Stage B : Design

Hong Joon Choi

Stage B : Design

B1. Data structures

The file that holds reservation will be a sequential file, with all the sorted reservations saved. Each reservation will have five fields: customer name, reserved time, number of customers, table number and additional request.

Name	Variable type	Sample data	justification
CustomerName	String	HongJoon	Customer name is a string because name is made of letters
ReservedTime	Calendar	1352300886780	Reserved time is represented in milliseconds, Calendar data type has built in function that does conversion for us. Millisecond form will be changed into specific dates and times whenever user has to see this data.
numberOfCustomers	byte	8	Number of customers will be in integer form, and it won't require large variable size since it is not possible for groups of 100 people to reserve a restaurant.
TableNumber	Int[]	74, 75	Each tables is assigned with its ID number, and it has four seats on it. Variable type is in array because more than two tables may be assigned for group of customers who have more than 5 people.
request	String	I want to seat outdoor	Because request from customer is in sentence form, String variable is used.

An array of reservations at Restaurant class will read all the bookings for specific day and it will list on screen. When the user wants to get specific reservation for restaurant, program will search for names. When a name is found, program will allow user to edit or delete the booking when it is processed.

B2. Algorithms

Name	Search	
Description	Returns index of array that holds the requested String	
Preconditions	There is an array that holds data.	
Parameters	**Local Variable** **Name Type Vaulue**	**Return values**
String ss String[] array		Int

Code

```
for int i=0, i<array.length
      if ss = array[i]
            return i
         end if
next i
return -1
```

PostConditions	Index of an array will be found and will allow user to do operations with it, if nothing is found, -1 is returned

Name	smartSearch	
Description	Returns multiple indexes of array that has part of the String. For example, “james” and “amy” will be found if user inputs “a”	
Preconditions	There is an array that holds data of String	
Parameters	**Local Variable** **Name** **Type** **Vaulue**	**Return values**
String ss String[] array Int arraySize	list int[] -1 numberFound int 0 disassemble char[] ‘’ reassembled String “”	Int[]

Code

```
for int i=0, i<arraySize
      disAssemble = staff[i] to array of characters
      for k=0, k<staff[i].length
            String assembled