "***commonHelper.h***", so be sure to include these.

4. Review the "***a1ms1.c***" tester file and examine each defined tester function (after the main function). Each tester function is designed to test a specific helper function.

5. Two (2) functions are provided for you. Here are the <u>function prototypes</u> you must copy and place into the "***commonHelper.h***" header file:

```
int currentYear(void);
void clearStanadardInputBuffer(void);
```

The source code file "***commonHelper.c***" must contain the <u>function definitions</u> (copy and place the function definitions below in the "***commonHelper.c***" file):

```
// Uses the time.h library to obtain current year information
// Get the current 4-digit year from the system
int currentYear(void)
{
    time_t currentTime = time(NULL);
    return localtime(&currentTime)->tm_year + 1900;
}
```
*Note: You will need to **#include <time.h>** system library for the above function to compile.

```
// As demonstrated in the course notes:
https://ict.senecacollege.ca//~ipc144/pages/content/formi.html#buf
// Empty the standard input buffer
void clearStandardInputBuffer(void)
{
    while (getchar() != '\n')
    {
        ; // On purpose: do nothing
    }
}
```

6. Each function briefly described below will require a function <u>prototype</u> to be placed in the "***commonHelpers.h***" file, and their respective function <u>definitions</u> in the "***commonHelpers.c***" file. The function identifiers (names) are provided for you however **you are responsible for constructing the full function prototype and definitions** based on the descriptions below (there are **seven (7) functions** in total):
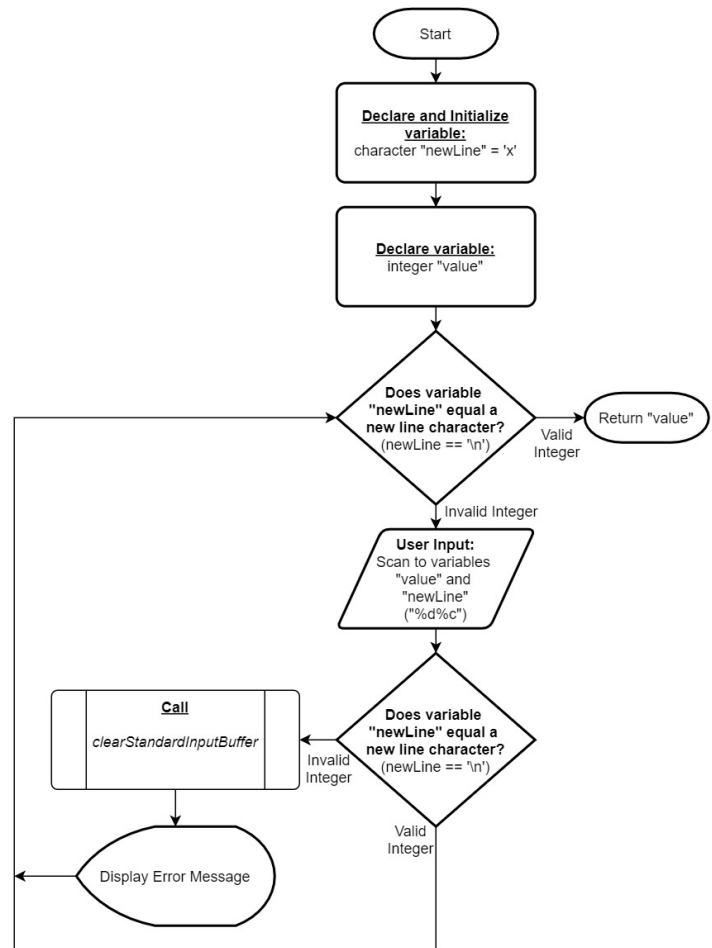
- Function: **getInteger**
  This function must:
    - return an integer value and receives no arguments.
    - get a valid integer from the keyboard.
    - display an error message if an invalid value is entered (review the sample output for the appropriate error message)
    - guarantee an integer value is entered and returned.

Hint: You can use scanf to read an integer and a character ("%d%c") in one call and then assess if the second value is a newline character. If the second character is a newline (the result of an <ENTER> key press), scanf read the first value successfully as an integer. **This technique can be used in other "get" functions you need to create for different data types!**

If the second value (character) is not a newline, the value entered was not an integer or included additional non-integer characters. If any invalid entry occurs, your function should call the *clearStandardInputBuffer* function, followed by displaying an error message and continue to prompt for a valid integer. Review the following flowchart that describes this process:

- Function: **getPositiveInteger**
  This function must:
    - return an integer value and receives no arguments.
    - perform the same operations as **getInteger** but validates the value entered is greater than 0.
    - display an error message if the value is a zero or less (review the sample output for the appropriate error message).
    - continue to prompt for a value until a value is greater than 0.
    - guarantee a positive integer value is entered and returned.

- Function: **getDouble**
  This function must:
    - return a double value and receives no arguments.
    - get a valid double value from the keyboard.
    - display an error message if an invalid value is entered (review the sample output for the appropriate error message)
    - guarantee a double value is entered and returned.
    - **Hint**: Process is the same as described in the flowchart for **getInteger** only this is for a double type

- Function: **getPositiveDouble**
  This function must:
  - return a double value and receives no arguments.
  - perform the same operations as **getDouble** but validates the value entered is greater than 0.
  - display an error message if the value is a zero or less (review the sample output for the appropriate error message).
  - continue to prompt for a value until a value is greater than 0.
  - guarantee a positive double value is entered and returned.

- Function: **getIntFromRange**
  This function must:
  - return an integer value and receives two arguments:
    - First argument represents the **lower-bound** of the permitted range.
    - Second argument represents the **upper-bound** of the permitted range.
    Note: You must provide **meaningful** parameter identifiers (names)
  - performs the same operations as **getInteger** but validates the value entered is between the two arguments received by the function (**inclusive**).
  - display an error message if the value is outside the permitted range (review the sample output for the appropriate error message).
  - continue to prompt for a value until a value is between the permitted range (inclusive)
  - guarantee an integer value is entered within the range (inclusive) and returned.

Note
You will need to review the supplemental document "**Introduction to C Strings**" (https://github.com/Seneca-144100/IPC-Project/tree/master/A1/Introduction%20to%20C%20Strings.pdf)
before attempting to do the next two functions

- Function: **getCharOption**
  This function must:
  - return a single character value and receives one argument:
    - an unmodifiable C string array representing a list of valid characters.
    Note: You must provide a **meaningful** parameter identifier (name)
  - get a single character value from the keyboard.
  - validate the entered character matches any of the characters in the received C string argument.
    Reminder: A C string will have a ***null terminator*** character marking the end of the array
  - display an error message if the entered character value is not in the list of valid characters (review the sample output for the appropriate error message)
    Note: Include in the error message the C string permitted characters
  - Continue to prompt for a single character value until a valid character is entered.
  - Guarantee a single character value is entered within the list of valid characters (as defined by the C string argument received) and returned.

- Function: **getCString**
  The purpose of this function is to obtain user input for a C string value with a length (number of characters) between the character range specified in the 2nd and 3rd arguments received (inclusive).

  This function:
  - must receive three (3) arguments and therefore needs three (3) parameters:
    - 1st parameter is a character pointer representing a C string
      Note: *Assumes the argument has been sized to accommodate at least the upper-bound limit specified in the 3rd argument received*
    - 2nd parameter represents an integral value of the **minimum** number of characters the user-entered value must be.
    - 3rd parameter represents an integral value of the **maximum** number of characters the user-entered value can be.
  - does not ***return*** a value, but <u>does</u> return a C string via the 1st argument parameter pointer.
  - must validate the entered number of characters is within the specified range. If not, display an error message (review the sample output for the appropriate error message).
    <u>Note</u>: If the 2nd and 3rd arguments are the same value, this means the C string entered must be a specific length.
  - must continue to prompt for a C string value until a valid length is entered.
  - guarantee's a C string value is entered containing the number of characters within the range specified by the 2nd and 3rd arguments (and return via the 1st argument pointer).

  [IMPORTANT]
  *You are <u>NOT</u> to use any of the **string library functions**; you must <u>manually</u> determine the entered C string length using <u>a conventional iteration construct</u>.*

A1-MS1: Sample Output

```
Assignment 1 Milestone 1
=============================================

TEST #1: Enter the word 'error' [ENTER], then the number -100: error
ERROR: Value must be an integer: -100
*** PASS ***

TEST #2: Enter the number -100 [ENTER], then the number 200: -100
ERROR: Value must be a positive integer greater than zero: 200
*** PASS ***

TEST #3: Enter the word 'error' [ENTER], then the number -4 [ENTER], then 12 [ENTER], then
-3: error
ERROR: Value must be an integer: -4
ERROR: Value must be between -3 and 11 inclusive: 12
ERROR: Value must be between -3 and 11 inclusive: -3
*** PASS ***

TEST #4: Enter the number 14: 14
```

```
*** PASS ***

TEST #5: Enter the word 'error' then, the number -150.75: error
ERROR: Value must be a double floating-point number: -150.75
*** PASS ***

TEST #6: Enter the number -22.11 [ENTER], the number 225.55: -22.11
ERROR: Value must be a positive double floating-point number: 225.55
*** PASS ***

TEST #7: Enter the character 'R' [ENTER], then 'p' [ENTER], then 'r': R
ERROR: Character must be one of [qwerty]: p
ERROR: Character must be one of [qwerty]: r
*** PASS ***

TEST #8: Enter the word 'horse' [ENTER], then 'SENECA': horse
ERROR: String length must be exactly 6 chars: SENECA
Your Result: SENECA (Answer: SENECA)

TEST #9: Enter the words 'Seneca College' [ENTER], then 'IPC': Seneca College
ERROR: String length must be no more than 6 chars: IPC
Your Result: IPC (Answer: IPC)

TEST #10: Enter the words 'ipc' [ENTER], then 'SCHOOL': ipc
ERROR: String length must be between 4 and 6 chars: SCHOOL
Your Result: SCHOOL (Answer: SCHOOL)

Assignment #1 Milestone #1 completed!
```

Milestone – 1 Submission

1. ***This is a <u>test submission</u> for verifying your work only*** – no files will be submitted to your instructor – this will test your functions and confirm the outputs match to the expected output.
2. Upload (file transfer) your all header and source files:
   - **commonHelpers.h**
   - **commonHelpers.c**
   - **a1ms1.c**
3. Login to matrix in an SSH terminal and change directory to where you placed your source code.
4. Manually compile and run your program to make sure everything works properly:

   gcc -Wall a1ms1.c commonHelpers.c -o ms1 *<ENTER>*

   If there are no error/warnings are generated, execute it: ***ms1*** *<ENTER>*

5. Run the submission command below (replace **profname.proflastname** with <u>**your professors**</u> Seneca userid and replace **NAA** with your section):

   ~profName.proflastname/submit 144a1ms1/NAA_ms1 *<ENTER>*

6. Follow the on-screen submission instructions.

Milestone – 2 *(Worth 20%, Due Date: March 12th)*

In Milestone – 2, will expand on what was done from Milestone – 1. You will need to <u>copy</u> the header and source code files for the "**commonHelpers**" module to the Milestone – 2 directory and include them in the Milestone – 2 Visual Studio project.

You will begin this milestone by creating some new data types in an "***account.h***" header file, and the main function creates variable instances of those new types. You will prompt for user input and store the entered values to the appropriate variable members. It is expected you will call functions from the common helper library where appropriate. After data has been entered and stored, you will display the information back to the user in a tabular format (review the sample output section).

Specifications

1. In the "***account.h***" header file, you will create three (3) new data types that will be used to represent an account and related customer demographic and login information. These new data types will be defined in the module "account" and will require you to create another header file called "***account.h***" (add this new file to the Visual Studio project). We will NOT be creating a source code file for this module yet (this will be done in a later milestone). Create the following new structures:

    <u>"Demographic"</u>
    *   This structure has **three (3) members**. You must provide the appropriate data type and meaningful identifiers/names for each described member:
        *   An integer type that represents the birth year of a customer.
        *   A double floating-point type that represents the household income.
        *   A C string that represents the country the customer resides and should be able to store up to thirty (30) displayable characters.

    <u>"UserLogin"</u>
    *   This structure has **three (3) members**. You must provide the appropriate data type and meaningful identifiers/names for each described member:
        *   A C string that represents the name of the customer account holder and is what will be displayed when they are logged into the system and should be able to store up to thirty (30) displayable characters.
        *   A C string that represents the user login name and should be able to store up to ten (10) displayable characters.
        *   A C string that represents the password for the user and should be able to store up to eight (8) displayable characters.

    <u>"Account"</u>
    *   This structure has **two (2) members**. You must provide the appropriate data type and meaningful identifiers/names for each described member:
        *   An integer type that represents the account number associated to a customer.
        *   A single character type that represents the account type (for example, an 'A' would represent a customer service agent, and a 'C' would represent a customer).

2. In the "***a1ms2.c***" source code file, you will find three variables declared ("**account**", "**login**", and "**demographic**") which are instances of the new types you created in the "***account.h***" header file. You

need to provide the necessary code that will assign user input to each of the variable members. Use the example output and the source code comments to help guide you in accomplishing this task.

Reminder
You should be utilizing the common helper functions you created in Milestone – 1 as much as possible where appropriate to help you do this task!

3. The last task you need to do, is complete the "***displayAccount***" function definition located after the main function. The formatted table header is provided for you. To help you format the data values to properly align with the header, you can use the following format specifiers in your printf statement for the respective fields:

Column Name	Format Specifier
Acct#	%05d
Acct.Type	%-9s
Birth	%5d
Income	$%10.2lf
Country	%-10s
Disp.Name	%-15s
Login	%-10s
Password	%8s

You will need to reference the appropriate arguments received by this function and their respective members to provide your printf function with the required data.

A1-MS2: Sample Output

```
Assignment 1 Milestone 2
=============================================

TEST #1: Enter the word 'error' [ENTER], then the number -100: error
ERROR: Value must be an integer: -100
*** PASS ***


TEST #2: Enter the number -100 [ENTER], then the number 200: -100
ERROR: Value must be a positive integer greater than zero: 200
*** PASS ***


TEST #3: Enter the number -4 [ENTER], then 12 [ENTER], then -3: -4
ERROR: Value must be between -3 and 11 inclusive: 12
ERROR: Value must be between -3 and 11 inclusive: -3
*** PASS ***


TEST #4: Enter the word 'error' then, the number -150.75: error
ERROR: Value must be a double floating-point number: -150.75
*** PASS ***


TEST #5: Enter the number -22.11 [ENTER], the number 225.55: -22.11
ERROR: Value must be a positive double floating-point number: 225.55
*** PASS ***
```

```
TEST #6: Enter the word 'error' then, the number 11: error
ERROR: Value must be an integer: 11
*** PASS ***

TEST #7: Enter the character 'R' [ENTER], then 'p' [ENTER], then 'r': R
ERROR: Character must be one of [qwerty]: p
ERROR: Character must be one of [qwerty]: r
*** PASS ***

TEST #8: Enter the word 'horse' [ENTER], then 'SENECA': horse
ERROR: String length must be exactly 6 chars: SENECA
Your Result: SENECA (Answer: SENECA)

TEST #9: Enter the words 'Seneca College' [ENTER], then 'IPC': Seneca College
ERROR: String length must be no more than 6 chars: IPC
Your Result: IPC (Answer: IPC)

TEST #10: Enter the words 'ipc' [ENTER], then 'SCHOOL': ipc
ERROR: String length must be between 4 and 6 chars: SCHOOL
Your Result: SCHOOL (Answer: SCHOOL)

Account Data Input
-----------------------------------------
Enter the account number: 50001 Account
ERROR: Value must be an integer: 50001
Enter the account type (A=Agent | C=Customer): Agent
ERROR: Character must be one of [AC]: a
ERROR: Character must be one of [AC]: c
ERROR: Character must be one of [AC]: C

User Login Data Input
-----------------------------------------
Enter user login (10 chars max): Williamson Willie
ERROR: String length must be no more than 10 chars: Williamson
Enter the display name (30 chars max): Seneca Student
Enter the password (must be 8 chars in length): jump
ERROR: String length must be exactly 8 chars: jumping
ERROR: String length must be exactly 8 chars: seventeen
ERROR: String length must be exactly 8 chars: seneca21

Demographic Data Input
-----------------------------------------
Enter birth year (current age must be between 18 and 110): 2004
ERROR: Value must be between 1911 and 2003 inclusive: 1910
ERROR: Value must be between 1911 and 2003 inclusive: 1988
Enter the household Income: $1 million 5 hundred
ERROR: Value must be a double floating-point number: -500.25
ERROR: Value must be a positive double floating-point number: 0.0
ERROR: Value must be a positive double floating-point number: 188222.75
Enter the country (30 chars max.): CANADA

Acct# Acct.Type Birth Income       Country    Disp.Name       Login      Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
50001 CUSTOMER   1988 $ 188222.75 CANADA      Seneca Student  Williamson seneca21

Assignment #1 Milestone #2 completed!
```

Reflection (Worth 20%, Due Date: March 12th)

Instructions

- Create a text file named "**reflect.txt**" and record your answers to the below questions in this file.
- Answer each question in sentence/paragraph form unless otherwise instructed.
- A minimum **300** overall word count is required (does NOT include the question).
- Whenever possible, be sure to substantiate your answers with a brief example to demonstrate your view(s).

1. From the helper functions library, what function was the most challenging to define and clearly describe the challenge(s) including how you managed to overcome them in the context of the methods used in preparing your logic, debugging, and testing.

2. Describe how the "helper functions" library contributes toward making the code easier to read and include in your analysis why the library will make your code easier to maintain.

3. Comment on why the C programming language provides a programmer the ability to create new data types (struct) and what advantages does this have? Are there limitations in the construction of a new data type – if so, what specifically?

Reflections will be graded based on the published rubric:
https://github.com/Seneca-144100/IPC-Project/tree/master/Reflection%20Rubric.pdf

Milestone – 2 Submission

1. Upload (file transfer) your all header and source files including your reflection:
   commonHelpers.h   commonHelpers.c   account.h   a1ms2.c   reflect.txt
2. Login to matrix in an SSH terminal and change directory to where you placed your source code.
3. Manually compile and run your program to make sure everything works properly:
   ```
   gcc -Wall a1ms2.c commonHelpers.c -o ms2 <ENTER>
   ```
   If there are no error/warnings are generated, execute it: **ms2** *<ENTER>*

4. Run the submission command below (replace **profname.proflastname** with **your professors** Seneca userid and replace **NAA** with your section):
   ```
   ~profName.proflastname/submit 144a1ms2/NAA_ms2 <ENTER>
   ```
5. Follow the on-screen submission instructions.

Milestone – 3 *(Worth 10%, Target Due Date: March 15/16th)*

In Milestone – 3, the "***account***" module will be refined and expanded on to include **three (3)** functions which will handle user input for account related data. A new "***accountTicketingUI***" (user interface) module will be introduced starting with **four (4)** functions that will be responsible for displaying account records in a tabular format.

Special Instructions Regarding Header Files (.h)

User library header files (such as the "account.h" file) are commonly "included" in many other source files within the same project. This often will cause build errors due to the duplication of the contents injected by including header files. To prevent these compile-time errors, we need to "***safeguard***" the header file. This is a technique used to instruct the compiler to use only one instance of the header contents even when it is referenced more than once in the project by several other files. This is an advanced topic not covered in this course and will be discussed in more depth in the next level course C++ (OOP244/BTP200). However, to successfully build and compile your project, you will need to apply this safeguarding technique to all the (.h) headers files. This will require three (3) extra lines of code to be applied in each header file.

Example <u>safeguard</u> applied to the "***account.h***" header file:

```
//
// Your identification information commented header goes here...
//

#ifndef ACCOUNT_H_
#define ACCOUNT_H_

// Header file contents goes here...

#endif // !ACCOUNT_H_
```

Safeguard
Unique Name: ACCOUNT_H_

Apply the same technique to all (.h) header files in your project (and any new ones you need to create going forward). It is **IMPORTANT** that you use a **unique name** reflecting the module name (usually derived from the filename) followed by "**_H_**". For example, to apply the safeguard to the "***commonHelpers.h***" file, you would do the following:

```
//
// Your identification information commented header goes here...
//

#ifndef COMMON_HELPERS_H_
#define COMMON_HELPERS_H_

// Header file contents goes here...

#endif // !COMMON_HELPERS_H_
```

Specifications

1. In the "***account.h***" header file, you will need to modify the "***Account***" data type to include **two (2)** additional members. You must provide the appropriate data type and meaningful identifiers/names for each described member:
    -   A "**UserLogin**" used to store related details of a user login.
    -   A "**Demographic**" used to store related details of a user's demographic information.

2. Each function briefly described below will require a function prototype to be placed in the "***account.h***" file, and the respective function definitions in the "***account.c***" source file.

    Note:
    ➢ The source file "***account.c***" will need to be created and added to your project. It will also require the appropriate library inclusions to be able to use the helper functions in the "***commonHelpers.h***" file and be able to define the functions prototyped in the "***account.h***" file. Remember to include your commented header that includes your identification information.
    ➢ When coding the function definitions, it is expected you will call functions from the **common helper library where appropriate**.

-   Function: **getAccount**
    -   Receives a modifiable ***Account*** pointer argument.
    -   Does not ***return*** anything but <u>does</u> return data for an ***Account*** type via the argument pointer variable.

    Functionality
    -   Displays a title: "*Account Data: New Record*" and is underlined using 40 dashes (-)
    -   Prompts the user to enter the account number.
    -   Prompts the user to enter the account type.
    -   The entered values should be assigned using the pointer argument received by the function.
    -   See the sample output for the prompts to be used.
    -   Hint: most of this logic and code should be coming from your work done in Milestone 2 found in the a1ms2.c main function

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-   Function: **getUserLogin**
    -   Receives a modifiable ***UserLogin*** pointer argument.
    -   Does not ***return*** anything but <u>does</u> return data for a ***UserLogin*** type via the argument pointer variable.

    Functionality
    -   Displays a title: "*User Login Data Input*" and is underlined using 40 dashes (-)
    -   Prompts the user to enter the user login ID.
    -   Prompts the user to enter the user display name.
    -   Prompts the user to enter the user login password.

- o The entered values should be assigned using the pointer argument received by the function.
- o See the sample output for the prompts to be used.
- o <u>Hint</u>: most of this logic and code should be coming from your work in Milestone 2 found in the a1ms2.c main function

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- Function: **getDemographic**
  - o Receives a modifiable ***Demographic*** pointer argument.
  - o Does not ***return*** anything but <u>does</u> return data for a ***Demographic*** type via the argument pointer variable.

  <u>Functionality</u>
  - o Displays a title: "*Demographic Data Input*" and is underlined using 40 dashes (-)
  - o Prompts the user to enter the account holder's birth year.
  - o Prompts the user to enter the household income.
  - o Prompts the user to enter the country where account holder lives.
  - o The entered values should be assigned using the pointer argument received by the function.
  - o See the sample output for the prompts to be used.
  - o <u>Hint</u>: most of this logic and code should be coming from your work in Milestone 2 found in the a1ms2.c main function

3. Create a module called "accountTicketingUI". To do this, you will need to <u>create two files</u>: "***accountTicketingUI.h***" and "***accountTicketingUI.c***" and add them to the Visual Studio project.
   - **<u>Reminder</u>**: You will need to apply a "***safeguard***" to the (.h) header file.

4. Each function briefly described below will require a function <u>prototype</u> to be placed in the "***accountTicketingUI.h***" file, and the respective function <u>definitions</u> in the " ***accountTicketingUI.c***" source file.

- Function: **displayAccountSummaryHeader**
  - o Receives no arguments.
  - o Does not return anything.

  <u>Functionality</u>
  - o Displays a formatted table header (FYI: the related function that produces the data rows under this header is: "*displayAccountSummaryRecord*" described later)
  - o This function should only display to the screen **three (3)** column headers with an underline:

```
Acct# Acct.Type Birth
----- --------- -----
```

- Function: **displayAccountDetailHeader**
  - Receives no arguments.
  - Does not return anything.

  Functionality
  - Displays a formatted table header (FYI: the related function that produces the data rows under this header is: "displayAccountDetailRecord" described later)
  - This function should only display to the screen **seven (7)** column headers with an underline:

```
Acct# Acct.Type Birth Income      Country    Disp.Name       Login      Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
```

- Function: **displayAccountSummaryRecord**
  - Receives a unmodifiable *Account* pointer argument.
  - Does not return anything.

  Functionality
  - Displays a formatted record that aligns to the respective header as defined in function "displayAccountSummaryHeader" described earlier)
  - Use the following format specifiers in your printf statement for the respective fields:

Column Name	Format Specifier
Acct#	%05d
Acct.Type	%-9s
Birth	%5d

  - You will need to reference the respective members of the Account pointer argument variable received by this function to provide your printf function with the required data.

- Function: **displayAccountDetailRecord**
  - Receives a unmodifiable *Account* pointer argument.
  - Does not return anything.

  Functionality
  - Displays a formatted record that aligns to the respective header as defined in function "displayAccountDetailHeader" described earlier)
  - Use the following format specifiers in your printf statement for the respective fields:

Column Name	Format Specifier
Acct#	%05d
Acct.Type	%-9s

Birth	%5d
Income	$%10.2lf
Country	%-10s
Disp.Name	%-15s
Login	%-10s
Password	%8s

- o   You will need to reference the respective members of the Account pointer argument variable received by this function to provide your printf function with the required data.

  NOTE
- o   The password must be partially "hidden" with asterisks (*****) used for every-other character displayed.

5. Using the comments provided in the "***a1ms3.c***" source file, call the new functions you created in this milestone where appropriate.

   Note
   - Only the insertion of the function calls is permitted.
   - No other code should be modified or added to the "a1ms3.c" source code file.
   - Some functions require an argument(s); you are limited to using the variable "***account***" already declared for you in the main function – no other variables are to be declared.

6. Review each (.h) header file and supply **brief** but meaningful and concise comments to each function prototype describing what the function does and additional usage information if required.
   - When you are satisfied with your documentation, copy the comments to each function definition in their respective (.c) source code files.

A1-MS3: Sample Output

```
Assignment 1 Milestone 3 - Tester
============================================
Account Data: New Record
----------------------------------------
Enter the account number: 50001 Account
ERROR: Value must be an integer: 50001
Enter the account type (A=Agent | C=Customer): Agent
ERROR: Character must be one of [AC]: a
ERROR: Character must be one of [AC]: c
ERROR: Character must be one of [AC]: A

User Login Data Input
----------------------------------------
Enter user login (10 chars max): Williamson Willie
ERROR: String length must be no more than 10 chars: Williamson
Enter the display name (30 chars max): Seneca Student
Enter the password (must be 8 chars in length): jump
ERROR: String length must be exactly 8 chars: jumping
ERROR: String length must be exactly 8 chars: seventeen
```

```
ERROR: String length must be exactly 8 chars: seneca21

Demographic Data Input
----------------------------------------
Enter birth year (current age must be between 18 and 110): 2004
ERROR: Value must be between 1911 and 2003 inclusive: 1910
ERROR: Value must be between 1911 and 2003 inclusive: 1988
Enter the household Income: $1 million 5 hundred
ERROR: Value must be a double floating-point number: -500.25
ERROR: Value must be a positive double floating-point number: 0.0
ERROR: Value must be a positive double floating-point number: 188222.75
Enter the country (30 chars max.): CANADA

Acct# Acct.Type Birth
----- --------- -----
50001 AGENT       1988

Acct# Acct.Type Birth Income      Country    Disp.Name       Login      Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
50001 AGENT       1988 $ 188222.75 CANADA     Seneca Student  Williamson s*n*c*2*

Account, User Login, and Demographic test completed!
```

Milestone – 3 Submission

7. ***This is a <u>test submission</u> for verifying your work only*** – no files will be submitted to your instructor – this will test your functions and confirm the outputs match to the expected output.

8. Upload (file transfer) your all header and source files:
   - **commonHelpers.h & commonHelpers.c**
   - **account.h & account.c**
   - **accountTicketingUI.h & accountTicketingUI.c**
   - **a1ms3.c**

9. Login to matrix in an SSH terminal and change directory to where you placed your source code.

10. Manually compile and run your program to make sure everything works properly:
    ```
    gcc -Wall a1ms3.c commonHelpers.c account.c accountTicketingUI.c -o
    ms3 <ENTER>
    ```
    *If there are no error/warnings are generated, execute it: **ms3** <ENTER>*

11. Run the submission command below (replace **profname.proflastname** with **your professors** Seneca userid and replace **NAA** with your section):
    ```
    ~profName.proflastname/submit 144a1ms3/NAA_ms3 <ENTER>
    ```

12. Follow the on-screen submission instructions.

Milestone – 4 *(Worth 20%, Due Date: March 19th)*

This module will conclude Assignment 1! In Milestone-4, you will be adding more functionality to the "***account***" module that will support the updating of data whereby the user can select a specific field member to change for each of the user-defined data types (***Account***, ***UserLogin***, ***Demographic***).

You will expand the "***accountTicketingUI***" module to include a menu-driven model for navigating the application features. The application will provide an "agent" user-type a custom menu for managing customer account records.

Review the sample output section to get a feel for how the application will flow and what menu options are available.

IMPORTANT
- It is expected you will minimize code redundancy as much as possible by calling appropriate ready-to-use functions that you have already coded (including those coded for this milestone if applicable)

Note: The application will continue to be enhanced and expanded on in Assignment 2.

Specifications

1. The "**a1ms4.c**" source file should not be modified. Examine the "**a1ms4.c**" file.
   - You will notice the main function does not do much. It assigns data to an accounts array and then calls a function "***applicationStartup***" providing it with the array of accounts.
   - The ***main*** function is the entry point to the application, but you will now create an entry point to the application logic which will be the "***applicationStartup***" function to be coded in the acountTicketingUI module.

2. Each function briefly described below will require a function prototype to be placed in the "***accountTicketingUI.h***" file, and the respective function definitions in the " ***accountTicketingUI.c***" source file.

- Function: **applicationStartup**
  - Receives as an argument in **parameter 1**, a modifiable array of type ***Account***.
  - Receives as an argument in **parameter 2**, an integer specifying the maximum number of elements in the first argument's array.
  - Does not return anything.

  Functionality
  - The purpose of this function is to be the entry point to the application logic.
  - This function will be responsible for a main loop that will call a ***menuLogin*** function (see next function description for details) until the user specifies the intention to exit the system.
  - The ***menuLogin*** function will return the index number of the **account array** for the user that is logged in (or -1 if the user wishes to exit the application).

- o Using the returned index number, you should check the logged in user account type.
- o If the logged in user is an "agent", load the agent main menu by calling the function "***menuAgent***" (described later)
- o If the logged in user is a "customer", the application should display:
  `"CUSTOMER: home menu currently unavailable…"`
- o When the user wishes to exit the application, the main loop should end and then display the exit message (see example output section for message)

- • Function: **menuLogin**
  - o Receives as an argument in **parameter 1**, an unmodifiable array of type *Account*.
  - o Receives as an argument in **parameter 2**, an integer specifying the maximum number of elements in the first argument's array.
  - o Returns an integer representing the array index of the *Account* that matches the entered account number or -1 if the user wishes to exit.

  Functionality
  - o Displays a login menu:
    ```
    ==============================================
    Account Ticketing System - Login
    ==============================================
    1) Login to the system
    0) Exit application
    ----------------------------------------------

    Selection:
    ```

  - o The user must select an option number (1 or 0).
  - o Selecting "1" (to login to the system), should prompt the user for an integer account number. The accounts array should be searched for a match on the entered account number.
    - ▪ If a match is found, the array index position should be returned to the caller of this function.
    - ▪ If no match is found, an error message should be displayed:
      `ERROR:  Access Denied.`
    - ▪ NOTE: The single-entry, single-exit principle must be honoured and therefore a function can have only ONE *return* statement near the end of the function.
  - o This process will repeat until either the user selects 0 signifying the user wishes to exit the application, or the entered account number matched to an account in the account array.

- • Function: **menuAgent**
  - o Receives as an argument in **parameter 1**, a modifiable array of type *Account*.
  - o Receives as an argument in **parameter 2**, an integer specifying the maximum number of elements in the first argument's array.
  - o Receives as an argument in **parameter 3**, an unmodifiable pointer to type *Account*. This argument represents the logged-in user's account details.

     o   Does not return anything.

Functionality
- Display's the agent's main menu options until the user wishes to logout.
- Display's the logged in agent's "display name" and "account number" (in parenthesis)
- Followed by the main menu options available to an "agent" account type user:

```
===============================================
Account Ticketing System - Agent Menu
===============================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
-----------------------------------------------
0) Logout

Selection:
```

- This is the main menu for an agent who has authorization to manage the accounts for the system.
- Option 1: New accounts can be added to the array.
  - Your logic should include finding an available index in the accounts array where a new Account record can be added (**the account number at that index should be zero (0) which indicates an empty record**).
  - If there are no remaining elements available for a new record (all account numbers have values > 0), then an error message should be displayed:
    `ERROR: Account listing is FULL, call ITS Support!`
  - Your logic should at some point be calling the function "***getAccount***"
- Option 2: Modification to existing accounts.
  - Your logic should prompt the user for an account number and if not found in the array of accounts, display an error (see sample output for appropriate message)
  - If the account is found, then at some point you must call the "***updateAccount***" function.
- Option 3: Removal of an account.
  - Like option 2 above, you must prompt for an account number used to lookup the specific account record and display an appropriate error message if not found.
  - If the account number entered is the **same as the logged-in user's account**, you must deny the removal (see sample output for appropriate message)
  - If the account is found and is different from the logged-in user's account, then you must obtain confirmation for the removal (see sample output for prompt message where only an uppercase "Y" or "N" is permitted)
    - If the user confirms the removal, you must set the **account number member to a zero (0) value** – no other members should be modified.
    - Based on the confirmation of removal response, display the appropriate message (see sample output for possible messages)

- Option 4: Displays a tabular view of all the accounts in a reduced "summary" format.
  - Your code should at some point call the function "***displayAllAccountSummaryRecords***"
- Option 5: Displays a tabular view of all the accounts in a "detailed" format containing more information than the summary view.
  - Your code should at some point call the function "***displayAllAccountDetailRecords***"
- Option – 0: Should exit the menu function (essentially logging out of the system) and return to the login menu (Note: You do **NOT** have to call the menuLogin function)

- Function: **findAccountIndexByAcctNum**
  - Receives an argument in **parameter 1**, an integer value representing the account number to find a match on in the account array (parameter 2)
  - Receives as an argument in **parameter 2**, an <u>unmodifiable</u> array of type ***Account***.
  - Receives as an argument in **parameter 3**, an integer specifying the maximum number of elements in the second argument's array.
  - Receives as an argument in **parameter 4**, an integer type representing a zero or non-zero value (indicates if this function should prompt the user for the account number)
  - Returns an integer representing the <u>array index</u> of the ***Account*** that matches the desired account number or -1 if the record was not found.

  <u>Functionality</u>
  - This function's purpose is to search the array received in argument 2 for a match on a desired account number.
    > **HINT**: This function can be used in many places in your application
  - If the 4th argument indicates a zero (0) value, then the 1st argument account number value should be used in the search routine, otherwise, the function will need to prompt the user for the invoice number to search on (and will NOT use the 1st argument value).
  - If prompting is required (4th argument will be a non-zero value), use the following prompt message:
  ```
  Enter the account#:
  ```
    - Use the entered account number value in the search routine.
  - The function should return either -1 (no record match found) or the index position where the matched record was found within the argument 2 array.

- Function: **displayAllAccountSummaryRecords**
  - Receives as an argument in **parameter 1**, an <u>unmodifiable</u> array of type ***Account***.
  - Receives as an argument in **parameter 2**, an integer specifying the maximum number of elements in the first argument's array.
  - Does not return anything.

  <u>Functionality</u>
  - This function displays a <u>summary</u> view of **all** the **valid** account records (where the account number is greater than zero (0)
  - The appropriate tabular header should be displayed (call the appropriate function)

- o The corresponding summary record should be displayed (call the appropriate function) as many times as required to show all the valid records.

- • Function: **displayAllAccountDetailRecords**
  - o Receives as an argument in **parameter 1**, an <u>unmodifiable</u> array of type *Account*.
  - o Receives as an argument in **parameter 2**, an integer specifying the maximum number of elements in the first argument's array.
  - o Does not return anything.

  <u>Functionality</u>
  - o This function displays a <u>detailed</u> view of **all** the **valid** account records (where the account number is greater than zero (0)
  - o The appropriate tabular header should be displayed (call the appropriate function)
  - o The corresponding record detail should be displayed (call the appropriate function) as many times as required to show all the valid records.

- • Function: **pauseExecution (Provided for you – see below)**
  - o This function is provided for you (the logic and a sample of this is already made available to you in the course notes)
  - o Often, we want to be able to "pause" the application and await the user's confirmation to continue by pressing the "enter" key. Be sure to call this function where appropriate (see sample output for where this needs to be implemented)

  <u>Function Prototype</u>
  ```
  // Pause execution until user enters the enter key
  void pauseExecution(void)
  ```

  <u>Function Definition</u>
  ```
  // Pause execution until user enters the enter key
  void pauseExecution(void)
  {
      printf("<< ENTER key to Continue... >>");
      clearStandardInputBuffer();
      putchar('\n');
  }
  ```

3. Each function briefly described below will require a function <u>prototype</u> to be placed in the "***account.h***" file, and the respective function <u>definitions</u> in the "***account.c***" source file.

- • Function: **updateAccount**
  - o Receives a modifiable ***Account*** pointer argument.
  - o Does not ***return*** anything but <u>does</u> return data for an ***Account*** type via the argument pointer variable.

  <u>Functionality</u>
  - o Display's the update menu options for the account until the user wishes to exit.

- o Display's a menu header title that **includes the account number** being modified (with 40 dashed characters on the next line). Example:

```
Account: 00001 - Update Options
----------------------------------------
```

- o Followed by a menu with options to modifying specific members of an ***Account***:

```
1) Update account type (current value: ?)
2) Login
3) Demographics
0) Done
Selection:
```

  - ▪ The highlighted green ? should be replaced with the current value for the ***account type*** member (single character **C** or **A**)
  - ▪ <u>Note</u>: The account number member is not modifiable and therefore is not an option in this menu

- o <u>Option – 1</u>: Prompt the user for the modified value and assign the entered value to the account accordingly (see sample output for prompt message and valid values)
- o <u>Option – 2</u>: Should call at some point the function "***updateUserLogin***"
- o <u>Option – 3</u>: Should call at some point the function "***updateDemographic***"
- o <u>Option – 0</u>: Should exit the function and return to the caller (the agent menu; <u>Note</u>: You do **NOT** have to call the menuAgent function)

- • Function: **updateUserLogin**
  - o Receives a modifiable ***UserLogin*** pointer argument.
  - o Does not ***return*** anything but <u>does</u> return data for an ***UserLogin*** type via the argument pointer variable.

<u>Functionality</u>
  - o Display's the update menu options for the user login until the user wishes to exit.
  - o Display's a menu header title that **includes the login ID** being modified (with 40 dashed characters on the next line). Example:

```
User Login: Williamson - Update Options
----------------------------------------
```

  - o Followed by a menu with options to modifying specific members of a ***UserLogin***:

```
1) Display name (current value: ?)
2) Password
0) Done
Selection:
```

    - ▪ The highlighted green ? should be replaced with the current value for the ***display name*** member
    - ▪ <u>Note</u>: The login ID member is not modifiable and therefore is not an option in this menu

  - o <u>Option – 1</u>: Prompt the user for the modified value and assign the entered value to the appropriate ***UserLogin*** member accordingly (see sample output for prompt message)
  - o <u>Option – 2</u>: Prompt the user for the modified value and assign the entered value to the appropriate ***UserLogin*** member accordingly (see sample output for prompt

- Option – 0: Should exit the function and return to the caller (the update account menu; Note: You do **NOT** have to call the updateAccount function)

- Function: **updateDemographic**
    - Receives a modifiable *Demographic* pointer argument.
    - Does not *return* anything but <u>does</u> return data for a *Demographic* type via the argument pointer variable.

  <u>Functionality</u>
    - Display's a menu header title followed by 40 dashed characters on the next line, followed by a menu with options to modifying specific members of a *Demographic*:

    ```
    Demographic Update Options
    ----------------------------------------
    1) Household Income (current value: $?)
    2) Country (current value: ?)
    0) Done
    Selection:
    ```

        - The highlighted green ? should be replaced with the current value for the respective members
        - Note: The account holders birth year member is not modifiable and therefore is not an option in this menu

    - Option – 1: Prompt the user for the modified value and assign the entered value to the appropriate *Demographic* member accordingly (see sample output for prompt message)
    - Option – 2: Prompt the user for the modified value and assign the entered value to the appropriate *Demographic* member accordingly (see sample output for prompt
    - Option – 0: Should exit the function and return to the caller (the update account menu; Note: You do **NOT** have to call the updateAccount function)

A1-MS4: Sample Output

```
===============================================
Account Ticketing System - Login
===============================================
1) Login to the system
0) Exit application
-----------------------------------------------

Selection: 2
ERROR: Value must be between 0 and 1 inclusive: -1
ERROR: Value must be between 0 and 1 inclusive: login
ERROR: Value must be an integer: 0

Are you sure you want to exit? ([Y]es|[N]o): no
ERROR: Character must be one of [yYnN]: n


===============================================
```

```
Account Ticketing System - Login
==============================================
1) Login to the system
0) Exit application
-------------------------------------------------

Selection: 1

Enter your account#: 12345

ERROR:  Access Denied.

<< ENTER key to Continue... >> [ENTER]


==============================================
Account Ticketing System - Login
==============================================
1) Login to the system
0) Exit application
-------------------------------------------------

Selection: 1

Enter your account#: 50001

CUSTOMER: home menu currently unavailable...

<< ENTER key to Continue... >> [ENTER]


==============================================
Account Ticketing System - Login
==============================================
1) Login to the system
0) Exit application
-------------------------------------------------

Selection: 1

Enter your account#: 50008

AGENT: Will Smith (50008)
==============================================
Account Ticketing System - Agent Menu
==============================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
-------------------------------------------------
0) Logout

Selection: 1
```

```
Account Data: New Record
-------------------------------------------
Enter the account number: 91111

Enter the account type (A=Agent | C=Customer): Agent
ERROR: Character must be one of [AC]: a
ERROR: Character must be one of [AC]: c
ERROR: Character must be one of [AC]: C

User Login Data Input
-------------------------------------------
Enter user login (10 chars max): Williamson Willie
ERROR: String length must be no more than 10 chars: Williamson
Enter the display name (30 chars max): Tesla Tommy
Enter the password (must be 8 chars in length): jump
ERROR: String length must be exactly 8 chars: jumping
ERROR: String length must be exactly 8 chars: seventeen million
ERROR: String length must be exactly 8 chars: automall

Demographic Data Input
-------------------------------------------
Enter birth year (current age must be between 18 and 110): 2004
ERROR: Value must be between 1911 and 2003 inclusive: 1910
ERROR: Value must be between 1911 and 2003 inclusive: 2003
Enter the household Income: $0.00
ERROR: Value must be a positive double floating-point number: 1.99
Enter the country (30 chars max.): FINLAND

*** New account added! ***

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
===============================================
Account Ticketing System - Agent Menu
===============================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
-----------------------------------------------
0) Logout

Selection: 4

Acct# Acct.Type Birth
----- --------- -----
50001 CUSTOMER   1990
50028 AGENT      1972
50004 CUSTOMER   1978
50008 AGENT      1952
```

```
50020 CUSTOMER    2000
91111 CUSTOMER    2003


<< ENTER key to Continue... >> [ENTER]


AGENT: Will Smith (50008)
================================================
Account Ticketing System - Agent Menu
================================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
------------------------------------------------
0) Logout


Selection: 5

Acct# Acct.Type Birth Income      Country     Disp.Name       Login      Password
----- --------- ----- ---------- ---------- --------------- ---------- --------
50001 CUSTOMER   1990 $ 150000.10 CANADA      Silly Sally     cust1      p*s*w*r*
50028 AGENT      1972 $2250400.22 AFRICA      Fred Flintstone agent1     y*b*d*b*
50004 CUSTOMER   1978 $ 250800.74 INDIA       Betty Boop      cust2      p*p*e*3*
50008 AGENT      1952 $2350600.82 U.S.A.      Will Smith      agentJ     t*e*o*s*
50020 CUSTOMER   2000 $ 350500.35 KOREA       Shrimpy Shrimp  cust3      j*m*y*i*
91111 CUSTOMER   2003 $       1.99 FINLAND     Tesla Tommy     Williamson a*t*m*l*


<< ENTER key to Continue... >> [ENTER]


AGENT: Will Smith (50008)
================================================
Account Ticketing System - Agent Menu
================================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
------------------------------------------------
0) Logout


Selection: 2


Enter the account#: 91111


Account: 91111 - Update Options
-------------------------------------------
1) Update account type (current value: C)
2) Login
3) Demographics
0) Done
Selection: 1
```

```
Enter the account type (A=Agent | C=Customer): A

Account: 91111 - Update Options
-----------------------------------------
1) Update account type (current value: A)
2) Login
3) Demographics
0) Done
Selection: 2

User Login: Williamson - Update Options
-----------------------------------------
1) Display name (current value: Tesla Tommy)
2) Password
0) Done
Selection: 1

Enter the display name (30 chars max): James Bond

User Login: Williamson - Update Options
-----------------------------------------
1) Display name (current value: James Bond)
2) Password
0) Done
Selection: 2

Enter the password (must be 8 chars in length): spygames

User Login: Williamson - Update Options
-----------------------------------------
1) Display name (current value: James Bond)
2) Password
0) Done
Selection: 0

Account: 91111 - Update Options
-----------------------------------------
1) Update account type (current value: A)
2) Login
3) Demographics
0) Done
Selection: 3

Demographic Update Options
-----------------------------------------
1) Household Income (current value: $1.99)
2) Country (current value: FINLAND)
0) Done
Selection: 1

Enter the household Income: $2123456.75
```

```
Demographic Update Options
-------------------------------------------
1) Household Income (current value: $2123456.75)
2) Country (current value: FINLAND)
0) Done
Selection: 2

Enter the country (30 chars max.): IRELAND

Demographic Update Options
-------------------------------------------
1) Household Income (current value: $2123456.75)
2) Country (current value: IRELAND)
0) Done
Selection: 0

Account: 91111 - Update Options
-------------------------------------------
1) Update account type (current value: A)
2) Login
3) Demographics
0) Done
Selection: 4
ERROR: Value must be between 0 and 3 inclusive: 0

AGENT: Will Smith (50008)
===============================================
Account Ticketing System - Agent Menu
===============================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
-----------------------------------------------
0) Logout

Selection: 5

Acct# Acct.Type Birth Income       Country    Disp.Name       Login      Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
50001 CUSTOMER  1990  $ 150000.10 CANADA     Silly Sally     cust1      p*s*w*r*
50028 AGENT     1972  $2250400.22 AFRICA     Fred Flintstone agent1     y*b*d*b*
50004 CUSTOMER  1978  $ 250800.74 INDIA      Betty Boop      cust2      p*p*e*3*
50008 AGENT     1952  $2350600.82 U.S.A.     Will Smith      agentJ     t*e*o*s*
50020 CUSTOMER  2000  $ 350500.35 KOREA      Shrimpy Shrimp  cust3      j*m*y*i*
91111 AGENT     2003  $2123456.75 IRELAND    James Bond      Williamson s*y*a*e*

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
===============================================
Account Ticketing System - Agent Menu
```

```
=================================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
-------------------------------------------------
0) Logout

Selection: 3

Enter the account#: 50008

ERROR: You can't remove your own account!

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
==============================================
Account Ticketing System - Agent Menu
==============================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
-------------------------------------------------
0) Logout

Selection: 3

Enter the account#: 50001
Acct# Acct.Type Birth Income      Country     Disp.Name       Login      Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
50001 CUSTOMER  1990 $ 150000.10 CANADA      Silly Sally     cust1      p*s*w*r*

Are you sure you want to remove this record? ([Y]es|[N]o): n
ERROR: Character must be one of [YN]: N

*** No changes made! ***

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
==============================================
Account Ticketing System - Agent Menu
==============================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
-------------------------------------------------
```

```
0) Logout

Selection: 3

Enter the account#: 50001
Acct# Acct.Type Birth Income      Country     Disp.Name        Login      Password
----- --------- ----- ----------- ---------- ---------------- ---------- --------
50001 CUSTOMER   1990 $ 150000.10 CANADA      Silly Sally      cust1      p*s*w*r*

Are you sure you want to remove this record? ([Y]es|[N]o): Y

*** Account Removed! ***

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
-------------------------------------------------
0) Logout

Selection: 4

Acct# Acct.Type Birth
----- --------- -----
50028 AGENT      1972
50004 CUSTOMER   1978
50008 AGENT      1952
50020 CUSTOMER   2000
91111 AGENT      2003

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
-------------------------------------------------
0) Logout

Selection: 5
```

```
Acct# Acct.Type Birth Income        Country    Disp.Name        Login       Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
50028 AGENT      1972 $2250400.22 AFRICA     Fred Flintstone agent1     y*b*d*b*
50004 CUSTOMER   1978 $ 250800.74 INDIA      Betty Boop       cust2      p*p*e*3*
50008 AGENT      1952 $2350600.82 U.S.A.     Will Smith       agentJ     t*e*o*s*
50020 CUSTOMER   2000 $ 350500.35 KOREA      Shrimpy Shrimp   cust3      j*m*y*i*
91111 AGENT      2003 $2123456.75 IRELAND    James Bond       Williamson s*y*a*e*


<< ENTER key to Continue... >> [ENTER]


AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
-------------------------------------------------
0) Logout

Selection: 6
ERROR: Value must be between 0 and 5 inclusive: 0


### LOGGED OUT ###


=============================================
Account Ticketing System - Login
=============================================
1) Login to the system
0) Exit application
-------------------------------------------------

Selection: 0

Are you sure you want to exit? ([Y]es|[N]o): Yes
ERROR: Character must be one of [yYnN]: no
ERROR: Character must be one of [yYnN]: y


=============================================
Account Ticketing System - Terminated
=============================================
```

Reflection (Worth 20%, Due Date: March 19th)

Academic Integrity

It is a violation of academic policy to copy content from the course notes or any other published source (including websites, work from another student, or sharing your work with others).

Failure to adhere to this policy will result in the filing of a violation report to the Academic Integrity Committee.

Instructions

- Create a text file named "**reflect.txt**" and record your answers to the below questions in this file.
- Answer each question in sentence/paragraph form unless otherwise instructed.
- A minimum **300** overall word count is required (does NOT include the question).
- Whenever possible, be sure to substantiate your answers with a brief example to demonstrate your view(s).

1. As painful and frustrating as it may be to match the expected output exactly, explain why you think you must be put through this challenge and expected to meet this minimum expectation.

2. What factors must you consider when naming a module or library? Why do you think it is a suggested best practice to identify a module/library header and source code files using the same name? Give an example to support your argument.

3. This application applies a cascading menu system framework. What does this mean and explain it using elements from this application to support your understanding of this logical concept?

Reflections will be graded based on the published rubric:
https://github.com/Seneca-144100/IPC-Project/tree/master/Reflection%20Rubric.pdf

Milestone – 4 Submission

1. Upload (file transfer) your all header and source files including your reflection:
   o **commonHelpers.h & commonHelpers.c**
   o **account.h & account.c**
   o **accountTicketingUI.h & accountTicketing.c**
   o **a1ms4.c**
   o **reflect.txt**
2. Login to matrix in an SSH terminal and change directory to where you placed your source code.
3. Manually compile and run your program to make sure everything works properly:

```
gcc -Wall a1ms4.c commonHelpers.c account.c accountTicketingUI.c -o
ms4 <ENTER>
```

If there are no error/warnings are generated, execute it: **ms4** *<ENTER>*

4. Run the submission command below (replace **profname.proflastname** with <u>**your professors**</u> Seneca userid and replace **NAA** with your section):

```
~profName.proflastname/submit 144a1ms4/NAA_ms4 <ENTER>
```

5. Follow the on-screen submission instructions.

Assignment #2

Worth: 15% of final grade

Account Ticketing System

Milestone	Worth	Due Date	Submission Required
1	*10%*	*(Suggested Target: March 23rd)*	*NO*
2	**40%**	**March 26th by 23:59 EST (end of Week 10)**	**YES**
3	*10%*	*(Suggested Target: April 2nd)*	*NO*
4	**40%**	**April 9th by 23:59 EST (end of Week 12)**	**YES**

Introduction

Assignment 2 is a continuation of Assignment 1 Milestone 4 and will complete the account ticketing system.   The ticketing component will be added among other improvements.

Additional business and data validation rules will be required to ensure a higher quality data store is maintained including security and overall application functionality.

Customers will be able to login using their credentials and have their own menu of options which include viewing their account information, creating a new ticket, viewing their active tickets, and managing their tickets.

Agents will have more features available from respective main menu options including viewing new tickets, viewing active tickets, managing tickets, and archiving closed tickets.

Persistent storage of data will be implemented so data can be stored (to files) when it changes and reloaded when the application is later restarted. An archiving feature will permit agents to move closed tickets to an archive data file which will help contribute towards better performance and limit resource usage by keeping the active ticket data set lean.

In this assignment, you will be provided with a set of generalized instructions and given **more freedom to create your own solution** (this means creating your own functions, macro's, and deciding in what file they should be placed). **However, you must use the data types and functions that are explicitly stated).**

Preparation

Download or clone the Assignment 2 (**A2**) from https://github.com/Seneca-144100/IPC-Project
In the directory: A2/MS1 you will find the Visual Studio project files ready to load. Open the project (**a2ms1.vcxproj**) in Visual Studio.

IMPORTANT
- ***You will need to copy your work from Assignment 1 Milestone 4 and add all the header and source code files to the a2ms1 Visual Studio project before continuing.***
- ***Remember to update the comments at the top of each file to reflect Assignment 2 Milestone 1.***
- ***DO NOT ADD the a1ms4.c file.***

Milestone – 1 *(Worth 10%, Target Due Date: March 23rd)*

Milestone – 1 does not require a submission and does not have a specific deadline, however, you should target to have this part completed no later than **March 23rd** to ensure you leave enough time to complete Milestone – 2 which must be submitted and is due **March 26th**.

Milestone-1 includes the main function and should not be modified (*a2ms1.c*). This main will do some preliminary data type testing by creating some test data using the ***new data types*** and then launch the application logic by calling the ***applicationStart*** function accordingly.

This milestone focuses on accommodating some ***new data types*** and extending/improving on data validation routines including implementing additional business logic (rules and conditions for data).

Specifications

New Data Types

You will need to create three (3) new data types in this milestone ("**Message**", "**Ticket**", and "**AccountTicketingData**") which will complete what is needed for this application.

Review the *a2ms1.c* file (more specifically the "*main*" and "*populateTickets*" functions) to learn more about the field information used in these new data types based on the data being assigned.

The "**Message**" and "**Ticket**" data types will need to be defined in **a new header file "*ticket.h*"** (don't forget to apply the *safeguarding* technique as described in Assignment 1).

Message type
- The **Message** data type has three members. The 1st member is a single character representing the account type of the author of the message (same as used in the ***Account*** type). The 2nd member represents the display name for a given user (same as used in the ***Account*** type) and should be able to accommodate 30 printable characters. The 3rd member represents the message details and should be sized to accommodate 150 printable characters.
- Create meaningful member names for each.

Ticket type

- The **Ticket** type has six (6) members.
  1. Unique number for a ticket.
  2. Customer account number related to the ticket.
  3. A ticket status indicator where 0 represents closed and 1 represent active (still open)
  4. A subject line (like an email subject line) that should be able to accommodate up to 30 printable characters.
  5. A counter that represents the number of messages associated with the ticket.
  6. An array of **Message** types that should be able to store up to 20 messages.
- Create meaningful member names for each.

<u>AccountTicketingData type</u>

- This new data type is provided for you below and should be placed in the existing header file **"accountTicketingUI.h".** This type will be used to help simplify the passing of data between key functions with more efficiency and readability.

```
struct AccountTicketingData
{
    struct Account* accounts;   // array of accounts
    const int ACCOUNT_MAX_SIZE; // maximum elements for account array

    struct Ticket* tickets;     // array of tickets
    const int TICKET_MAX_SIZE;  // maximum elements for ticket array
};
```

- Review the *a2ms1.c* file to see how this is instantiated and used.

<u>Application Logic Entry-Point</u>

The function parameters for "*applicationStart*" will need to be modified so it receives just one argument which is a pointer to the new "*AccountTicketingData*" type.

- Update the necessary function definition to use the new argument accordingly (after reading and implementing the menu changes below).

<u>Menu Modifications</u>

<u>menuAgent</u>

- The function used for the **agent** main menu "*menuAgent*" currently has three (3) parameters but will require modification. Since the accounts array and its maximum size information are now members of the new data type "*AccountTIcketingData*", the existing <u>first two parameters</u> can be <u>replaced</u> with a pointer to the new "*AccountTicketingData*" type. This means this function should now only have two (2) parameters.

- Update the necessary function definition to use the new argument accordingly.

- The **agentMenu** function should be modified to display four (4) more menu options (6 – 9). Selecting any of these new options will display a temporary notice that the feature is not currently available. Review the sample output for details.

<u>New Client Main Menu</u>

- A new menu needs to be created that will be the main menu for a customer login.
- Currently, when a customer log's in with a customer account number, the application states "CUSTOMER: home menu currently unavailable…". This should be removed and replaced with the customer main menu.
- Review the sample output for the available customer menu options.
- You will need to handle option 1 that displays the account detail information however the other options should display a temporary notice that the feature is not currently available. Review the sample output for details.
- Something to consider: The customer main menu should only have access to Ticket information and the customer's own account record – it should not have access to the system's accounts array information.

Data Validation and Business Rules

You should be applying system library functions like the character analysis and manipulators you have recently learned about to help enforce data validation and business rules where appropriate (review your code and apply where necessary).

New Account

- The application currently prompts the user for an account number when creating a new **Account**. This is not ideal and needs to be replaced with an **auto-generated account number** based on the next increment of the highest number found in the accounts data set.
    - Upgrade your process for creating a new account so the account number is automatically assigned before getting user input for the remaining data. The account number should also be **displayed as part of the title/banner** (see below sample, the **50600** was automatically assigned).
    - Prompting for a new account should therefore start with the account type like this:

```
New Account Data (Account#:50600)
----------------------------------------
Enter the account type (A=Agent | C=Customer):
```

User Login

- Enhance the validation for obtaining the **UserLogin** member that stores the *login identifier* and do <u>not allow</u> any **whitespace characters** (spaces and tabs etc.). Below is an example of an attempt to enter whitespace characters:

```
User Login Data Input
-----------------------------------------
Enter user login (10 chars max): my login
ERROR:  The user login must NOT contain whitespace characters.
Enter user login (10 chars max): my      login
ERROR:  The user login must NOT contain whitespace characters.
Enter user login (10 chars max):
```

- Enhance the validation for obtaining the **UserLogin** member that stores the *password* to enforce the password meets the new criteria (see example below):

```
Enter the password (must be 8 chars in length): password
SECURITY: Password must contain 2 of each:
        Digit: 0-9
        UPPERCASE character
        lowercase character
        symbol character: !@#$%^&*
Enter the password (must be 8 chars in length): aaAA#$12
```

Note: "**aaAA##$12**" is valid because it meets the password validation criteria.

Demographic

- Enhance the **Demographic** process so that entered values for the *country* member are <u>stored</u> as all <u>UPPERCASE</u> characters (the user should be able to enter lowercase characters and you will convert it to uppercase accordingly).

A2-MS1: Sample Output

```
================================================
Account Ticketing System - Login
================================================
1) Login to the system
0) Exit application
------------------------------------------------


Selection: 1


Enter your account#: 50008


AGENT: Will Smith (50008)
================================================
Account Ticketing System - Agent Menu
================================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
------------------------------------------------
6) List new tickets
7) List active tickets
8) Manage a ticket
9) Archive closed tickets
------------------------------------------------
0) Logout


Selection: 1


New Account Data (Account#:50600)
-------------------------------------------
Enter the account type (A=Agent | C=Customer): C


User Login Data Input
-------------------------------------------
Enter user login (10 chars max): Has Space
ERROR:  The user login must NOT contain whitespace characters.
Enter user login (10 chars max): NoSpace
Enter the display name (30 chars max): Customer Chris
Enter the password (must be 8 chars in length): A
ERROR: String length must be exactly 8 chars: 12345678
SECURITY: Password must contain 2 of each:
        Digit: 0-9
        UPPERCASE character
        lowercase character
        symbol character: !@#$%^&*
Enter the password (must be 8 chars in length): pa55WD!d
SECURITY: Password must contain 2 of each:
        Digit: 0-9
```

```
        UPPERCASE character
        lowercase character
        symbol character: !@#$%^&*
Enter the password (must be 8 chars in length): pa55WD&!

Demographic Data Input
-------------------------------------------
Enter birth year (current age must be between 18 and 110): 1999
Enter the household Income: $240750.11
Enter the country (30 chars max.): england

*** New account added! ***

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
==============================================
Account Ticketing System - Agent Menu
==============================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
--------------------------------------------------
6) List new tickets
7) List active tickets
8) Manage a ticket
9) Archive closed tickets
--------------------------------------------------
0) Logout

Selection: 5

Acct# Acct.Type Birth Income       Country    Disp.Name        Login      Password
----- --------- ----- ----------- ---------- ---------------- ---------- --------
30001 CUSTOMER  1990 $ 150000.10 CANADA      Silly Sally      cust1      A*1*3*D*
50599 AGENT     1972 $2250400.22 AFRICA      Fred Flintstone agent1     y*b*#*@*
30004 CUSTOMER  1978 $ 250800.74 INDIA       Betty Boop       cust2      1*E*P*!*
50008 AGENT     1952 $2350600.82 U.S.A.      Will Smith       agentJ     T***2*t*
20020 CUSTOMER  2000 $ 350500.35 KOREA       Shrimpy Shrimp  cust3      8*3*J*m*
50600 CUSTOMER  1999 $ 240750.11 ENGLAND     Customer Chris   NoSpace    p*5*W*&*

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
==============================================
Account Ticketing System - Agent Menu
==============================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
```

```
5) List accounts: detailed view
------------------------------------------------
6) List new tickets
7) List active tickets
8) Manage a ticket
9) Archive closed tickets
------------------------------------------------
0) Logout


Selection: 2


Enter the account#: 50600


Account: 50600 - Update Options
-------------------------------------------
1) Update account type (current value: C)
2) Login
3) Demographics
0) Done
Selection: 2


User Login: NoSpace - Update Options
-------------------------------------------
1) Display name (current value: Customer Chris)
2) Password
0) Done
Selection: 2


Enter the password (must be 8 chars in length): juMP1!*&
SECURITY: Password must contain 2 of each:
        Digit: 0-9
        UPPERCASE character
        lowercase character
        symbol character: !@#$%^&*
Enter the password (must be 8 chars in length): juMP1!*9


User Login: NoSpace - Update Options
-------------------------------------------
1) Display name (current value: Customer Chris)
2) Password
0) Done
Selection: 0


Account: 50600 - Update Options
-------------------------------------------
1) Update account type (current value: C)
2) Login
3) Demographics
0) Done
Selection: 3


Demographic Update Options
-------------------------------------------
```

```
1) Household Income (current value: $240750.11)
2) Country (current value: ENGLAND)
0) Done
Selection: 2

Enter the country (30 chars max.): romania

Demographic Update Options
-------------------------------------------
1) Household Income (current value: $240750.11)
2) Country (current value: ROMANIA)
0) Done
Selection: 0

Account: 50600 - Update Options
-------------------------------------------
1) Update account type (current value: C)
2) Login
3) Demographics
0) Done
Selection: 0

AGENT: Will Smith (50008)
================================================
Account Ticketing System - Agent Menu
================================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
-------------------------------------------------
6) List new tickets
7) List active tickets
8) Manage a ticket
9) Archive closed tickets
-------------------------------------------------
0) Logout

Selection: 6

Feature #6 currently unavailable!

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
================================================
Account Ticketing System - Agent Menu
================================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
```

```
5) List accounts: detailed view
--------------------------------------------------
6) List new tickets
7) List active tickets
8) Manage a ticket
9) Archive closed tickets
--------------------------------------------------
0) Logout

Selection: 7

Feature #7 currently unavailable!

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
============================================
Account Ticketing System - Agent Menu
============================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
--------------------------------------------------
6) List new tickets
7) List active tickets
8) Manage a ticket
9) Archive closed tickets
--------------------------------------------------
0) Logout

Selection: 8

Feature #8 currently unavailable!

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
============================================
Account Ticketing System - Agent Menu
============================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
--------------------------------------------------
6) List new tickets
7) List active tickets
8) Manage a ticket
9) Archive closed tickets
--------------------------------------------------
```

```
0) Logout

Selection: 9

Feature #9 currently unavailable!

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
---------------------------------------------
6) List new tickets
7) List active tickets
8) Manage a ticket
9) Archive closed tickets
---------------------------------------------
0) Logout

Selection: 0

### LOGGED OUT ###


=============================================
Account Ticketing System - Login
=============================================
1) Login to the system
0) Exit application
---------------------------------------------

Selection: 1

Enter your account#: 12345

ERROR:  Access Denied.

<< ENTER key to Continue... >> [ENTER]


=============================================
Account Ticketing System - Login
=============================================
1) Login to the system
0) Exit application
---------------------------------------------

Selection: 1
```

```
Enter your account#: 50600

CUSTOMER: Customer Chris (50600)
============================================
Customer Main Menu
============================================
1) View your account detail
2) List my tickets
3) Create a new ticket
4) Manage a ticket
------------------------------------------------
0) Logout

Selection: 1

Acct# Acct.Type Birth Income      Country    Disp.Name        Login      Password
----- --------- ----- ----------- ---------- ---------------- ---------- --------
50600 CUSTOMER   1999 $ 240750.11 ROMANIA    Customer Chris   NoSpace    j*M*1***

<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Customer Chris (50600)
============================================
Customer Main Menu
============================================
1) View your account detail
2) List my tickets
3) Create a new ticket
4) Manage a ticket
------------------------------------------------
0) Logout

Selection: 2

Feature #2 currently unavailable!

<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Customer Chris (50600)
============================================
Customer Main Menu
============================================
1) View your account detail
2) List my tickets
3) Create a new ticket
4) Manage a ticket
------------------------------------------------
0) Logout

Selection: 3

Feature #3 currently unavailable!
```

```
<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Customer Chris (50600)
=============================================
Customer Main Menu
=============================================
1) View your account detail
2) List my tickets
3) Create a new ticket
4) Manage a ticket
-------------------------------------------------
0) Logout

Selection: 4

Feature #4 currently unavailable!

<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Customer Chris (50600)
=============================================
Customer Main Menu
=============================================
1) View your account detail
2) List my tickets
3) Create a new ticket
4) Manage a ticket
-------------------------------------------------
0) Logout

Selection: 0

### LOGGED OUT ###

=============================================
Account Ticketing System - Login
=============================================
1) Login to the system
0) Exit application
-------------------------------------------------

Selection: 0

Are you sure you want to exit? ([Y]es|[N]o): y

=============================================
Account Ticketing System - Terminated
=============================================
```

Milestone – 1 Submission

1. ***This is a <u>test submission</u> for verifying your work only*** – no files will be submitted to your instructor.
2. Upload (file transfer) your all header and source files:
   o **a2ms1.c**
   o **account.c**
   o **account.h**
   o **accountTicketingUI.c**
   o **accountTicketingUI.h**
   o **commonHelpers.c**
   o **commonHelpers.h**
   o **ticket.h**
3. Login to matrix in an SSH terminal and change directory to where you placed your source code.
4. Manually compile and run your program to make sure everything works properly:

   ```
   gcc -Wall a2ms1.c account.c accountTicketingUI.c commonHelpers.c -o
   ms1 <ENTER>
   ```

   If there are no error/warnings are generated, execute it: **ms1** *<ENTER>*

5. Run the submission command below (replace **profname.proflastname** with <u>**your professors**</u> Seneca userid and replace **NAA** with your section):

   ```
   ~profName.proflastname/submit 144a2ms1/NAA_ms1 <ENTER>
   ```

6. Follow the on-screen submission instructions.

Milestone – 2 *(Worth 20%, Due Date: March 26TH)*

Milestone – 2 will involve refinements to be made to any appropriate code that would benefit from using the string library (string.h). In addition, the login procedure and requirements will be enhanced to include more robust authentication. This will involve the prompting of the user for their account number, login identifier, and password to be validated before being given access to the system (only three (3) attempts will be permitted and if not successful, will be returned to the login menu). Lastly, the viewing of ticket information will be added for both the customer and agent account types.

Milestone-2 includes the main function which should not be modified (**a2ms2.c**). The main function will populate account and ticketing data to be used in testing the changes and new features before handing off the process to your business logic, starting in the **applicationStart** function.

This milestone focuses on accommodating some **new data types** and extending/improving on data validation routines including implementing additional business logic (rules and conditions for data).

Specifications

<u>String Library</u>

- Review <u>all your code</u> and upgrade where necessary to use functions available from the string library. Functions you should be considering can be any of the following (but no others):

  strlen, strcpy, strcat, strcmp, strncat, strncmp, strncpy, strchr, strrchr

<u>Business Rules and Logic Modifications</u>

<u>Login Process</u>

- The login process currently only prompts for an account number to permit access to the system. This must be changed to incorporate more robust authentication. This will now include prompting for the following:

  - Account number
  - User login identifier
  - Password

- The combined validation of all these pieces of information will determine if the user can have access to the system where the appropriate main menu will be loaded as determined by the account type (customer or agent).

- Only three (3) attempts are permitted. If the 3rd attempt does not match the records for the provided account and user information, the user should be returned to the starting menu.

- Review the sample output carefully to see how the process should work when invalid account numbers, and/or invalid user login identifiers, and/or invalid passwords are entered.

- <u>Note</u>: You do not want to disclose to the user which of the three (3) fields were incorrect – doing so helps hackers determine where they have guessed correctly!

<u>Viewing Tickets</u>

<u>Customer</u>

- Currently, the **customer main menu** option #4 to "List my tickets" indicates the feature is currently unavailable. This must now be replaced with the functionality to display all the tickets related to the logged-in customer's account.

- Review the sample output to see how this should work including what content should be displayed and the desired tabular format.

- You will notice, after displaying the main ticket summaries, the user should have the option to enter a specific ticket number to view the messages related to that specific ticket.

- Review how the contents of the messages should be displayed and the required formatting.

- When the user enters a zero (0), control will be returned to the ticket menu.

Agent

- Currently, the **agent main menu** options #6 and #7 to list new and active tickets indicates the feature is currently unavailable. This must now be replaced with the functionality to display all the appropriate tickets for the respective views (new or active).

- **New tickets** are determined based on two field values. The ticket status must be open (will have a value of 1) and there will be only one (1) message.

  Note: Only customers can create tickets and when they do, a message will be created to describe the problem, so the first message for a ticket will always be authored by the customer. The creating of new tickets will not be done in this milestone but will be done in the next milestone!

- **Active tickets** are determined based on the status being open (will have a value of 1) and this listing will include new tickets.

- The ticket listing is like the customer view but will include two (2) additional pieces of information:

  o Account number

  o Customer's login display name *****

     *Hint: see "note" above regarding ticket construction. You may assume the 1st message in a ticket will be authored by a customer.

- Review the sample output to see how this should work including what content should be displayed and the desired tabular format.

- You will notice, after displaying the main ticket summaries, the user should have the option to enter a specific ticket number to view the messages related to that specific ticket.

- Review how the contents of the messages should be displayed and the required formatting.

- When the user enters a zero (0), control will be returned to the ticket menu.

A2-MS2: Sample Output

```
===========================================
Account Ticketing System - Login
===========================================
1) Login to the system
0) Exit application
-----------------------------------------------

Selection: Buffalo Bison
ERROR: Value must be an integer: -1
ERROR: Value must be between 0 and 1 inclusive: 1

Enter the account#: ACCT 1234
ERROR: Value must be an integer: 1234
User Login    : Rooster Ronnie
```

```
Password        : Hippo Henrietta
INVALID user login/password combination! [attempts remaining:2]


Enter the account#: 1234
User Login     : cust2
Password       : 1pE@Pr!3
INVALID user login/password combination! [attempts remaining:1]


Enter the account#: 50008
User Login     : cust2
Password       : 1pE@Pr!3
INVALID user login/password combination! [attempts remaining:0]


ERROR:  Login failed!

<< ENTER key to Continue... >> [ENTER]


===========================================
Account Ticketing System - Login
===========================================
1) Login to the system
0) Exit application
-------------------------------------------

Selection: 1

Enter the account#: 50008
User Login     : agentJ
Password       : TT*&21tt

AGENT: Will Smith (50008)
===========================================
Account Ticketing System - Agent Menu
===========================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
-------------------------------------------
6) List new tickets
7) List active tickets
8) Manage a ticket
9) Archive closed tickets
-------------------------------------------
0) Logout

Selection: 4

Acct# Acct.Type Birth
----- --------- -----
30001 CUSTOMER  1990
50599 AGENT     1972
```

```
30004 CUSTOMER    1978
50008 AGENT       1952
20020 CUSTOMER    2000


<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
============================================
Account Ticketing System - Agent Menu
============================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
-------------------------------------------------
6) List new tickets
7) List active tickets
8) Manage a ticket
9) Archive closed tickets
-------------------------------------------------
0) Logout

Selection: 5

Acct# Acct.Type Birth Income       Country    Disp.Name        Login      Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
30001 CUSTOMER  1990 $ 150000.10 CANADA     Silly Sally     cust1      A*1*3*D*
50599 AGENT     1972 $2250400.22 AFRICA     Fred Flintstone agent1     y*b*#*@*
30004 CUSTOMER  1978 $ 250800.74 INDIA      Betty Boop      cust2      1*E*P*!*
50008 AGENT     1952 $2350600.82 U.S.A.     Will Smith      agentJ     T***2*t*
20020 CUSTOMER  2000 $ 350500.35 KOREA      Shrimpy Shrimp  cust3      8*3*J*m*

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
============================================
Account Ticketing System - Agent Menu
============================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
-------------------------------------------------
6) List new tickets
7) List active tickets
8) Manage a ticket
9) Archive closed tickets
-------------------------------------------------
0) Logout

Selection: 2
```

```
Enter the account#: 30004

Account: 30004 - Update Options
-------------------------------------------
1) Update account type (current value: C)
2) Login
3) Demographics
0) Done
Selection: 2

User Login: cust2 - Update Options
-------------------------------------------
1) Display name (current value: Betty Boop)
2) Password
0) Done
Selection: 2

Enter the password (must be 8 chars in length): bb33&&44
SECURITY: Password must contain 2 of each:
        Digit: 0-9
        UPPERCASE character
        lowercase character
        symbol character: !@#$%^&*
Enter the password (must be 8 chars in length): bb33&&BB

User Login: cust2 - Update Options
-------------------------------------------
1) Display name (current value: Betty Boop)
2) Password
0) Done
Selection: 0

Account: 30004 - Update Options
-------------------------------------------
1) Update account type (current value: C)
2) Login
3) Demographics
0) Done
Selection: 0

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
-------------------------------------------------
6) List new tickets
7) List active tickets
```

```
8) Manage a ticket
9) Archive closed tickets
-------------------------------------------------
0) Logout


Selection: 5


Acct# Acct.Type Birth Income      Country    Disp.Name       Login      Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
30001 CUSTOMER  1990 $ 150000.10 CANADA      Silly Sally     cust1      A*1*3*D*
50599 AGENT     1972 $2250400.22 AFRICA      Fred Flintstone agent1     y*b*#*@*
30004 CUSTOMER  1978 $ 250800.74 INDIA       Betty Boop      cust2      b*3*&*B*
50008 AGENT     1952 $2350600.82 U.S.A.      Will Smith      agentJ     T***2*t*
20020 CUSTOMER  2000 $ 350500.35 KOREA       Shrimpy Shrimp  cust3      8*3*J*m*


<< ENTER key to Continue... >> [ENTER]


AGENT: Will Smith (50008)
================================================
Account Ticketing System - Agent Menu
================================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
-------------------------------------------------
6) List new tickets
7) List active tickets
8) Manage a ticket
9) Archive closed tickets
-------------------------------------------------
0) Logout


Selection: 6


------ ----- --------------- ------ ----------------------------- --------
Ticket Acct# Display Name    Status Subject                       Messages
------ ----- --------------- ------ ----------------------------- --------
080599 30001 Silly Sally     OPEN   No power/does not turn on          1
------ ----- --------------- ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: -1
ERROR: Value must be positive or zero: 123456


ERROR: Invalid ticket number.


<< ENTER key to Continue... >> [ENTER]


------ ----- --------------- ------ ----------------------------- --------
Ticket Acct# Display Name    Status Subject                       Messages
------ ----- --------------- ------ ----------------------------- --------
```

```
080599 30001 Silly Sally     OPEN   No power/does not turn on          1
------ ----- -------------- ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 080599


===========================================================================
080599 (OPEN) Re: No power/does not turn on
===========================================================================
CUSTOMER (Silly Sally):
   The unit won't turn on - please help.

<< ENTER key to Continue... >> [ENTER]


------ ----- -------------- ------ ----------------------------- --------
Ticket Acct# Display Name    Status Subject                       Messages
------ ----- -------------- ------ ----------------------------- --------
080599 30001 Silly Sally     OPEN   No power/does not turn on          1
------ ----- -------------- ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 0

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
---------------------------------------------
6) List new tickets
7) List active tickets
8) Manage a ticket
9) Archive closed tickets
---------------------------------------------
0) Logout

Selection: 7


------ ----- -------------- ------ ----------------------------- --------
Ticket Acct# Display Name    Status Subject                       Messages
------ ----- -------------- ------ ----------------------------- --------
060001 30004 Betty Boop      OPEN   Frequent Disconnects               2
080599 30001 Silly Sally     OPEN   No power/does not turn on          1
080004 20020 Shrimpy Shrimp  OPEN   My head hurts!                     3
080020 20020 Shrimpy Shrimp  OPEN   It's broken/does not work          3
------ ----- -------------- ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 123456
```

```
ERROR: Invalid ticket number.

<< ENTER key to Continue... >> [ENTER]


------ ----- --------------- ------ ------------------------------ --------
Ticket Acct# Display Name    Status Subject                        Messages
------ ----- --------------- ------ ------------------------------ --------
060001 30004 Betty Boop      OPEN   Frequent Disconnects           2
080599 30001 Silly Sally     OPEN   No power/does not turn on       1
080004 20020 Shrimpy Shrimp  OPEN   My head hurts!                  3
080020 20020 Shrimpy Shrimp  OPEN   It's broken/does not work       3
------ ----- --------------- ------ ------------------------------ --------


Enter the ticket number to view the messages or
0 to return to previous menu: 80004


===============================================================================
080004 (OPEN) Re: My head hurts!
===============================================================================
CUSTOMER (Shrimpy Shrimp):
   When the unit is placed on my head it hurts.

AGENT (Will Smith):
   Don't place it on your head.

CUSTOMER (Shrimpy Shrimp):
   I don't understand - why not?

<< ENTER key to Continue... >> [ENTER]


------ ----- --------------- ------ ------------------------------ --------
Ticket Acct# Display Name    Status Subject                        Messages
------ ----- --------------- ------ ------------------------------ --------
060001 30004 Betty Boop      OPEN   Frequent Disconnects           2
080599 30001 Silly Sally     OPEN   No power/does not turn on       1
080004 20020 Shrimpy Shrimp  OPEN   My head hurts!                  3
080020 20020 Shrimpy Shrimp  OPEN   It's broken/does not work       3
------ ----- --------------- ------ ------------------------------ --------


Enter the ticket number to view the messages or
0 to return to previous menu: 080020


===============================================================================
080020 (OPEN) Re: It's broken/does not work
===============================================================================
CUSTOMER (Shrimpy Shrimp):
   When I took it out of the box, it's in pieces.

AGENT (Fred Flintstone):
   You have to assemble it - read the instructions.

CUSTOMER (Shrimpy Shrimp):
```

```
   What are instructions?

<< ENTER key to Continue... >> [ENTER]


------ ----- -------------- ------ ------------------------------ --------
Ticket Acct# Display Name    Status Subject                        Messages
------ ----- -------------- ------ ------------------------------ --------
060001 30004 Betty Boop      OPEN   Frequent Disconnects           2
080599 30001 Silly Sally     OPEN   No power/does not turn on       1
080004 20020 Shrimpy Shrimp  OPEN   My head hurts!                  3
080020 20020 Shrimpy Shrimp  OPEN   It's broken/does not work       3
------ ----- -------------- ------ ------------------------------ --------


Enter the ticket number to view the messages or
0 to return to previous menu: 0

AGENT: Will Smith (50008)
==========================================
Account Ticketing System - Agent Menu
==========================================
1) Add a new account
2) Modify an existing account
3) Remove an account
4) List accounts: summary view
5) List accounts: detailed view
--------------------------------------------------
6) List new tickets
7) List active tickets
8) Manage a ticket
9) Archive closed tickets
--------------------------------------------------
0) Logout

Selection: 0

### LOGGED OUT ###


==============================================
Account Ticketing System - Login
==============================================
1) Login to the system
0) Exit application
--------------------------------------------------


Selection: 1

Enter the account#: 30004
User Login    : cust2
Password      : bb33&&44
INVALID user login/password combination! [attempts remaining:2]

Enter the account#: 30004
User Login    : cust2
```

Password   : bb33&&BB

CUSTOMER: Betty Boop (30004)
===
Customer Main Menu
===
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
----
0) Logout

Selection: 1

Acct# Acct.Type Birth Income   Country   Disp.Name   Login   Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
30004 CUSTOMER   1978 $ 250800.74 INDIA   Betty Boop   cust2   b*3*&*B*

<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Betty Boop (30004)
===
Customer Main Menu
===
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
----
0) Logout

Selection: 4

------ ------ ------------------------------ --------
Ticket Status Subject   Messages
------ ------ ------------------------------ --------
060001 OPEN   Frequent Disconnects   2
070533 CLOSED Nothing happens...   7
------ ------ ------------------------------ --------

Enter the ticket number to view the messages or
0 to return to previous menu: 123456

ERROR: Invalid ticket number.

<< ENTER key to Continue... >> [ENTER]

------ ------ ------------------------------ --------
Ticket Status Subject   Messages
------ ------ ------------------------------ --------
060001 OPEN   Frequent Disconnects   2
070533 CLOSED Nothing happens...   7

```
------ ------ ---------------------------- --------

Enter the ticket number to view the messages or
0 to return to previous menu: 060001


================================================================================
060001 (OPEN) Re: Frequent Disconnects
================================================================================
CUSTOMER (Betty Boop):
   Every time I go near the microwave the unit disconnects.

AGENT (Will Smith):
   Don't go near the microwave.

<< ENTER key to Continue... >> [ENTER]


------ ------ ---------------------------- --------
Ticket Status Subject                      Messages
------ ------ ---------------------------- --------
060001 OPEN   Frequent Disconnects             2
070533 CLOSED Nothing happens...               7
------ ------ ---------------------------- --------

Enter the ticket number to view the messages or
0 to return to previous menu: 70533


================================================================================
070533 (CLOSED) Re: Nothing happens...
================================================================================
CUSTOMER (Betty Boop):
   Instructions state to 'say yes' to the prompts - but nothing happens.

AGENT (Fred Flintstone):
   Is this when setting up the unit for the first time?

CUSTOMER (Betty Boop):
   Yes - it asks me if I'm ready to start and I tell it 'yes' nothing happens.

AGENT (Fred Flintstone):
   Are you pressing the 'yes' button on the unit?

CUSTOMER (Betty Boop):
   No, instructions state to say yes - not press any buttons.

AGENT (Will Smith):
   'say' was meant to be interpretted as press the 'yes' button.

CUSTOMER (Betty Boop):
   Oh I get it now - thanks!

<< ENTER key to Continue... >> [ENTER]


------ ------ ---------------------------- --------
```

```
Ticket Status Subject                         Messages
------ ------ ------------------------------ --------
060001 OPEN   Frequent Disconnects              2
070533 CLOSED Nothing happens...               7
------ ------ ------------------------------ --------


Enter the ticket number to view the messages or
0 to return to previous menu: -1
ERROR: Value must be positive or zero: 0

CUSTOMER: Betty Boop (30004)
=============================================
Customer Main Menu
=============================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
---------------------------------------------
0) Logout

Selection: 0

### LOGGED OUT ###


=============================================
Account Ticketing System - Login
=============================================
1) Login to the system
0) Exit application
---------------------------------------------

Selection: 0

Are you sure you want to exit? ([Y]es|[N]o): y


=============================================
Account Ticketing System - Terminated
=============================================
```

Reflection (Worth 20%, Due Date: March 26th)

Academic Integrity

It is a violation of academic policy to copy content from the course notes or any other published source (including websites, work from another student, or sharing your work with others).

Failure to adhere to this policy will result in the filing of a violation report to the Academic Integrity Committee.

<u>Instructions</u>

- Create a text file named "**reflect.txt**" and record your answers to the questions below in this file.
- Answer each question in <u>sentence/paragraph form</u> unless otherwise instructed.
- A minimum **350** overall word count is required (does NOT include the question or any sample code) and <u>no more</u> than **600.**
- Whenever possible, it is expected you will substantiate your answers with a brief example to demonstrate your view(s).

1. What is your favourite string function from the string library that you have used in this application? Describe why?

2. List all the **<u>new</u>** function **prototypes** you added to <u>this milestone</u>. For <u>each new function</u>, briefly describe why you created it and include what module/library you put it in <u>and why</u>.

Reflections will be graded based on the published rubric:
https://github.com/Seneca-144100/IPC-Project/tree/master/Reflection%20Rubric.pdf

Milestone – 2 Submission

1. Upload (file transfer) your all header and source files including your reflection:
   - **a2ms2.c**
   - **account.c**
   - **account.h**
   - **accountTicketingUI.c**
   - **accountTicketingUI.h**
   - **commonHelpers.c**
   - **commonHelpers.h**
   - **ticket.h**
   - **reflect.txt**
2. Login to matrix in an SSH terminal and change directory to where you placed your source code.
3. Manually compile and run your program to make sure everything works properly:

```
gcc -Wall a2ms2.c account.c accountTicketingUI.c commonHelpers.c -o ms2
<ENTER>
```

*If there are no error/warnings are generated, execute it: **ms2** <ENTER>*

4. Run the submission command below (replace **profname.proflastname** with **<u>your professors</u>** Seneca userid and replace **NAA** with your section):

```
~profName.proflastname/submit 144a2ms2/NAA_ms2 <ENTER>
```

5. Follow the on-screen submission instructions.

Milestone – 3 *(Worth 10%, Target Due Date: April 2nd)*

Milestone – 3 does not require a submission and does not have a specific deadline, however, you should target to have this part completed no later than **April 2nd** to ensure you leave enough time to complete Milestone – 4 which must be submitted and is due **April 9th**. Milestone-3 includes the main function and, like previous milestones, should not be modified (***a2ms3.c***). The provided main creates some test data and then launches the application logic by calling the ***applicationStart*** function.

This milestone completes the ticketing component where data input and the management of tickets is implemented. It is highly possible you will need to create a source code file (.c) for the ***ticket*** module/library to address some of the new features for this milestone.

Specifications

Ticket Status

Management did not like the inconsistency in terminology used for the ticket status. The term "active" is used in all the UI menu's while the listing of the ticket status values state "OPEN". It has been decided that all displayed values of a ticket status must state "***ACTIVE***" (and <u>not</u> "OPEN"). Refer to the sample output for details.

Viewing Ticket Messages

Additional logic needs to be added so the UI will pause execution (wait for the user to hit the enter key) after displaying every 5th message. This will implement paging of the tickets one screen at a time when there are too many messages to see on a single screen.

Customer Ticket Management

Options from the **customer main menu**:

Create a new ticket

- New tickets must be initiated by the customer (agents are not permitted to create tickets).
- The system must **automatically determine** the next available **ticket number** (follows the same logic applied in the generation of the next account number).
  <u>Note</u>: If the ticketing system has reached the maximum allowable number of tickets, the following error message should be displayed and then return to the main menu:
  `ERROR: Ticket listing is FULL, call ITS Support!`
- All new tickets are immediately set to the "ACTIVE" status.
- The customer's account number must be associated with the new ticket being created.
- The main **subject** of the ticket must be entered by the customer that concisely summarizes the purpose of the ticket (the problem).
- It is mandatory the customer enter an initial **message** that details the reason for the ticket.
  <u>Hint</u>: You can guarantee and assume that all active or closed tickets will have at least one message and that the first message will be generated by the customer

- The user type and display name must be recorded with the message.

Modify an active ticket

- The customer must enter the ticket number to be modified.
- A customer is not permitted to modify another customer's ticket – only their own and they may not modify a closed ticket.
- The customer may modify the ticket **subject**, add another **message** to the ticket, or **close** the ticket to indicate the problem has been resolved.
- If the message limit has been reached, you should display an error:
  ERROR: Message limit has been reached, call ITS Support!

  Note: Closing a ticket should prompt the customer for confirmation followed by an opportunity to enter a final message but only if the message limit has not been reached.
- Review the sample output to see how these options are processed.

Agent Ticket Management

Options from the **agent main menu**:

Management noted the agent main menu did not provide a way to view a listing of **closed tickets**. This feature "***List closed tickets***" must be added accordingly (these would be filtered records where the ticket status is CLOSED). It should be placed after the 7th option "List active tickets" and renumber the remaining options accordingly.

Remove an account

- Removal of an account should also **remove any related tickets** that have an **ACTIVE** status – affected ticket records should be marked as removed by setting the **ticket number to zero** which will free-up the ticket record listing and allow for more tickets to be added by other customers. Note: In Milestone 4, the removed account record will be archived to persistent storage.

- Do not remove tickets that have a **CLOSED** status (these will be archived in the next milestone).

Manage a ticket

- The agent must enter a valid ticket number to be modified.
- The agent may modify the ticket in three (3) possible ways:
  1. Add a message (if the limits have not been reached and only if the ticket is NOT closed)
  2. Close the ticket (only if it is currently active)
     o Like the customer closing options, the agent should be prompted for confirmation followed by an opportunity to enter a final message but only if the message limit has not been reached.
  3. Re-open a ticket to make it ACTIVE again (only if it is currently closed) and should get confirmation from the agent.

Archive closed tickets

- This option will be completed in milestone 4.

A2-MS3: Sample Output

```
================================================
Account Ticketing System - Login
================================================
1) Login to the system
0) Exit application
------------------------------------------------


Selection: 1


Enter the account#: 30004
User Login    : cust2
Password      : 77*&FFaa


CUSTOMER: Betty Boop (30004)
================================================
Customer Main Menu
================================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
------------------------------------------------
0) Logout


Selection: 4


------ ------ ----------------------------- --------
Ticket Status Subject                        Messages
------ ------ ----------------------------- --------
060001 ACTIVE Frequent Disconnects              5
030530 ACTIVE Does not respond to command...   20
070533 ACTIVE Nothing happens...               20
080020 ACTIVE It's broken/does not work        19
------ ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 80004

ERROR: Invalid ticket number - you may only access your own tickets.

<< ENTER key to Continue... >> [ENTER]


------ ------ ----------------------------- --------
Ticket Status Subject                        Messages
------ ------ ----------------------------- --------
060001 ACTIVE Frequent Disconnects              5
030530 ACTIVE Does not respond to command...   20
070533 ACTIVE Nothing happens...               20
080020 ACTIVE It's broken/does not work        19
------ ------ ----------------------------- --------
```

```
Enter the ticket number to view the messages or
0 to return to previous menu: 60001


===============================================================================
060001 (ACTIVE) Re: Frequent Disconnects
===============================================================================
CUSTOMER (Betty Boop):
   Every time I go near the microwave the unit disconnects.

AGENT (Will Smith):
   Don't go near the microwave.

AGENT (Will Smith):
   It will radiate waves which will interrupt the unit.

CUSTOMER (Betty Boop):
   But I use the microwave a lot.

AGENT (Will Smith):
   You cook too much!

<< ENTER key to Continue... >> [ENTER]

------ ------ ---------------------------- --------
Ticket Status Subject                       Messages
------ ------ ---------------------------- --------
060001 ACTIVE Frequent Disconnects              5
030530 ACTIVE Does not respond to command...   20
070533 ACTIVE Nothing happens...               20
080020 ACTIVE It's broken/does not work        19
------ ------ ---------------------------- --------

Enter the ticket number to view the messages or
0 to return to previous menu: 80020


===============================================================================
080020 (ACTIVE) Re: It's broken/does not work
===============================================================================
CUSTOMER (Betty Boop):
   When I took it out of the box, it was in pieces.

AGENT (Will Smith):
   You have to assemble it - read the instructions.

CUSTOMER (Betty Boop):
   What are instructions?

AGENT (Will Smith):
   The paper document that look's like a book with words.

CUSTOMER (Betty Boop):
   Oh - right, okay so it says to snap part-1 to part-2.
```

```
<< ENTER key to Continue... >> [ENTER]

CUSTOMER (Betty Boop):
   Hello? what should I do?

CUSTOMER (Betty Boop):
   Then it says to place part-3 on parts 1 and 2 then twist.

CUSTOMER (Betty Boop):
   Please help... I don't know what this means.

AGENT (Will Smith):
   It's been 9 months, are you still unable to assemble it?

CUSTOMER (Betty Boop):
   Yes, I am stuck on instruction 2 the twist part.

<< ENTER key to Continue... >> [ENTER]

AGENT (Will Smith):
   Place part-3 into the grooves of parts 1 and 2, then rotate clockwise.

CUSTOMER (Betty Boop):
   Why?

CUSTOMER (Betty Boop):
   Hello?

CUSTOMER (Betty Boop):
   Well I did what you said, now it's in 3 pieces again.

AGENT (Will Smith):
   What did you do?

<< ENTER key to Continue... >> [ENTER]

CUSTOMER (Betty Boop):
   I put part-3 in the grooves, than I turned clockwise causing it to fall off the
table.

AGENT (Will Smith):
   You were to rotate part-3 not turn yourself around!

CUSTOMER (Betty Boop):
   Well now what do I do?

AGENT (Will Smith):
   What do you think?

<< ENTER key to Continue... >> [ENTER]

------ ------ ---------------------------- --------
```

```
Ticket Status Subject                       Messages
------ ------ ----------------------------- --------
060001 ACTIVE Frequent Disconnects              5
030530 ACTIVE Does not respond to command...   20
070533 ACTIVE Nothing happens...               20
080020 ACTIVE It's broken/does not work        19
------ ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 0

CUSTOMER: Betty Boop (30004)
===============================================
Customer Main Menu
===============================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
-------------------------------------------------
0) Logout

Selection: 2

New Ticket (Ticket#:080600)
-------------------------------------------
Enter the ticket SUBJECT (30 chars. maximum): Funny Noise!

Enter the ticket message details (150 chars. maximum). Press the ENTER key to
submit:
When it turns on it screams at me and it's quite offending.

*** New ticket created! ***

<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Betty Boop (30004)
===============================================
Customer Main Menu
===============================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
-------------------------------------------------
0) Logout

Selection: 4

------ ------ ----------------------------- --------
Ticket Status Subject                       Messages
------ ------ ----------------------------- --------
060001 ACTIVE Frequent Disconnects              5
```

```
030530 ACTIVE Does not respond to command...    20
070533 ACTIVE Nothing happens...                20
080020 ACTIVE It's broken/does not work         19
080600 ACTIVE Funny Noise!                       1
------ ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 0

CUSTOMER: Betty Boop (30004)
=============================================
Customer Main Menu
=============================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
---------------------------------------------
0) Logout

Selection: 2

ERROR: Ticket listing is FULL, call ITS Support!

<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Betty Boop (30004)
=============================================
Customer Main Menu
=============================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
---------------------------------------------
0) Logout

Selection: 3

Enter ticket number: 80004

ERROR: Invalid ticket number - you may only modify your own ticket.

<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Betty Boop (30004)
=============================================
Customer Main Menu
=============================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
```

```
--------------------------------------------------
0) Logout


Selection: 3


Enter ticket number: 80020


------------------------------------------
Ticket 080020 - Update Options
------------------------------------------
Status  : ACTIVE
Subject : It's broken/does not work
------------------------------------------
1) Modify the subject
2) Add a message
3) Close ticket
0) Done
Selection: 2


Enter the ticket message details (150 chars. maximum). Press the ENTER key to
submit:
I'm so confused.


------------------------------------------
Ticket 080020 - Update Options
------------------------------------------
Status  : ACTIVE
Subject : It's broken/does not work
------------------------------------------
1) Modify the subject
2) Add a message
3) Close ticket
0) Done
Selection: 1


Enter the revised ticket SUBJECT (30 chars. maximum): Double broken!


------------------------------------------
Ticket 080020 - Update Options
------------------------------------------
Status  : ACTIVE
Subject : Double broken!
------------------------------------------
1) Modify the subject
2) Add a message
3) Close ticket
0) Done
Selection: 2


ERROR: Message limit has been reached, call ITS Support!


------------------------------------------
Ticket 080020 - Update Options
```

```
-------------------------------------------
Status  : ACTIVE
Subject : Double broken!
-------------------------------------------
1) Modify the subject
2) Add a message
3) Close ticket
0) Done
Selection: 0

<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Betty Boop (30004)
============================================
Customer Main Menu
============================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
--------------------------------------------
0) Logout

Selection: 3

Enter ticket number: 60001


-------------------------------------------
Ticket 060001 - Update Options
-------------------------------------------
Status  : ACTIVE
Subject : Frequent Disconnects
-------------------------------------------
1) Modify the subject
2) Add a message
3) Close ticket
0) Done
Selection: 3

Are you sure you CLOSE this ticket? ([Y]es|[N]o): Y

Do you want to leave a closing message? ([Y]es|[N]o): N

*** Ticket closed! ***

<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Betty Boop (30004)
============================================
Customer Main Menu
============================================
1) View your account detail
2) Create a new ticket
```

```
3) Modify an active ticket
4) List my tickets
-------------------------------------------------
0) Logout

Selection: 3

Enter ticket number: 80600


------------------------------------------
Ticket 080600 - Update Options
------------------------------------------
Status  : ACTIVE
Subject : Funny Noise!
------------------------------------------
1) Modify the subject
2) Add a message
3) Close ticket
0) Done
Selection: 3

Are you sure you CLOSE this ticket? ([Y]es|[N]o): Y

Do you want to leave a closing message? ([Y]es|[N]o): Y

Enter the ticket message details (150 chars. maximum). Press the ENTER key to
submit:
Never mind, I oiled it and all is fine now.

*** Ticket closed! ***

<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Betty Boop (30004)
==============================================
Customer Main Menu
==============================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
-------------------------------------------------
0) Logout

Selection: 4


------ ------ ----------------------------- --------
Ticket Status Subject                       Messages
------ ------ ----------------------------- --------
060001 CLOSED Frequent Disconnects              5
030530 ACTIVE Does not respond to command...   20
070533 ACTIVE Nothing happens...               20
080020 ACTIVE Double broken!                   20
```

```
080600 CLOSED Funny Noise!                         2
------ ------ ---------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 80600


================================================================================
080600 (CLOSED) Re: Funny Noise!
================================================================================
CUSTOMER (Betty Boop):
   When it turns on it screams at me and it's quite offending.

CUSTOMER (Betty Boop):
   Never mind, I oiled it and all is fine now.

<< ENTER key to Continue... >> [ENTER]


------ ------ ---------------------------- --------
Ticket Status Subject                         Messages
------ ------ ---------------------------- --------
060001 CLOSED Frequent Disconnects               5
030530 ACTIVE Does not respond to command...    20
070533 ACTIVE Nothing happens...                20
080020 ACTIVE Double broken!                    20
080600 CLOSED Funny Noise!                        2
------ ------ ---------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 0

CUSTOMER: Betty Boop (30004)
============================================
Customer Main Menu
============================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
--------------------------------------------
0) Logout

Selection: 3

Enter ticket number: 30530


-------------------------------------------
Ticket 030530 - Update Options
-------------------------------------------
Status  : ACTIVE
Subject : Does not respond to command...
-------------------------------------------
1) Modify the subject
2) Add a message
```

```
3) Close ticket
0) Done
Selection: 3

Are you sure you CLOSE this ticket? ([Y]es|[N]o): Y

*** Ticket closed! ***

<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Betty Boop (30004)
===========================================
Customer Main Menu
===========================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
-----------------------------------------------
0) Logout

Selection: 3

Enter ticket number: 80600

ERROR: Ticket is closed - changes are not permitted.

<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Betty Boop (30004)
===========================================
Customer Main Menu
===========================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
-----------------------------------------------
0) Logout

Selection: 4

------ ------ ----------------------------- --------
Ticket Status Subject                       Messages
------ ------ ----------------------------- --------
060001 CLOSED Frequent Disconnects              5
030530 CLOSED Does not respond to command...   20
070533 ACTIVE Nothing happens...               20
080020 ACTIVE Double broken!                   20
080600 CLOSED Funny Noise!                      2
------ ------ ----------------------------- --------

Enter the ticket number to view the messages or
```

0 to return to previous menu: <mark>80020</mark>

==
080020 (ACTIVE) Re: Double broken!
==
CUSTOMER (Betty Boop):
   When I took it out of the box, it was in pieces.

AGENT (Will Smith):
   You have to assemble it - read the instructions.

CUSTOMER (Betty Boop):
   What are instructions?

AGENT (Will Smith):
   The paper document that look's like a book with words.

CUSTOMER (Betty Boop):
   Oh - right, okay so it says to snap part-1 to part-2.

<< ENTER key to Continue... >> <mark>[ENTER]</mark>

CUSTOMER (Betty Boop):
   Hello? what should I do?

CUSTOMER (Betty Boop):
   Then it says to place part-3 on parts 1 and 2 then twist.

CUSTOMER (Betty Boop):
   Please help... I don't know what this means.

AGENT (Will Smith):
   It's been 9 months, are you still unable to assemble it?

CUSTOMER (Betty Boop):
   Yes, I am stuck on instruction 2 the twist part.

<< ENTER key to Continue... >> <mark>[ENTER]</mark>

AGENT (Will Smith):
   Place part-3 into the grooves of parts 1 and 2, then rotate clockwise.

CUSTOMER (Betty Boop):
   Why?

CUSTOMER (Betty Boop):
   Hello?

CUSTOMER (Betty Boop):
   Well I did what you said, now it's in 3 pieces again.

AGENT (Will Smith):
   What did you do?

```
<< ENTER key to Continue... >> [ENTER]

CUSTOMER (Betty Boop):
   I put part-3 in the grooves, than I turned clockwise causing it to fall off the
table.

AGENT (Will Smith):
   You were to rotate part-3 not turn yourself around!

CUSTOMER (Betty Boop):
   Well now what do I do?

AGENT (Will Smith):
   What do you think?

CUSTOMER (Betty Boop):
   I'm so confused.

<< ENTER key to Continue... >> [ENTER]

------ ------ ----------------------------- --------
Ticket Status Subject                        Messages
------ ------ ----------------------------- --------
060001 CLOSED Frequent Disconnects               5
030530 CLOSED Does not respond to command...    20
070533 ACTIVE Nothing happens...                20
080020 ACTIVE Double broken!                    20
080600 CLOSED Funny Noise!                       2
------ ------ ----------------------------- --------

Enter the ticket number to view the messages or
0 to return to previous menu: 0

CUSTOMER: Betty Boop (30004)
===============================================
Customer Main Menu
===============================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
-----------------------------------------------
0) Logout

Selection: 0

### LOGGED OUT ###


===============================================
Account Ticketing System - Login
===============================================
1) Login to the system
```

```
0) Exit application
-----------------------------------------------

Selection: 1


Enter the account#: 50008
User Login    : agentJ
Password      : TT*&21tt


AGENT: Will Smith (50008)
================================================
Account Ticketing System - Agent Menu
================================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
0) Logout


Selection: 1


New Account Data (Account#:50600)
-------------------------------------------
Enter the account type (A=Agent | C=Customer): C


User Login Data Input
-------------------------------------------
Enter user login (10 chars max): HarryHorse
Enter the display name (30 chars max): Nay to Hay
Enter the password (must be 8 chars in length): RR$#jj99


Demographic Data Input
-------------------------------------------
Enter birth year (current age must be between 18 and 110): 1940
Enter the household Income: $12345.33
Enter the country (30 chars max.): japan


*** New account added! ***


<< ENTER key to Continue... >> [ENTER]


AGENT: Will Smith (50008)
================================================
Account Ticketing System - Agent Menu
================================================
```

```
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
0) Logout

Selection: 1

ERROR: Account listing is FULL, call ITS Support!

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
===============================================
Account Ticketing System - Agent Menu
===============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
0) Logout

Selection: 6

------ ----- -------------- ------ ---------------------------- --------
Ticket Acct# Display Name    Status Subject                      Messages
------ ----- -------------- ------ ---------------------------- --------
080599 20020 Shrimpy Shrimp  ACTIVE No power/does not turn on        1
------ ----- -------------- ------ ---------------------------- --------

Enter the ticket number to view the messages or
0 to return to previous menu: 80599


============================================================================
080599 (ACTIVE) Re: No power/does not turn on
============================================================================
CUSTOMER (Shrimpy Shrimp):
```

```
      The unit won't turn on - please help.

<< ENTER key to Continue... >> [ENTER]


------ ----- -------------- ------ ----------------------------- --------
Ticket Acct# Display Name    Status Subject                       Messages
------ ----- -------------- ------ ----------------------------- --------
080599 20020 Shrimpy Shrimp  ACTIVE No power/does not turn on         1
------ ----- -------------- ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 0

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
 -------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
 -------------------------------------------------
0) Logout

Selection: 7


------ ----- -------------- ------ ----------------------------- --------
Ticket Acct# Display Name    Status Subject                       Messages
------ ----- -------------- ------ ----------------------------- --------
080599 20020 Shrimpy Shrimp  ACTIVE No power/does not turn on         1
080004 20020 Shrimpy Shrimp  ACTIVE My head hurts!                    3
070533 30004 Betty Boop      ACTIVE Nothing happens...               20
080020 30004 Betty Boop      ACTIVE Double broken!                   20
080204 30001 Silly Sally     ACTIVE It's very messy!                  2
------ ----- -------------- ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 70533


===============================================================================
070533 (ACTIVE) Re: Nothing happens...
===============================================================================
CUSTOMER (Betty Boop):
   Instructions state to 'say yes' to the prompts - but nothing happens.

AGENT (Fred Flintstone):
```

    Is this when setting up the unit for the first time?

CUSTOMER (Betty Boop):
   Yes - it asks me if I'm ready to start and I tell it 'yes' nothing happens.

AGENT (Fred Flintstone):
   Are you pressing the 'yes' button on the unit?

CUSTOMER (Betty Boop):
   No, instructions state to say yes - not press any buttons.

<< ENTER key to Continue... >> **[ENTER]**

AGENT (Will Smith):
   'say' was meant to be interpretted as press the 'yes' button.

CUSTOMER (Betty Boop):
   But the instructions don't mention any buttons.

AGENT (Will Smith):
   Agreed, it isn't very clear, but you must press the yes button.

CUSTOMER (Betty Boop):
   There's no button in the instruction booklet.

AGENT (Will Smith):
   The button isn't in the instructions, it will be on the device.

<< ENTER key to Continue... >> **[ENTER]**

CUSTOMER (Betty Boop):
   Oh I get it that now makes sense.

CUSTOMER (Betty Boop):
   Wait... I get further now, but it's stops after pressing the yes button.

AGENT (Will Smith):
   What is the problem now?

CUSTOMER (Betty Boop):
   The instructions state to 'say no' if I have health issues.

AGENT (Will Smith):
   Do you have health issues?

<< ENTER key to Continue... >> **[ENTER]**

CUSTOMER (Betty Boop):
   No.

AGENT (Will Smith):
   Then what is the problem exactly?

```
CUSTOMER (Betty Boop):
   It doesn't do anything when I say No.

AGENT (Will Smith):
   Again, you don't 'say' no, you must press the no button.

CUSTOMER (Betty Boop):
   Oh I get it now - thanks!

<< ENTER key to Continue... >> [ENTER]


------ ----- -------------- ------ ----------------------------- --------
Ticket Acct# Display Name   Status Subject                       Messages
------ ----- -------------- ------ ----------------------------- --------
080599 20020 Shrimpy Shrimp ACTIVE No power/does not turn on        1
080004 20020 Shrimpy Shrimp ACTIVE My head hurts!                   3
070533 30004 Betty Boop     ACTIVE Nothing happens...              20
080020 30004 Betty Boop     ACTIVE Double broken!                  20
080204 30001 Silly Sally    ACTIVE It's very messy!                 2
------ ----- -------------- ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 0

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
0) Logout

Selection: 8

------ ----- -------------- ------ ----------------------------- --------
Ticket Acct# Display Name   Status Subject                       Messages
------ ----- -------------- ------ ----------------------------- --------
060001 30004 Betty Boop     CLOSED Frequent Disconnects             5
064611 20020 Shrimpy Shrimp CLOSED It gets hot and smokes           4
030530 30004 Betty Boop     CLOSED Does not respond to command...  20
080600 30004 Betty Boop     CLOSED Funny Noise!                     2
------ ----- -------------- ------ ----------------------------- --------
```

Enter the ticket number to view the messages or
0 to return to previous menu: **64611**

==
064611 (CLOSED) Re: It gets hot and smokes
==
CUSTOMER (Shrimpy Shrimp):
   When I put it in the oven, it gets hot and starts smoking.

AGENT (Will Smith):
   It is not designed to be put in the oven - your warranty is now void.

CUSTOMER (Shrimpy Shrimp):
   So you won't fix it?

AGENT (Will Smith):
   No - you will have to purchase another.

<< ENTER key to Continue... >> **[ENTER]**

------ ----- -------------- ------ ---------------------------- --------
Ticket Acct# Display Name   Status Subject   Messages
------ ----- -------------- ------ ---------------------------- --------
060001 30004 Betty Boop   CLOSED Frequent Disconnects   5
064611 20020 Shrimpy Shrimp CLOSED It gets hot and smokes   4
030530 30004 Betty Boop   CLOSED Does not respond to command... 20
080600 30004 Betty Boop   CLOSED Funny Noise!   2
------ ----- -------------- ------ ---------------------------- --------

Enter the ticket number to view the messages or
0 to return to previous menu: **0**

AGENT: Will Smith (50008)
==
Account Ticketing System - Agent Menu
==
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
----
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
----
0) Logout

Selection: **3**

Enter the account#: **20020**

```
Acct# Acct.Type Birth Income      Country     Disp.Name        Login      Password
----- --------- ----- ----------- ----------- ---------------- ---------- --------
20020 CUSTOMER   2000 $ 350500.35 KOREA       Shrimpy Shrimp   cust3      8*3*J*m*


Are you sure you want to remove this record? ([Y]es|[N]o): Y

*** Account Removed! ***

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
0) Logout

Selection: 4

Acct# Acct.Type Birth
----- --------- -----
30001 CUSTOMER   1990
50599 AGENT      1972
30004 CUSTOMER   1978
50008 AGENT      1952
50600 CUSTOMER   1940

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
```

```
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
0) Logout

Selection: 5

Acct# Acct.Type Birth Income      Country    Disp.Name       Login      Password
----- --------- ----- ---------- ---------- --------------- ---------- --------
30001 CUSTOMER   1990 $ 150000.10 CANADA     Silly Sally     cust1      A*1*3*D*
50599 AGENT      1972 $2250400.22 AFRICA     Fred Flintstone agent1     y*b*#*@*
30004 CUSTOMER   1978 $ 250800.74 INDIA      Betty Boop      cust2      7***F*a*
50008 AGENT      1952 $2350600.82 U.S.A.     Will Smith      agentJ     T***2*t*
50600 CUSTOMER   1940 $  12345.33 JAPAN      Nay to Hay      HarryHorse R*$*j*9*

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
0) Logout

Selection: 7

------ ----- -------------- ------ ---------------------------- --------
Ticket Acct# Display Name    Status Subject                      Messages
------ ----- -------------- ------ ---------------------------- --------
070533 30004 Betty Boop      ACTIVE Nothing happens...           20
080020 30004 Betty Boop      ACTIVE Double broken!               20
080204 30001 Silly Sally     ACTIVE It's very messy!             2
------ ----- -------------- ------ ---------------------------- --------

Enter the ticket number to view the messages or
0 to return to previous menu: 0

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
 1) Add a new account
```

```
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
0) Logout

Selection: 8


------ ----- -------------- ------ ---------------------------- --------
Ticket Acct# Display Name    Status Subject                      Messages
------ ----- -------------- ------ ---------------------------- --------
060001 30004 Betty Boop      CLOSED Frequent Disconnects            5
064611 20020 Shrimpy Shrimp  CLOSED It gets hot and smokes          4
030530 30004 Betty Boop      CLOSED Does not respond to command... 20
080600 30004 Betty Boop      CLOSED Funny Noise!                    2
------ ----- -------------- ------ ---------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 0

AGENT: Will Smith (50008)
================================================
Account Ticketing System - Agent Menu
================================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
0) Logout

Selection: 1

New Account Data (Account#:50601)
-------------------------------------------
Enter the account type (A=Agent | C=Customer): C

User Login Data Input
-------------------------------------------
```

```
Enter user login (10 chars max): CrazyCamel
Enter the display name (30 chars max): Sandy Sand
Enter the password (must be 8 chars in length): 12RR!@jj


Demographic Data Input
-------------------------------------------
Enter birth year (current age must be between 18 and 110): 1949
Enter the household Income: $54321.22
Enter the country (30 chars max.): Australia


*** New account added! ***


<< ENTER key to Continue... >> [ENTER]


AGENT: Will Smith (50008)
===============================================
Account Ticketing System - Agent Menu
===============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
0) Logout


Selection: 5

Acct# Acct.Type Birth Income      Country    Disp.Name       Login      Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
30001 CUSTOMER  1990 $ 150000.10 CANADA      Silly Sally     cust1      A*1*3*D*
50599 AGENT     1972 $2250400.22 AFRICA      Fred Flintstone agent1     y*b*#*@*
30004 CUSTOMER  1978 $ 250800.74 INDIA       Betty Boop      cust2      7***F*a*
50008 AGENT     1952 $2350600.82 U.S.A.      Will Smith      agentJ     T***2*t*
50601 CUSTOMER  1949 $   54321.22 AUSTRALIA  Sandy Sand      CrazyCamel 1*R*!*j*
50600 CUSTOMER  1940 $   12345.33 JAPAN      Nay to Hay      HarryHorse R*$*j*9*


<< ENTER key to Continue... >> [ENTER]


AGENT: Will Smith (50008)
===============================================
Account Ticketing System - Agent Menu
===============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
```

```
 5) List accounts: detailed view
------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
------------------------------------------------
0) Logout

Selection: 9


Enter ticket number: 80600


------------------------------------------
Ticket 080600 - Update Options
------------------------------------------
Status  : CLOSED
Subject : Funny Noise!
Acct#   : 30004
Customer: Betty Boop
------------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 1

ERROR: Ticket is closed - new messages are not permitted.

------------------------------------------
Ticket 080600 - Update Options
------------------------------------------
Status  : CLOSED
Subject : Funny Noise!
Acct#   : 30004
Customer: Betty Boop
------------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 2

ERROR: Ticket is already closed!

------------------------------------------
Ticket 080600 - Update Options
------------------------------------------
Status  : CLOSED
Subject : Funny Noise!
Acct#   : 30004
Customer: Betty Boop
```

```
-----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 3


Are you sure you RE-OPEN this closed ticket? ([Y]es|[N]o): N


-----------------------------------------
Ticket 080600 - Update Options
-----------------------------------------
Status  : CLOSED
Subject : Funny Noise!
Acct#   : 30004
Customer: Betty Boop
-----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 0


AGENT: Will Smith (50008)
================================================
Account Ticketing System - Agent Menu
================================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
------------------------------------------------
0) Logout


Selection: 8


------ ----- -------------- ------ ---------------------------- --------
Ticket Acct# Display Name    Status Subject                      Messages
------ ----- -------------- ------ ---------------------------- --------
060001 30004 Betty Boop      CLOSED Frequent Disconnects            5
064611 20020 Shrimpy Shrimp  CLOSED It gets hot and smokes          4
030530 30004 Betty Boop      CLOSED Does not respond to command...  20
080600 30004 Betty Boop      CLOSED Funny Noise!                    2
------ ----- -------------- ------ ---------------------------- --------


Enter the ticket number to view the messages or
```

```
0 to return to previous menu: 0

AGENT: Will Smith (50008)
==============================================
Account Ticketing System - Agent Menu
==============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
0) Logout

Selection: 9

Enter ticket number: 80600


-------------------------------------------
Ticket 080600 - Update Options
-------------------------------------------
Status  : CLOSED
Subject : Funny Noise!
Acct#   : 30004
Customer: Betty Boop
-------------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 3

Are you sure you RE-OPEN this closed ticket? ([Y]es|[N]o): Y

*** Ticket re-opened! ***


-------------------------------------------
Ticket 080600 - Update Options
-------------------------------------------
Status  : ACTIVE
Subject : Funny Noise!
Acct#   : 30004
Customer: Betty Boop
-------------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
```

```
0) Done
Selection: 1

Enter the ticket message details (150 chars. maximum). Press the ENTER key to
submit:
Enjoy your purchase!

-----------------------------------------
Ticket 080600 - Update Options
-----------------------------------------
Status  : ACTIVE
Subject : Funny Noise!
Acct#   : 30004
Customer: Betty Boop
-----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 2

Are you sure you CLOSE this ticket? ([Y]es|[N]o): Y

Do you want to leave a closing message? ([Y]es|[N]o): Y

Enter the ticket message details (150 chars. maximum). Press the ENTER key to
submit:
Ticket is now closed.

*** Ticket closed! ***

-----------------------------------------
Ticket 080600 - Update Options
-----------------------------------------
Status  : CLOSED
Subject : Funny Noise!
Acct#   : 30004
Customer: Betty Boop
-----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 0

AGENT: Will Smith (50008)
============================================
Account Ticketing System - Agent Menu
============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
```

```
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
0) Logout

Selection: 8


------ ----- -------------- ------ ----------------------------- --------
Ticket Acct# Display Name    Status Subject                       Messages
------ ----- -------------- ------ ----------------------------- --------
060001 30004 Betty Boop      CLOSED Frequent Disconnects             5
064611 20020 Shrimpy Shrimp  CLOSED It gets hot and smokes           4
030530 30004 Betty Boop      CLOSED Does not respond to command...   20
080600 30004 Betty Boop      CLOSED Funny Noise!                     4
------ ----- -------------- ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 80600


================================================================================
080600 (CLOSED) Re: Funny Noise!
================================================================================
CUSTOMER (Betty Boop):
   When it turns on it screams at me and it's quite offending.

CUSTOMER (Betty Boop):
   Never mind, I oiled it and all is fine now.

AGENT (Will Smith):
   Enjoy your purchase!

AGENT (Will Smith):
   Ticket is now closed.

<< ENTER key to Continue... >> [ENTER]


------ ----- -------------- ------ ----------------------------- --------
Ticket Acct# Display Name    Status Subject                       Messages
------ ----- -------------- ------ ----------------------------- --------
060001 30004 Betty Boop      CLOSED Frequent Disconnects             5
064611 20020 Shrimpy Shrimp  CLOSED It gets hot and smokes           4
030530 30004 Betty Boop      CLOSED Does not respond to command...   20
080600 30004 Betty Boop      CLOSED Funny Noise!                     4
------ ----- -------------- ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 0
```

```
AGENT: Will Smith (50008)
============================================
Account Ticketing System - Agent Menu
============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
0) Logout

Selection: 9

Enter ticket number: 70533


-------------------------------------------
Ticket 070533 - Update Options
-------------------------------------------
Status  : ACTIVE
Subject : Nothing happens...
Acct#   : 30004
Customer: Betty Boop
-------------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 1

ERROR: Message limit has been reached, call ITS Support!


-------------------------------------------
Ticket 070533 - Update Options
-------------------------------------------
Status  : ACTIVE
Subject : Nothing happens...
Acct#   : 30004
Customer: Betty Boop
-------------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 0

AGENT: Will Smith (50008)
```

```
===========================================
Account Ticketing System - Agent Menu
===========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
0) Logout

Selection: 9

Enter ticket number: 80204


-------------------------------------------
Ticket 080204 - Update Options
-------------------------------------------
Status  : ACTIVE
Subject : It's very messy!
Acct#   : 30001
Customer: Silly Sally
-------------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 2

Are you sure you CLOSE this ticket? ([Y]es|[N]o): Y

Do you want to leave a closing message? ([Y]es|[N]o): N

*** Ticket closed! ***


-------------------------------------------
Ticket 080204 - Update Options
-------------------------------------------
Status  : CLOSED
Subject : It's very messy!
Acct#   : 30001
Customer: Silly Sally
-------------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
```

```
Selection: 0

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
0) Logout

Selection: 9

Enter ticket number: 70533


-------------------------------------------
Ticket 070533 - Update Options
-------------------------------------------
Status  : ACTIVE
Subject : Nothing happens...
Acct#   : 30004
Customer: Betty Boop
-------------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 3

ERROR: Ticket is already active!

-------------------------------------------
Ticket 070533 - Update Options
-------------------------------------------
Status  : ACTIVE
Subject : Nothing happens...
Acct#   : 30004
Customer: Betty Boop
-------------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 0
```

```
AGENT: Will Smith (50008)
==========================================
Account Ticketing System - Agent Menu
==========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
--------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
--------------------------------------------
0) Logout

Selection: 9


Enter ticket number: 60001


-------------------------------------------
Ticket 060001 - Update Options
-------------------------------------------
Status  : CLOSED
Subject : Frequent Disconnects
Acct#   : 30004
Customer: Betty Boop
-------------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 3


Are you sure you RE-OPEN this closed ticket? ([Y]es|[N]o): N


-------------------------------------------
Ticket 060001 - Update Options
-------------------------------------------
Status  : CLOSED
Subject : Frequent Disconnects
Acct#   : 30004
Customer: Betty Boop
-------------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 3
```

```
Are you sure you RE-OPEN this closed ticket? ([Y]es|[N]o): Y

*** Ticket re-opened! ***


------------------------------------------
Ticket 060001 - Update Options
------------------------------------------
Status  : ACTIVE
Subject : Frequent Disconnects
Acct#   : 30004
Customer: Betty Boop
------------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 0

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
0) Logout

Selection: 7


------ ----- --------------- ------ ----------------------------- --------
Ticket Acct# Display Name     Status Subject                      Messages
------ ----- --------------- ------ ----------------------------- --------
060001 30004 Betty Boop      ACTIVE Frequent Disconnects            5
070533 30004 Betty Boop      ACTIVE Nothing happens...             20
080020 30004 Betty Boop      ACTIVE Double broken!                 20
------ ----- --------------- ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 60001


================================================================================
060001 (ACTIVE) Re: Frequent Disconnects
================================================================================
CUSTOMER (Betty Boop):
```

```
    Every time I go near the microwave the unit disconnects.

AGENT (Will Smith):
    Don't go near the microwave.

AGENT (Will Smith):
    It will radiate waves which will interrupt the unit.

CUSTOMER (Betty Boop):
    But I use the microwave a lot.

AGENT (Will Smith):
    You cook too much!

<< ENTER key to Continue... >> [ENTER]


------ ----- --------------- ------ ----------------------------- --------
Ticket Acct# Display Name     Status Subject                       Messages
------ ----- --------------- ------ ----------------------------- --------
060001 30004 Betty Boop       ACTIVE Frequent Disconnects             5
070533 30004 Betty Boop       ACTIVE Nothing happens...              20
080020 30004 Betty Boop       ACTIVE Double broken!                  20
------ ----- --------------- ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 0

AGENT: Will Smith (50008)
================================================
Account Ticketing System - Agent Menu
================================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
------------------------------------------------
0) Logout

Selection: 0

### LOGGED OUT ###


================================================
Account Ticketing System - Login
================================================
1) Login to the system
```

```
0) Exit application
------------------------------------------------

Selection: 0

Are you sure you want to exit? ([Y]es|[N]o): y


==============================================
Account Ticketing System - Terminated
==============================================
```

Milestone – 3 Submission

7. ***This is a <u>test submission</u> for verifying your work only*** – no files will be submitted to your instructor.

8. Upload (file transfer) your all header and source files:
   - **a2ms3.c**
   - **account.c**
   - **account.h**
   - **accountTicketingUI.c**
   - **accountTicketingUI.h**
   - **commonHelpers.c**
   - **commonHelpers.h**
   - **ticket.h**
   - **ticket.c**

9. Login to matrix in an SSH terminal and change directory to where you placed your source code.

10. Manually compile and run your program to make sure everything works properly:
    ```
    gcc -Wall a2ms3.c account.c ticket.c accountTicketingUI.c commonHelpers.c -o
    ms3 <ENTER>
    ```

    If there are no error/warnings are generated, execute it: **ms3** *<ENTER>*

11. Run the submission command below (replace **profname.proflastname** with <u>**your professors**</u> Seneca userid and replace **NAA** with your section):
    ```
    ~profName.proflastname/submit 144a2ms3/NAA_ms3 <ENTER>
    ```

12. Follow the on-screen submission instructions.

Milestone – 4 *(Worth 20%, Due Date: April 9th)*

This will be the final milestone for the account ticketing system application. The last major component to be added will involve the implementation of persistent storage of the account and ticketing data. The system will require the functionality to load account and ticket information from files, save account and ticket information to files and finally archive data which will no longer be actively used in the system.

This is your last chance to refine your work! The completion of this milestone is a culmination of weeks of hard work, and you should celebrate it by polishing it with all the refinements you can think of and make it a piece of work you can be proud of. Therefore, it is expected you will thoroughly review your code and…

1. Implement all necessary changes as per your instructor's feedback from previous milestones.
2. Beautify your code so it is easy to read and maintain, which includes:
    o Consistent formatting of code (indentation and line-spacing).
    o Use of sufficient comments that concisely describe critical sections of logic to maximize the understanding of your code where the code is otherwise not quickly easy to read.
    o Applying best practices for variable, function, and parameter naming.
    o Following the style guidelines as demonstrated by the course notes, video examples, previous tests quizzes, and your professor's examples.
3. Remove any violations of the single-entry single-exit principle (see course notes regarding the use of flags to control logic flow).
4. Apply as best you can, the design principles for modularity and structured design as described in the course notes.

Specifications

The application will need to add support for reading and writing of data from and to text files that will store data persistently – there are four (4) text files involved:

accounts.txt

The "**accounts.txt**" file is responsible for storing all the system's <u>account</u> data. Each member of the Account data type is represented in the data and delimited using a tilde (~) symbol. Review the contents of this file carefully. (See the file included with this project.)

tickets.txt

The "**tickets.txt**" file is responsible for storing all the system's <u>ticket</u> data (including messages). Each member of the Ticket data type is represented in the data and delimited using a pipe (|) symbol. Review the contents of this file carefully – particularly how it stores the related messages. (See the file included with this project.)

accounts_arc.txt

The "**accounts_arc.txt**" file is responsible for storing all the *archived* (removed) accounts from the system. The data format for this file is the same as in the "accounts.txt" file.

tickets_arc.txt

The "**tickets_arc.txt**" file is responsible for storing all the *archived* (closed) tickets. The data format for this file is the same as in the "tickets.txt" file.

There are critical times when data must be either read from a file or written to a file based on the following rules:

Application Start

- The starting routine of the application must _read_ from the **accounts.txt** and **tickets.txt** files to prepare the system for operation. Review the main() code in **a2ms4.c** and develop the necessary functions that are called which populate the Account and Ticket type array's.

Customer

- When a **customer** log's out of their session and returns to the main login menu, the current state of the *tickets array* must be saved to the *tickets.txt* file (recreates the file) and displays the number of ticket records stored to the file. Review the sample output where a customer log's out to see how this should work.
  Note
  The customer portion of the system should not have access to all the account data (other than the customer's own account record which cannot be modified) so there is no reason to update the accounts data file.

Agent

- Menu option: " **3) Remove an account**"
  - o Removing an account record will involve the *archiving* of all related tickets to the "*tickets_arc.txt*" data file that are in a "*closed*" state (closed tickets must be retained for auditing purposes).
  - o All tickets related to the account being removed (open or closed status) should be removed from the system's main tickets array and set to an empty state to free-up space for new tickets.
  - o Removing of an account record will also require the account record to be archived to the "*accounts_arc.txt*" data file and removed from the system's main accounts array and set to an empty state to free-up space for new accounts.

- Menu option: "**10) Archive closed tickets**"
  - o All tickets in a "*closed*" state, should be appended to the "*tickets_arc.txt*" data file.
  - o After archiving a ticket record, the element in the system's tickets array should be **set to an empty state** to free-up space for new tickets.

- The agent main menu requires modification to include **two (2)** more options:

```
11) View archived account statistics
12) View archived tickets statistics
```

  - o Viewing of the **account** statistics will display the number of account records in the account archive file "*accounts_arc.txt*".
  - o Viewing of the **tickets** statistics will display the number of ticket records and total messages that are stored in the archive file "*tickets_arc.txt*".
  - o Review the sample output for how this should work.

- When an **agent** log's out of their session and returns to the main login menu, the current state of the *accounts array* must be saved to the *accounts.txt* file (recreates the file). The current state of the *tickets array* must also be saved to the *tickets.txt* file (recreates the file) and displays the number of records saved to each file. Review the sample output where an agent log's out to see how this should work.

A2-MS4: Sample Output

```
##########################################################################
Starting Account Ticketing System....
    Loading account data... (15 accounts loaded)
    Loading ticket data...  (16 tickets loaded)
##########################################################################



==========================================
Account Ticketing System - Login
==========================================
1) Login to the system
0) Exit application
-------------------------------------------------

Selection: 1

Enter the account#: 30004
User Login    : cust2
Password      : 77*&FFaa7
INVALID user login/password combination! [attempts remaining:2]

Enter the account#: 30004
User Login    : cust2
Password      : TT*&21tt
INVALID user login/password combination! [attempts remaining:1]

Enter the account#: 30004
User Login    : cust3
Password      : 77*&FFaa
INVALID user login/password combination! [attempts remaining:0]

ERROR:  Login failed!

<< ENTER key to Continue... >> [ENTER]

==========================================
Account Ticketing System - Login
==========================================
1) Login to the system
0) Exit application
-------------------------------------------------

Selection: 1

Enter the account#: 30005
User Login    : cust2
Password      : 77*&FFaa
```

```
INVALID user login/password combination! [attempts remaining:2]

Enter the account#: 30004
User Login    : cust2
Password      : 77*&FFaa

CUSTOMER: Betty Boop (30004)
=============================================
Customer Main Menu
=============================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
-------------------------------------------------
0) Logout

Selection: 1

Acct# Acct.Type Birth Income        Country     Disp.Name        Login      Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
30004 CUSTOMER   1978 $ 250800.74 INDIA       Betty Boop      cust2      7***F*a*

<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Betty Boop (30004)
=============================================
Customer Main Menu
=============================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
-------------------------------------------------
0) Logout

Selection: 4

------ ------ ------------------------------ --------
Ticket Status Subject                        Messages
------ ------ ------------------------------ --------
060001 ACTIVE Frequent Disconnects              5
030530 ACTIVE Does not respond to command...   20
070533 ACTIVE Nothing happens...               20
080020 ACTIVE It's broken/does not work        19
------ ------ ------------------------------ --------

Enter the ticket number to view the messages or
0 to return to previous menu: 80004

ERROR: Invalid ticket number - you may only access your own tickets.

<< ENTER key to Continue... >> [ENTER]

------ ------ ------------------------------ --------
Ticket Status Subject                        Messages
------ ------ ------------------------------ --------
060001 ACTIVE Frequent Disconnects              5
```

```
030530 ACTIVE Does not respond to command...    20
070533 ACTIVE Nothing happens...                20
080020 ACTIVE It's broken/does not work         19
------ ------ ---------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 60001


===============================================================================
060001 (ACTIVE) Re: Frequent Disconnects
===============================================================================
CUSTOMER (Betty Boop):
   Every time I go near the microwave the unit disconnects.

AGENT (Will Smith):
   Don't go near the microwave.

AGENT (Will Smith):
   It will radiate waves which will interrupt the unit.

CUSTOMER (Betty Boop):
   But I use the microwave a lot.

AGENT (Will Smith):
   You cook too much!

<< ENTER key to Continue... >> [ENTER]

------ ------ ---------------------------- --------
Ticket Status Subject                      Messages
------ ------ ---------------------------- --------
060001 ACTIVE Frequent Disconnects             5
030530 ACTIVE Does not respond to command...   20
070533 ACTIVE Nothing happens...               20
080020 ACTIVE It's broken/does not work        19
------ ------ ---------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 80020


===============================================================================
080020 (ACTIVE) Re: It's broken/does not work
===============================================================================
CUSTOMER (Betty Boop):
   When I took it out of the box, it was in pieces.

AGENT (Will Smith):
   You have to assemble it - read the instructions.

CUSTOMER (Betty Boop):
   What are instructions?

AGENT (Will Smith):
   The paper document that look's like a book with words.

CUSTOMER (Betty Boop):
   Oh - right, okay so it says to snap part-1 to part-2.
```

```
<< ENTER key to Continue... >> [ENTER]

CUSTOMER (Betty Boop):
   Hello? what should I do?

CUSTOMER (Betty Boop):
   Then it says to place part-3 on parts 1 and 2 then twist.

CUSTOMER (Betty Boop):
   Please help... I don't know what this means.

AGENT (Will Smith):
   It's been 9 months, are you still unable to assemble it?

CUSTOMER (Betty Boop):
   Yes, I am stuck on instruction 2 the twist part.

<< ENTER key to Continue... >> [ENTER]

AGENT (Will Smith):
   Place part-3 into the grooves of parts 1 and 2, then rotate clockwise.

CUSTOMER (Betty Boop):
   Why?

CUSTOMER (Betty Boop):
   Hello?

CUSTOMER (Betty Boop):
   Well I did what you said, now it's in 3 pieces again.

AGENT (Will Smith):
   What did you do?

<< ENTER key to Continue... >> [ENTER]

CUSTOMER (Betty Boop):
   I put part-3 in the grooves, than I turned clockwise causing it to fall off the table.

AGENT (Will Smith):
   You were to rotate part-3 not turn yourself around!

CUSTOMER (Betty Boop):
   Well now what do I do?

AGENT (Will Smith):
   What do you think?

<< ENTER key to Continue... >> [ENTER]

------ ------ ----------------------------- --------
Ticket Status Subject                       Messages
------ ------ ----------------------------- --------
060001 ACTIVE Frequent Disconnects             5
030530 ACTIVE Does not respond to command...  20
070533 ACTIVE Nothing happens...              20
080020 ACTIVE It's broken/does not work       19
------ ------ ----------------------------- --------
```

```
Enter the ticket number to view the messages or
0 to return to previous menu: 0

CUSTOMER: Betty Boop (30004)
===========================================
Customer Main Menu
===========================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
-------------------------------------------
0) Logout

Selection: 2

New Ticket (Ticket#:080600)
-------------------------------------------
Enter the ticket SUBJECT (30 chars. maximum): Funny Noises are coming from the unit!
ERROR: String length must be no more than 30 chars: Funny Noise!

Enter the ticket message details (150 chars. maximum). Press the ENTER key to submit:
When it turns on it screams at me and it's quite offending.

*** New ticket created! ***

<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Betty Boop (30004)
===========================================
Customer Main Menu
===========================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
-------------------------------------------
0) Logout

Selection: 4

------ ------ ------------------------------ --------
Ticket Status Subject                         Messages
------ ------ ------------------------------ --------
060001 ACTIVE Frequent Disconnects              5
030530 ACTIVE Does not respond to command...   20
070533 ACTIVE Nothing happens...               20
080020 ACTIVE It's broken/does not work        19
080600 ACTIVE Funny Noise!                      1
------ ------ ------------------------------ --------

Enter the ticket number to view the messages or
0 to return to previous menu: 0

CUSTOMER: Betty Boop (30004)
===========================================
Customer Main Menu
```

```
=============================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
-------------------------------------------------
0) Logout

Selection: 2

ERROR: Ticket listing is FULL, call ITS Support!

<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Betty Boop (30004)
=============================================
Customer Main Menu
=============================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
-------------------------------------------------
0) Logout

Selection: 3

Enter ticket number: 80004

ERROR: Invalid ticket number - you may only modify your own ticket.

<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Betty Boop (30004)
=============================================
Customer Main Menu
=============================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
-------------------------------------------------
0) Logout

Selection: 3

Enter ticket number: 80020


-----------------------------------------
Ticket 080020 - Update Options
-----------------------------------------
Status  : ACTIVE
Subject : It's broken/does not work
-----------------------------------------
1) Modify the subject
2) Add a message
3) Close ticket
0) Done
```

```
Selection: 2

Enter the ticket message details (150 chars. maximum). Press the ENTER key to submit:
I'm so confused.

-----------------------------------------
Ticket 080020 - Update Options
-----------------------------------------
Status  : ACTIVE
Subject : It's broken/does not work
-----------------------------------------
1) Modify the subject
2) Add a message
3) Close ticket
0) Done
Selection: 1

Enter the revised ticket SUBJECT (30 chars. maximum): Double broken!

-----------------------------------------
Ticket 080020 - Update Options
-----------------------------------------
Status  : ACTIVE
Subject : Double broken!
-----------------------------------------
1) Modify the subject
2) Add a message
3) Close ticket
0) Done
Selection: 2

ERROR: Message limit has been reached, call ITS Support!

-----------------------------------------
Ticket 080020 - Update Options
-----------------------------------------
Status  : ACTIVE
Subject : Double broken!
-----------------------------------------
1) Modify the subject
2) Add a message
3) Close ticket
0) Done
Selection: 0

<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Betty Boop (30004)
==========================================
Customer Main Menu
==========================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
------------------------------------------
0) Logout
```

```
Selection: 3

Enter ticket number: 60001


-----------------------------------------
Ticket 060001 - Update Options
-----------------------------------------
Status  : ACTIVE
Subject : Frequent Disconnects
-----------------------------------------
1) Modify the subject
2) Add a message
3) Close ticket
0) Done
Selection: 3

Are you sure you CLOSE this ticket? ([Y]es|[N]o): Y

Do you want to leave a closing message? ([Y]es|[N]o): N

*** Ticket closed! ***

<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Betty Boop (30004)
===========================================
Customer Main Menu
===========================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
-------------------------------------------------
0) Logout

Selection: 3

Enter ticket number: 80600


-----------------------------------------
Ticket 080600 - Update Options
-----------------------------------------
Status  : ACTIVE
Subject : Funny Noise!
-----------------------------------------
1) Modify the subject
2) Add a message
3) Close ticket
0) Done
Selection: 3

Are you sure you CLOSE this ticket? ([Y]es|[N]o): Y

Do you want to leave a closing message? ([Y]es|[N]o): Y

Enter the ticket message details (150 chars. maximum). Press the ENTER key to submit:
Never mind, I oiled it and all is fine now.
```

```
*** Ticket closed! ***

<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Betty Boop (30004)
==========================================
Customer Main Menu
==========================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
-------------------------------------------------
0) Logout

Selection: 4


------ ------ ----------------------------- --------
Ticket Status Subject                        Messages
------ ------ ----------------------------- --------
060001 CLOSED Frequent Disconnects              5
030530 ACTIVE Does not respond to command...   20
070533 ACTIVE Nothing happens...               20
080020 ACTIVE Double broken!                   20
080600 CLOSED Funny Noise!                       2
------ ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 80600


==============================================================================
080600 (CLOSED) Re: Funny Noise!
==============================================================================
CUSTOMER (Betty Boop):
   When it turns on it screams at me and it's quite offending.

CUSTOMER (Betty Boop):
   Never mind, I oiled it and all is fine now.

<< ENTER key to Continue... >> [ENTER]

------ ------ ----------------------------- --------
Ticket Status Subject                        Messages
------ ------ ----------------------------- --------
060001 CLOSED Frequent Disconnects              5
030530 ACTIVE Does not respond to command...   20
070533 ACTIVE Nothing happens...               20
080020 ACTIVE Double broken!                   20
080600 CLOSED Funny Noise!                       2
------ ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 0

CUSTOMER: Betty Boop (30004)
==========================================
Customer Main Menu
==========================================
```

```
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
------------------------------------------------
0) Logout

Selection: 3

Enter ticket number: 30530

----------------------------------------
Ticket 030530 - Update Options
----------------------------------------
Status  : ACTIVE
Subject : Does not respond to command...
----------------------------------------
1) Modify the subject
2) Add a message
3) Close ticket
0) Done
Selection: 3

Are you sure you CLOSE this ticket? ([Y]es|[N]o): Y

*** Ticket closed! ***

<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Betty Boop (30004)
============================================
Customer Main Menu
============================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
------------------------------------------------
0) Logout

Selection: 3

Enter ticket number: 80600

ERROR: Ticket is closed - changes are not permitted.

<< ENTER key to Continue... >> [ENTER]

CUSTOMER: Betty Boop (30004)
============================================
Customer Main Menu
============================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
------------------------------------------------
0) Logout
```

```
Selection: 4


------ ------ ----------------------------- --------
Ticket Status Subject                       Messages
------ ------ ----------------------------- --------
060001 CLOSED Frequent Disconnects            5
030530 CLOSED Does not respond to command...  20
070533 ACTIVE Nothing happens...              20
080020 ACTIVE Double broken!                  20
080600 CLOSED Funny Noise!                    2
------ ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 80020


===============================================================================
080020 (ACTIVE) Re: Double broken!
===============================================================================
CUSTOMER (Betty Boop):
   When I took it out of the box, it was in pieces.

AGENT (Will Smith):
   You have to assemble it - read the instructions.

CUSTOMER (Betty Boop):
   What are instructions?

AGENT (Will Smith):
   The paper document that look's like a book with words.

CUSTOMER (Betty Boop):
   Oh - right, okay so it says to snap part-1 to part-2.

<< ENTER key to Continue... >> [ENTER]

CUSTOMER (Betty Boop):
   Hello? what should I do?

CUSTOMER (Betty Boop):
   Then it says to place part-3 on parts 1 and 2 then twist.

CUSTOMER (Betty Boop):
   Please help... I don't know what this means.

AGENT (Will Smith):
   It's been 9 months, are you still unable to assemble it?

CUSTOMER (Betty Boop):
   Yes, I am stuck on instruction 2 the twist part.

<< ENTER key to Continue... >> [ENTER]

AGENT (Will Smith):
   Place part-3 into the grooves of parts 1 and 2, then rotate clockwise.

CUSTOMER (Betty Boop):
   Why?
```

```
CUSTOMER (Betty Boop):
   Hello?

CUSTOMER (Betty Boop):
   Well I did what you said, now it's in 3 pieces again.

AGENT (Will Smith):
   What did you do?

<< ENTER key to Continue... >> [ENTER]

CUSTOMER (Betty Boop):
   I put part-3 in the grooves, than I turned clockwise causing it to fall off the table.

AGENT (Will Smith):
   You were to rotate part-3 not turn yourself around!

CUSTOMER (Betty Boop):
   Well now what do I do?

AGENT (Will Smith):
   What do you think?

CUSTOMER (Betty Boop):
   I'm so confused.

<< ENTER key to Continue... >> [ENTER]

------ ------ ------------------------------ --------
Ticket Status Subject                        Messages
------ ------ ------------------------------ --------
060001 CLOSED Frequent Disconnects              5
030530 CLOSED Does not respond to command...   20
070533 ACTIVE Nothing happens...               20
080020 ACTIVE Double broken!                   20
080600 CLOSED Funny Noise!                      2
------ ------ ------------------------------ --------

Enter the ticket number to view the messages or
0 to return to previous menu: 0

CUSTOMER: Betty Boop (30004)
=============================================
Customer Main Menu
=============================================
1) View your account detail
2) Create a new ticket
3) Modify an active ticket
4) List my tickets
---------------------------------------------
0) Logout

Selection: 0

Saving session modifications...
   17 tickets saved.
### LOGGED OUT ###
```

```
===========================================
Account Ticketing System - Login
===========================================
1) Login to the system
0) Exit application
-------------------------------------------------

Selection: 1

Enter the account#: 50008
User Login    : agentJ
Password      : TT*&21tt

AGENT: Will Smith (50008)
===========================================
Account Ticketing System - Agent Menu
===========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 11

There are 0 account(s) currently archived.

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
===========================================
Account Ticketing System - Agent Menu
===========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
```

```
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 12

There are 0 ticket(s) and a total of 0 message(s) archived.

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
==========================================
Account Ticketing System - Agent Menu
==========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 1

ERROR: Account listing is FULL, call ITS Support!

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
==========================================
Account Ticketing System - Agent Menu
==========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout
```

Selection: 3

Enter the account#: 34063
Acct# Acct.Type Birth Income   Country   Disp.Name   Login   Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
34063 CUSTOMER   1989 $ 27746.17 SRI LANKA Jeffrey Gills   Kibo   N*9*s*&*

Are you sure you want to remove this record? ([Y]es|[N]o): y
ERROR: Character must be one of [YN]: Y

*** Account Removed! ***

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
===
Account Ticketing System - Agent Menu
===
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
----
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
----
11) View archived account statistics
12) View archived tickets statistics
----
0) Logout

Selection: 1

New Account Data (Account#:82043)

Enter the account type (A=Agent | C=Customer): C

User Login Data Input

Enter user login (10 chars max): NobodyWillKnowMe
ERROR: String length must be no more than 10 chars: Nobody Will Know Me
ERROR: String length must be no more than 10 chars: No Body
ERROR: The user login must NOT contain whitespace characters.
Enter user login (10 chars max): HarryHorse
Enter the display name (30 chars max): Horse and goat and donkey get along
ERROR: String length must be no more than 30 chars: Nay to Hay
Enter the password (must be 8 chars in length): abcdefg
ERROR: String length must be exactly 8 chars: aaJJ88$#a
ERROR: String length must be exactly 8 chars: aJJ77$#J
SECURITY: Password must contain 2 of each:
        Digit: 0-9
        UPPERCASE character
        lowercase character
        symbol character: !@#$%^&*

```
Enter the password (must be 8 chars in length): aaJ99$#c
SECURITY: Password must contain 2 of each:
        Digit: 0-9
        UPPERCASE character
        lowercase character
        symbol character: !@#$%^&*
Enter the password (must be 8 chars in length): aaJJ8$#@
SECURITY: Password must contain 2 of each:
        Digit: 0-9
        UPPERCASE character
        lowercase character
        symbol character: !@#$%^&*
Enter the password (must be 8 chars in length): aaJJ77*(
SECURITY: Password must contain 2 of each:
        Digit: 0-9
        UPPERCASE character
        lowercase character
        symbol character: !@#$%^&*
Enter the password (must be 8 chars in length): aaJJ88$#

Demographic Data Input
-----------------------------------------
Enter birth year (current age must be between 18 and 110): 2004
ERROR: Value must be between 1911 and 2003 inclusive: 1910
ERROR: Value must be between 1911 and 2003 inclusive: 2003
Enter the household Income: $asdf
ERROR: Value must be a double floating-point number: -8.22
ERROR: Value must be a positive double floating-point number: 0.00
ERROR: Value must be a positive double floating-point number: 125000.12
Enter the country (30 chars max.): Not all countries get along unfortunately
ERROR: String length must be no more than 30 chars: u.s.a.

*** New account added! ***

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
==============================================
Account Ticketing System - Agent Menu
==============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 2
```

```
Enter the account#: 53070

Account: 53070 - Update Options
----------------------------------------
1) Update account type (current value: A)
2) Login
3) Demographics
0) Done
Selection: 1

Enter the account type (A=Agent | C=Customer): c
ERROR: Character must be one of [AC]: C
Account: 53070 - Update Options
----------------------------------------
1) Update account type (current value: C)
2) Login
3) Demographics
0) Done
Selection: 2

User Login: Lara - Update Options
----------------------------------------
1) Display name (current value: Wylie Pollard)
2) Password
0) Done
Selection: 1

Enter the display name (30 chars max): Wylie Coyote

User Login: Lara - Update Options
----------------------------------------
1) Display name (current value: Wylie Coyote)
2) Password
0) Done
Selection: 2

Enter the password (must be 8 chars in length): dd99@$FF

User Login: Lara - Update Options
----------------------------------------
1) Display name (current value: Wylie Coyote)
2) Password
0) Done
Selection: 0

Account: 53070 - Update Options
----------------------------------------
1) Update account type (current value: C)
2) Login
3) Demographics
0) Done
Selection: 3

Demographic Update Options
----------------------------------------
1) Household Income (current value: $61384.65)
2) Country (current value: ALBANIA)
```

```
0) Done
Selection: 1

Enter the household Income: $0
ERROR: Value must be a positive double floating-point number: 180222.22

Demographic Update Options
-----------------------------------------
1) Household Income (current value: $180222.22)
2) Country (current value: ALBANIA)
0) Done
Selection: 2

Enter the country (30 chars max.): canada

Demographic Update Options
-----------------------------------------
1) Household Income (current value: $180222.22)
2) Country (current value: CANADA)
0) Done
Selection: 0

Account: 53070 - Update Options
-----------------------------------------
1) Update account type (current value: C)
2) Login
3) Demographics
0) Done
Selection: 0

AGENT: Will Smith (50008)
===========================================
Account Ticketing System - Agent Menu
===========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-----------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-----------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-----------------------------------------------
0) Logout

Selection: 5

Acct# Acct.Type Birth Income      Country    Disp.Name       Login      Password
----- --------- ----- ---------- ---------- --------------- ---------- --------
30001 CUSTOMER  1990 $ 150000.10 CANADA     Silly Sally     cust1      A*1*3*D*
50599 AGENT     1972 $2250400.22 AFRICA     Fred Flintstone agent1     y*b*#*@*
30004 CUSTOMER  1978 $ 250800.74 INDIA      Betty Boop      cust2      7***F*a*
```

```
50008 AGENT        1952 $2350600.82 U.S.A.      Will Smith        agentJ     T***2*t*
20020 CUSTOMER     2000 $ 350500.35 KOREA       Shrimpy Shrimp    cust3      8*3*J*m*
34000 AGENT        1991 $  61907.58 GREECE      Xyla Yates        Cherokee   E*1*d*&*
53007 CUSTOMER     1963 $  22288.09 SLOVENIA    Chaney Kinney     Demetria   Y*0*j*&*
30014 AGENT        1999 $  35403.36 SPAIN       Hanae Horn        Keiko      R*5*r*&*
70021 AGENT        1951 $  77711.60 PORTUGAL    Kane Lancaster    Benjamin   H*8*z*&*
35035 CUSTOMER     1999 $  83024.91 HONDURAS    Honorato Banks    Kimberly   C*7*o*&*
82042 CUSTOMER     1932 $  40187.20 GUAM        Dexter Martin     Isabelle   H*2*k*&*
35049 CUSTOMER     1990 $  60494.16 LESOTHO     Buck Odom         Aidan      B*6*s*&*
54056 CUSTOMER     1961 $  91914.61 BAHAMAS     Craig Mcknight    Fredericka O*8*e*&*
82043 CUSTOMER     2003 $ 125000.12 U.S.A.      Nay to Hay        HarryHorse a*J*8*$*
53070 CUSTOMER     1990 $ 180222.22 CANADA      Wylie Coyote      Lara       d*9*@*F*

<< ENTER key to Continue... >> [ENTER]


AGENT: Will Smith (50008)
============================================
Account Ticketing System - Agent Menu
============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
------------------------------------------------
0) Logout

Selection: 6


------ ----- -------------- ------ ---------------------------- --------
Ticket Acct# Display Name    Status Subject                      Messages
------ ----- -------------- ------ ---------------------------- --------
080599 20020 Shrimpy Shrimp  ACTIVE No power/does not turn on        1
040599 35049 Buck Odom       ACTIVE Power Issue                      1
------ ----- -------------- ------ ---------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 80599


===============================================================================
080599 (ACTIVE) Re: No power/does not turn on
===============================================================================
CUSTOMER (Shrimpy Shrimp):
   The unit won't turn on - please help.

<< ENTER key to Continue... >> [ENTER]


------ ----- -------------- ------ ---------------------------- --------
Ticket Acct# Display Name    Status Subject                      Messages
```

```
------ ----- -------------- ------ ---------------------------- --------
080599 20020 Shrimpy Shrimp  ACTIVE No power/does not turn on         1
040599 35049 Buck Odom       ACTIVE Power Issue                      1
------ ----- -------------- ------ ---------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 0

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
 ------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
 ------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
 ------------------------------------------------
0) Logout

Selection: 7


------ ----- -------------- ------ ---------------------------- --------
Ticket Acct# Display Name    Status Subject                      Messages
------ ----- -------------- ------ ---------------------------- --------
080599 20020 Shrimpy Shrimp  ACTIVE No power/does not turn on         1
080004 20020 Shrimpy Shrimp  ACTIVE My head hurts!                    3
070533 30004 Betty Boop      ACTIVE Nothing happens...               20
080020 30004 Betty Boop      ACTIVE Double broken!                   20
080204 30001 Silly Sally     ACTIVE It's very messy!                  2
040599 35049 Buck Odom       ACTIVE Power Issue                      1
040001 70021 Kane Lancaster  ACTIVE Connectivity Problem              5
040530 70021 Kane Lancaster  ACTIVE Not doing what it's told...      20
040004 35049 Buck Odom       ACTIVE Causes bodily harm!               3
040533 70021 Kane Lancaster  ACTIVE Doesn't respond...               20
040020 70021 Kane Lancaster  ACTIVE Damaged and in pieces            19
040204 53070 Wylie Pollard   ACTIVE It's very messy!                  2
------ ----- -------------- ------ ---------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 70533


===============================================================================
070533 (ACTIVE) Re: Nothing happens...
===============================================================================
CUSTOMER (Betty Boop):
   Instructions state to 'say yes' to the prompts - but nothing happens.


AGENT (Fred Flintstone):
```

```
   Is this when setting up the unit for the first time?

CUSTOMER (Betty Boop):
   Yes - it asks me if I'm ready to start and I tell it 'yes' nothing happens.

AGENT (Fred Flintstone):
   Are you pressing the 'yes' button on the unit?

CUSTOMER (Betty Boop):
   No, instructions state to say yes - not press any buttons.

<< ENTER key to Continue... >> [ENTER]

AGENT (Will Smith):
   'say' was meant to be interpreted as press the 'yes' button.

CUSTOMER (Betty Boop):
   But the instructions don't mention any buttons.

AGENT (Will Smith):
   Agreed, it isn't very clear, but you must press the yes button.

CUSTOMER (Betty Boop):
   There's no button in the instruction booklet.

AGENT (Will Smith):
   The button isn't in the instructions, it will be on the device.

<< ENTER key to Continue... >> [ENTER]

CUSTOMER (Betty Boop):
   Oh I get it that now makes sense.

CUSTOMER (Betty Boop):
   Wait... I get further now, but it's stops after pressing the yes button.

AGENT (Will Smith):
   What is the problem now?

CUSTOMER (Betty Boop):
   The instructions state to 'say no' if I have health issues.

AGENT (Will Smith):
   Do you have health issues?

<< ENTER key to Continue... >> [ENTER]

CUSTOMER (Betty Boop):
   No.

AGENT (Will Smith):
   Then what is the problem exactly?

CUSTOMER (Betty Boop):
   It doesn't do anything when I say No.

AGENT (Will Smith):
   Again, you don't 'say' no, you must press the no button.
```

```
CUSTOMER (Betty Boop):
   Oh I get it now - thanks!

<< ENTER key to Continue... >> [ENTER]


------ ----- --------------- ------ ----------------------------- --------
Ticket Acct# Display Name    Status Subject                       Messages
------ ----- --------------- ------ ----------------------------- --------
080599 20020 Shrimpy Shrimp  ACTIVE No power/does not turn on         1
080004 20020 Shrimpy Shrimp  ACTIVE My head hurts!                    3
070533 30004 Betty Boop      ACTIVE Nothing happens...               20
080020 30004 Betty Boop      ACTIVE Double broken!                   20
080204 30001 Silly Sally     ACTIVE It's very messy!                  2
040599 35049 Buck Odom       ACTIVE Power Issue                       1
040001 70021 Kane Lancaster  ACTIVE Connectivity Problem              5
040530 70021 Kane Lancaster  ACTIVE Not doing what it's told...      20
040004 35049 Buck Odom       ACTIVE Causes bodily harm!               3
040533 70021 Kane Lancaster  ACTIVE Doesn't respond...               20
040020 70021 Kane Lancaster  ACTIVE Damaged and in pieces            19
040204 53070 Wylie Pollard   ACTIVE It's very messy!                  2
------ ----- --------------- ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 0

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-----------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-----------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-----------------------------------------------
0) Logout

Selection: 8


------ ----- --------------- ------ ----------------------------- --------
Ticket Acct# Display Name    Status Subject                       Messages
------ ----- --------------- ------ ----------------------------- --------
060001 30004 Betty Boop      CLOSED Frequent Disconnects              5
064611 20020 Shrimpy Shrimp  CLOSED It gets hot and smokes            4
030530 30004 Betty Boop      CLOSED Does not respond to command...   20
044611 35049 Buck Odom       CLOSED Unit is burning up                4
080600 30004 Betty Boop      CLOSED Funny Noise!                      2
------ ----- --------------- ------ ----------------------------- --------
```

```
Enter the ticket number to view the messages or
0 to return to previous menu: 64611


===========================================================================
064611 (CLOSED) Re: It gets hot and smokes
===========================================================================
CUSTOMER (Shrimpy Shrimp):
   When I put it in the oven, it gets hot and starts smoking.

AGENT (Will Smith):
   It is not designed to be put in the oven - your warranty is now void.

CUSTOMER (Shrimpy Shrimp):
   So you won't fix it?

AGENT (Will Smith):
   No - you will have to purchase another.

<< ENTER key to Continue... >> [ENTER]


------ ----- -------------- ------ ----------------------------- --------
Ticket Acct# Display Name   Status Subject                       Messages
------ ----- -------------- ------ ----------------------------- --------
060001 30004 Betty Boop     CLOSED Frequent Disconnects             5
064611 20020 Shrimpy Shrimp CLOSED It gets hot and smokes           4
030530 30004 Betty Boop     CLOSED Does not respond to command...   20
044611 35049 Buck Odom      CLOSED Unit is burning up               4
080600 30004 Betty Boop     CLOSED Funny Noise!                     2
------ ----- -------------- ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 0

AGENT: Will Smith (50008)
==========================================
Account Ticketing System - Agent Menu
==========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 3

Enter the account#: 20020
```

```
Acct# Acct.Type Birth Income       Country    Disp.Name       Login      Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
20020 CUSTOMER   2000 $ 350500.35 KOREA       Shrimpy Shrimp  cust3      8*3*J*m*

Are you sure you want to remove this record? ([Y]es|[N]o): Y

*** Account Removed! ***

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
==========================================
Account Ticketing System - Agent Menu
==========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 4

Acct# Acct.Type Birth
----- --------- -----
30001 CUSTOMER   1990
50599 AGENT      1972
30004 CUSTOMER   1978
50008 AGENT      1952
34000 AGENT      1991
53007 CUSTOMER   1963
30014 AGENT      1999
70021 AGENT      1951
35035 CUSTOMER   1999
82042 CUSTOMER   1932
35049 CUSTOMER   1990
54056 CUSTOMER   1961
82043 CUSTOMER   2003
53070 CUSTOMER   1990

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
==========================================
Account Ticketing System - Agent Menu
==========================================
 1) Add a new account
 2) Modify an existing account
```

```
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
 0) Logout

Selection: 5

Acct# Acct.Type Birth Income      Country    Disp.Name       Login      Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
30001 CUSTOMER   1990 $ 150000.10 CANADA     Silly Sally     cust1      A*1*3*D*
50599 AGENT      1972 $2250400.22 AFRICA     Fred Flintstone agent1     y*b*#*@*
30004 CUSTOMER   1978 $ 250800.74 INDIA      Betty Boop      cust2      7***F*a*
50008 AGENT      1952 $2350600.82 U.S.A.     Will Smith      agentJ     T***2*t*
34000 AGENT      1991 $   61907.58 GREECE    Xyla Yates      Cherokee   E*1*d*&*
53007 CUSTOMER   1963 $   22288.09 SLOVENIA  Chaney Kinney   Demetria   Y*0*j*&*
30014 AGENT      1999 $   35403.36 SPAIN     Hanae Horn      Keiko      R*5*r*&*
70021 AGENT      1951 $   77711.60 PORTUGAL  Kane Lancaster  Benjamin   H*8*z*&*
35035 CUSTOMER   1999 $   83024.91 HONDURAS  Honorato Banks  Kimberly   C*7*o*&*
82042 CUSTOMER   1932 $   40187.20 GUAM      Dexter Martin   Isabelle   H*2*k*&*
35049 CUSTOMER   1990 $   60494.16 LESOTHO   Buck Odom       Aidan      B*6*s*&*
54056 CUSTOMER   1961 $   91914.61 BAHAMAS   Craig Mcknight  Fredericka O*8*e*&*
82043 CUSTOMER   2003 $ 125000.12 U.S.A.     Nay to Hay      HarryHorse a*J*8*$*
53070 CUSTOMER   1990 $ 180222.22 CANADA     Wylie Coyote    Lara       d*9*@*F*

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
 0) Logout

Selection: 7
```

```
------ ----- -------------- ------ ----------------------------- --------
Ticket Acct# Display Name   Status Subject                       Messages
------ ----- -------------- ------ ----------------------------- --------
070533 30004 Betty Boop     ACTIVE Nothing happens...               20
080020 30004 Betty Boop     ACTIVE Double broken!                   20
080204 30001 Silly Sally    ACTIVE It's very messy!                  2
040599 35049 Buck Odom      ACTIVE Power Issue                       1
040001 70021 Kane Lancaster ACTIVE Connectivity Problem              5
040530 70021 Kane Lancaster ACTIVE Not doing what it's told...      20
040004 35049 Buck Odom      ACTIVE Causes bodily harm!               3
040533 70021 Kane Lancaster ACTIVE Doesn't respond...               20
040020 70021 Kane Lancaster ACTIVE Damaged and in pieces            19
040204 53070 Wylie Pollard  ACTIVE It's very messy!                  2
------ ----- -------------- ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 0

AGENT: Will Smith (50008)
==========================================
Account Ticketing System - Agent Menu
==========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 8

------ ----- -------------- ------ ----------------------------- --------
Ticket Acct# Display Name   Status Subject                       Messages
------ ----- -------------- ------ ----------------------------- --------
060001 30004 Betty Boop     CLOSED Frequent Disconnects              5
030530 30004 Betty Boop     CLOSED Does not respond to command...   20
044611 35049 Buck Odom      CLOSED Unit is burning up                4
080600 30004 Betty Boop     CLOSED Funny Noise!                      2
------ ----- -------------- ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 0

AGENT: Will Smith (50008)
==========================================
Account Ticketing System - Agent Menu
==========================================
```

```
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 1

New Account Data (Account#:82044)
-----------------------------------------
Enter the account type (A=Agent | C=Customer): C

User Login Data Input
-----------------------------------------
Enter user login (10 chars max): CrazyCamel
Enter the display name (30 chars max): Sandy Sand
Enter the password (must be 8 chars in length): 12RR!@jj

Demographic Data Input
-----------------------------------------
Enter birth year (current age must be between 18 and 110): 1911
Enter the household Income: $54321.22
Enter the country (30 chars max.): Australia

*** New account added! ***

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
==========================================
Account Ticketing System - Agent Menu
==========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
```

```
0) Logout

Selection: 5

Acct# Acct.Type Birth Income       Country    Disp.Name        Login      Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
30001 CUSTOMER   1990 $ 150000.10 CANADA     Silly Sally     cust1      A*1*3*D*
50599 AGENT      1972 $2250400.22 AFRICA     Fred Flintstone agent1     y*b*#*@*
30004 CUSTOMER   1978 $ 250800.74 INDIA      Betty Boop      cust2      7***F*a*
50008 AGENT      1952 $2350600.82 U.S.A.     Will Smith      agentJ     T***2*t*
82044 CUSTOMER   1911 $   54321.22 AUSTRALIA Sandy Sand      CrazyCamel 1*R*!*j*
34000 AGENT      1991 $   61907.58 GREECE    Xyla Yates      Cherokee   E*1*d*&*
53007 CUSTOMER   1963 $   22288.09 SLOVENIA  Chaney Kinney   Demetria   Y*0*j*&*
30014 AGENT      1999 $   35403.36 SPAIN     Hanae Horn      Keiko      R*5*r*&*
70021 AGENT      1951 $   77711.60 PORTUGAL  Kane Lancaster  Benjamin   H*8*z*&*
35035 CUSTOMER   1999 $   83024.91 HONDURAS  Honorato Banks  Kimberly   C*7*o*&*
82042 CUSTOMER   1932 $   40187.20 GUAM      Dexter Martin   Isabelle   H*2*k*&*
35049 CUSTOMER   1990 $   60494.16 LESOTHO   Buck Odom       Aidan      B*6*s*&*
54056 CUSTOMER   1961 $   91914.61 BAHAMAS   Craig Mcknight  Fredericka O*8*e*&*
82043 CUSTOMER   2003 $ 125000.12 U.S.A.     Nay to Hay      HarryHorse a*J*8*$*
53070 CUSTOMER   1990 $ 180222.22 CANADA     Wylie Coyote    Lara       d*9*@*F*

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
============================================
Account Ticketing System - Agent Menu
============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-----------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-----------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-----------------------------------------------
0) Logout

Selection: 9

Enter ticket number: 80600

-----------------------------------------
Ticket 080600 - Update Options
-----------------------------------------
Status  : CLOSED
Subject : Funny Noise!
Acct#   : 30004
Customer: Betty Boop
-----------------------------------------
1) Add a message
```

```
2) Close ticket
3) Re-open ticket
0) Done
Selection: 1

ERROR: Ticket is closed - new messages are not permitted.

----------------------------------------
Ticket 080600 - Update Options
----------------------------------------
Status  : CLOSED
Subject : Funny Noise!
Acct#   : 30004
Customer: Betty Boop
----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 2

ERROR: Ticket is already closed!

----------------------------------------
Ticket 080600 - Update Options
----------------------------------------
Status  : CLOSED
Subject : Funny Noise!
Acct#   : 30004
Customer: Betty Boop
----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 3

Are you sure you RE-OPEN this closed ticket? ([Y]es|[N]o): N

----------------------------------------
Ticket 080600 - Update Options
----------------------------------------
Status  : CLOSED
Subject : Funny Noise!
Acct#   : 30004
Customer: Betty Boop
----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 0

AGENT: Will Smith (50008)
=========================================
Account Ticketing System - Agent Menu
=========================================
 1) Add a new account
```

```
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
------------------------------------------------
0) Logout

Selection: 8


------ ----- -------------- ------ ------------------------------ --------
Ticket Acct# Display Name    Status Subject                        Messages
------ ----- -------------- ------ ------------------------------ --------
060001 30004 Betty Boop     CLOSED Frequent Disconnects              5
030530 30004 Betty Boop     CLOSED Does not respond to command...   20
044611 35049 Buck Odom      CLOSED Unit is burning up                4
080600 30004 Betty Boop     CLOSED Funny Noise!                      2
------ ----- -------------- ------ ------------------------------ --------


Enter the ticket number to view the messages or
0 to return to previous menu: 0

AGENT: Will Smith (50008)
===========================================
Account Ticketing System - Agent Menu
===========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
------------------------------------------------
0) Logout

Selection: 9

Enter ticket number: 80600


-----------------------------------------
Ticket 080600 - Update Options
-----------------------------------------
```

```
Status  : CLOSED
Subject : Funny Noise!
Acct#   : 30004
Customer: Betty Boop
----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 3

Are you sure you RE-OPEN this closed ticket? ([Y]es|[N]o): Y

*** Ticket re-opened! ***


----------------------------------------
Ticket 080600 - Update Options
----------------------------------------
Status  : ACTIVE
Subject : Funny Noise!
Acct#   : 30004
Customer: Betty Boop
----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 1

Enter the ticket message details (150 chars. maximum). Press the ENTER key to submit:
Enjoy your purchase!

----------------------------------------
Ticket 080600 - Update Options
----------------------------------------
Status  : ACTIVE
Subject : Funny Noise!
Acct#   : 30004
Customer: Betty Boop
----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 2

Are you sure you CLOSE this ticket? ([Y]es|[N]o): Y

Do you want to leave a closing message? ([Y]es|[N]o): Y

Enter the ticket message details (150 chars. maximum). Press the ENTER key to submit:
Ticket is now closed.

*** Ticket closed! ***


----------------------------------------
Ticket 080600 - Update Options
----------------------------------------
```

```
Status  : CLOSED
Subject : Funny Noise!
Acct#   : 30004
Customer: Betty Boop
----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 0

AGENT: Will Smith (50008)
============================================
Account Ticketing System - Agent Menu
============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------
0) Logout

Selection: 8

------ ----- -------------- ------ ------------------------------ --------
Ticket Acct# Display Name    Status Subject                        Messages
------ ----- -------------- ------ ------------------------------ --------
060001 30004 Betty Boop      CLOSED Frequent Disconnects              5
030530 30004 Betty Boop      CLOSED Does not respond to command...   20
044611 35049 Buck Odom       CLOSED Unit is burning up                4
080600 30004 Betty Boop      CLOSED Funny Noise!                      4
------ ----- -------------- ------ ------------------------------ --------


Enter the ticket number to view the messages or
0 to return to previous menu: 80600


===============================================================================
080600 (CLOSED) Re: Funny Noise!
===============================================================================
CUSTOMER (Betty Boop):
   When it turns on it screams at me and it's quite offending.

CUSTOMER (Betty Boop):
   Never mind, I oiled it and all is fine now.

AGENT (Will Smith):
   Enjoy your purchase!
```

```
AGENT (Will Smith):
   Ticket is now closed.

<< ENTER key to Continue... >> [ENTER]


------ ----- -------------- ------ ----------------------------- --------
Ticket Acct# Display Name    Status Subject                       Messages
------ ----- -------------- ------ ----------------------------- --------
060001 30004 Betty Boop      CLOSED Frequent Disconnects             5
030530 30004 Betty Boop      CLOSED Does not respond to command...  20
044611 35049 Buck Odom       CLOSED Unit is burning up               4
080600 30004 Betty Boop      CLOSED Funny Noise!                     4
------ ----- -------------- ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 0

AGENT: Will Smith (50008)
===========================================
Account Ticketing System - Agent Menu
===========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
--------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
--------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
--------------------------------------------
0) Logout

Selection: 9

Enter ticket number: 70533


----------------------------------------
Ticket 070533 - Update Options
----------------------------------------
Status  : ACTIVE
Subject : Nothing happens...
Acct#   : 30004
Customer: Betty Boop
----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 1

ERROR: Message limit has been reached, call ITS Support!
```

```
-----------------------------------------
Ticket 070533 - Update Options
-----------------------------------------
Status  : ACTIVE
Subject : Nothing happens...
Acct#   : 30004
Customer: Betty Boop
-----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 0

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 9

Enter ticket number: 80204


-----------------------------------------
Ticket 080204 - Update Options
-----------------------------------------
Status  : ACTIVE
Subject : It's very messy!
Acct#   : 30001
Customer: Silly Sally
-----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 2

Are you sure you CLOSE this ticket? ([Y]es|[N]o): Y

Do you want to leave a closing message? ([Y]es|[N]o): N

*** Ticket closed! ***
```

```
----------------------------------------
Ticket 080204 - Update Options
----------------------------------------
Status  : CLOSED
Subject : It's very messy!
Acct#   : 30001
Customer: Silly Sally
----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 0

AGENT: Will Smith (50008)
===========================================
Account Ticketing System - Agent Menu
===========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-----------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-----------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-----------------------------------------------
0) Logout

Selection: 9

Enter ticket number: 80020


----------------------------------------
Ticket 080020 - Update Options
----------------------------------------
Status  : ACTIVE
Subject : Double broken!
Acct#   : 30004
Customer: Betty Boop
----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 2

Are you sure you CLOSE this ticket? ([Y]es|[N]o): Y

*** Ticket closed! ***
```

```
-----------------------------------------
Ticket 080020 - Update Options
-----------------------------------------
Status  : CLOSED
Subject : Double broken!
Acct#   : 30004
Customer: Betty Boop
-----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 0

AGENT: Will Smith (50008)
==========================================
Account Ticketing System - Agent Menu
==========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 9

Enter ticket number: 70533


-----------------------------------------
Ticket 070533 - Update Options
-----------------------------------------
Status  : ACTIVE
Subject : Nothing happens...
Acct#   : 30004
Customer: Betty Boop
-----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 3

ERROR: Ticket is already active!


-----------------------------------------
Ticket 070533 - Update Options
-----------------------------------------
```

```
Status  : ACTIVE
Subject : Nothing happens...
Acct#   : 30004
Customer: Betty Boop
----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 0

AGENT: Will Smith (50008)
==========================================
Account Ticketing System - Agent Menu
==========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------
0) Logout

Selection: 9

Enter ticket number: 60001


----------------------------------------
Ticket 060001 - Update Options
----------------------------------------
Status  : CLOSED
Subject : Frequent Disconnects
Acct#   : 30004
Customer: Betty Boop
----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 3

Are you sure you RE-OPEN this closed ticket? ([Y]es|[N]o): N


----------------------------------------
Ticket 060001 - Update Options
----------------------------------------
Status  : CLOSED
Subject : Frequent Disconnects
Acct#   : 30004
```

```
Customer: Betty Boop
----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 3

Are you sure you RE-OPEN this closed ticket? ([Y]es|[N]o): Y

*** Ticket re-opened! ***


----------------------------------------
Ticket 060001 - Update Options
----------------------------------------
Status  : ACTIVE
Subject : Frequent Disconnects
Acct#   : 30004
Customer: Betty Boop
----------------------------------------
1) Add a message
2) Close ticket
3) Re-open ticket
0) Done
Selection: 0

AGENT: Will Smith (50008)
===========================================
Account Ticketing System - Agent Menu
===========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-----------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-----------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-----------------------------------------------
0) Logout

Selection: 7


------ ----- --------------- ------ ----------------------------- --------
Ticket Acct# Display Name    Status Subject                       Messages
------ ----- --------------- ------ ----------------------------- --------
060001 30004 Betty Boop      ACTIVE Frequent Disconnects             5
070533 30004 Betty Boop      ACTIVE Nothing happens...              20
040599 35049 Buck Odom       ACTIVE Power Issue                      1
040001 70021 Kane Lancaster  ACTIVE Connectivity Problem             5
040530 70021 Kane Lancaster  ACTIVE Not doing what it's told...     20
040004 35049 Buck Odom       ACTIVE Causes bodily harm!              3
```

```
040533 70021 Kane Lancaster  ACTIVE Doesn't respond...                    20
040020 70021 Kane Lancaster  ACTIVE Damaged and in pieces                 19
040204 53070 Wylie Pollard   ACTIVE It's very messy!                       2
------ ----- -------------- ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 60001


================================================================================
060001 (ACTIVE) Re: Frequent Disconnects
================================================================================
CUSTOMER (Betty Boop):
   Every time I go near the microwave the unit disconnects.

AGENT (Will Smith):
   Don't go near the microwave.

AGENT (Will Smith):
   It will radiate waves which will interrupt the unit.

CUSTOMER (Betty Boop):
   But I use the microwave a lot.

AGENT (Will Smith):
   You cook too much!

<< ENTER key to Continue... >> [ENTER]


------ ----- -------------- ------ ----------------------------- --------
Ticket Acct# Display Name   Status Subject                       Messages
------ ----- -------------- ------ ----------------------------- --------
060001 30004 Betty Boop     ACTIVE Frequent Disconnects                 5
070533 30004 Betty Boop     ACTIVE Nothing happens...                  20
040599 35049 Buck Odom      ACTIVE Power Issue                          1
040001 70021 Kane Lancaster ACTIVE Connectivity Problem                 5
040530 70021 Kane Lancaster ACTIVE Not doing what it's told...         20
040004 35049 Buck Odom      ACTIVE Causes bodily harm!                  3
040533 70021 Kane Lancaster ACTIVE Doesn't respond...                  20
040020 70021 Kane Lancaster ACTIVE Damaged and in pieces               19
040204 53070 Wylie Pollard  ACTIVE It's very messy!                     2
------ ----- -------------- ------ ----------------------------- --------


Enter the ticket number to view the messages or
0 to return to previous menu: 0

AGENT: Will Smith (50008)
=========================================
Account Ticketing System - Agent Menu
=========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-----------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
```

```
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 10

Are you sure? This action cannot be reversed. ([Y]es|[N]o): Y

*** 5 tickets archived ***

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 3

Enter the account#: 30001
Acct# Acct.Type Birth Income       Country    Disp.Name       Login      Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
30001 CUSTOMER   1990 $ 150000.10 CANADA     Silly Sally     cust1      A*1*3*D*

Are you sure you want to remove this record? ([Y]es|[N]o): Y

*** Account Removed! ***

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
```

```
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 3

Enter the account#: 50599
Acct# Acct.Type Birth Income      Country    Disp.Name       Login      Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
50599 AGENT      1972 $2250400.22 AFRICA     Fred Flintstone agent1     y*b*#*@*

Are you sure you want to remove this record? ([Y]es|[N]o): Y

*** Account Removed! ***

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
==========================================
Account Ticketing System - Agent Menu
==========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 3

Enter the account#: 30004
Acct# Acct.Type Birth Income      Country    Disp.Name       Login      Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
30004 CUSTOMER   1978 $ 250800.74 INDIA      Betty Boop      cust2      7***F*a*

Are you sure you want to remove this record? ([Y]es|[N]o): Y

*** Account Removed! ***
```

```
<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
===========================================
Account Ticketing System - Agent Menu
===========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 3

Enter the account#: 34000
Acct# Acct.Type Birth Income     Country    Disp.Name       Login      Password
----- --------- ----- ---------- ---------- --------------- ---------- --------
34000 AGENT      1991 $  61907.58 GREECE     Xyla Yates       Cherokee   E*1*d*&*

Are you sure you want to remove this record? ([Y]es|[N]o): Y

*** Account Removed! ***

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
===========================================
Account Ticketing System - Agent Menu
===========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 3
```

```
Enter the account#: 53007
Acct# Acct.Type Birth Income      Country    Disp.Name       Login      Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
53007 CUSTOMER   1963 $   22288.09 SLOVENIA   Chaney Kinney   Demetria   Y*0*j*&*

Are you sure you want to remove this record? ([Y]es|[N]o): Y

*** Account Removed! ***

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------
0) Logout

Selection: 3

Enter the account#: 30014
Acct# Acct.Type Birth Income      Country    Disp.Name       Login      Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
30014 AGENT      1999 $   35403.36 SPAIN      Hanae Horn      Keiko      R*5*r*&*

Are you sure you want to remove this record? ([Y]es|[N]o): Y

*** Account Removed! ***

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------
 6) List new tickets
 7) List active tickets
```

```
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
------------------------------------------------
0) Logout

Selection: 3

Enter the account#: 70021
Acct# Acct.Type Birth Income      Country    Disp.Name        Login      Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
70021 AGENT      1951 $  77711.60 PORTUGAL   Kane Lancaster   Benjamin   H*8*z*&*

Are you sure you want to remove this record? ([Y]es|[N]o): Y

*** Account Removed! ***

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
===========================================
Account Ticketing System - Agent Menu
===========================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
------------------------------------------------
0) Logout

Selection: 3

Enter the account#: 35035
Acct# Acct.Type Birth Income      Country    Disp.Name        Login      Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
35035 CUSTOMER   1999 $  83024.91 HONDURAS   Honorato Banks   Kimberly   C*7*o*&*

Are you sure you want to remove this record? ([Y]es|[N]o): Y

*** Account Removed! ***

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
===========================================
```

```
Account Ticketing System - Agent Menu
=============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 3

Enter the account#: 82042
Acct# Acct.Type Birth Income       Country    Disp.Name       Login      Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
82042 CUSTOMER   1932 $  40187.20 GUAM        Dexter Martin   Isabelle   H*2*k*&*

Are you sure you want to remove this record? ([Y]es|[N]o): Y

*** Account Removed! ***

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 3


Enter the account#: 35049
Acct# Acct.Type Birth Income       Country    Disp.Name       Login      Password
----- --------- ----- ----------- ---------- --------------- ---------- --------
```

```
35049 CUSTOMER    1990 $   60494.16 LESOTHO     Buck Odom       Aidan       B*6*s*&*

Are you sure you want to remove this record? ([Y]es|[N]o): Y

*** Account Removed! ***

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
============================================
Account Ticketing System - Agent Menu
============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
------------------------------------------------
0) Logout

Selection: 3

Enter the account#: 54056
Acct# Acct.Type Birth Income     Country    Disp.Name       Login      Password
----- --------- ----- ---------- ---------- --------------- ---------- --------
54056 CUSTOMER   1961 $  91914.61 BAHAMAS    Craig Mcknight  Fredericka O*8*e*&*

Are you sure you want to remove this record? ([Y]es|[N]o): Y

*** Account Removed! ***

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
============================================
Account Ticketing System - Agent Menu
============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
------------------------------------------------
```

```
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 5

Acct# Acct.Type Birth Income      Country    Disp.Name        Login      Password
----- --------- ----- ----------- ---------- ---------------- ---------- --------
50008 AGENT     1952 $2350600.82 U.S.A.     Will Smith       agentJ     T***2*t*
82044 CUSTOMER  1911 $   54321.22 AUSTRALIA  Sandy Sand       CrazyCamel 1*R*!*j*
82043 CUSTOMER  2003 $  125000.12 U.S.A.     Nay to Hay       HarryHorse a*J*8*$*
53070 CUSTOMER  1990 $  180222.22 CANADA     Wylie Coyote     Lara       d*9*@*F*

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 11

There are 13 account(s) currently archived.

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
```

```
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 12

There are 6 ticket(s) and a total of 54 message(s) archived.

<< ENTER key to Continue... >> [ENTER]

AGENT: Will Smith (50008)
=============================================
Account Ticketing System - Agent Menu
=============================================
 1) Add a new account
 2) Modify an existing account
 3) Remove an account
 4) List accounts: summary view
 5) List accounts: detailed view
-------------------------------------------------
 6) List new tickets
 7) List active tickets
 8) List closed tickets
 9) Manage a ticket
10) Archive closed tickets
-------------------------------------------------
11) View archived account statistics
12) View archived tickets statistics
-------------------------------------------------
0) Logout

Selection: 0

Saving session modifications...
   4 account saved.
   1 tickets saved.
### LOGGED OUT ###


=============================================
Account Ticketing System - Login
=============================================
1) Login to the system
0) Exit application
-------------------------------------------------

Selection: 0

Are you sure you want to exit? ([Y]es|[N]o): y


=============================================
Account Ticketing System - Terminated
=============================================
```

Reflection (Worth 20%, Due Date: April 9th)

Instructions

- Create a text file named "**reflect.txt**" and record your answers to the questions below in this file.
- Answer each question in <u>sentence/paragraph form</u> unless otherwise instructed.

1. NOT including the mandatory functions stated in the specifications from Assignments 1 and 2, **LIST all** the functions (use the prototypes) **you** created. Categorize them by module/library in the following sequence (if you did not create any functions for a given module/library, simply state "***None developed***"):

   a) commonHelpers.h
   b) account.h
   c) ticket.h
   d) accountTicketingUI.h

2. Identify **two (2) major components** (features) from the assignment that you **<u>enjoyed</u>** developing and detail why you found it enjoyable. Your answer must be at least <u>200</u> words but no more than <u>300</u>.

3. Identify **two(2)** major components (features) from the assignment that you **<u>disliked</u>** developing and detail why you found it so unlikable. Your answer must be at least <u>200</u> words but no more than <u>300</u>.

<u>**NOTE:**</u> **The submission testing process cannot be one of those reasons!**

Reflections will be graded based on the published rubric:
https://github.com/Seneca-144100/IPC-Project/tree/master/Reflection%20Rubric.pdf

Milestone – 4 Submission

1. Upload (file transfer) your all header and source files including your reflection:
   - `a2ms4.c`
   - `account.c`
   - `account.h`
   - `accountTicketingUI.c`
   - `accountTicketingUI.h`
   - `commonHelpers.c`

- **commonHelpers.h**
- **ticket.h**
- **ticket.c**
- **accounts.txt**
- **tickets.txt**
- **reflect.txt**

2. Login to matrix in an SSH terminal and change directory to where you placed your source code.

3. Manually compile and run your program to make sure everything works properly:

```
gcc -Wall a2ms4.c account.c accountTicketingUI.c commonHelpers.c ticket.c
-o ms4 <ENTER>
```

If there are no error/warnings are generated, execute it: **ms4** *<ENTER>*

4. Run the submission command below (replace **profname.proflastname** with <u>**your professors**</u> Seneca userid and replace **NAA** with your section):

```
~profName.proflastname/submit 144a2ms4/NAA_ms4 <ENTER>
```

5. Follow the on-screen submission instructions.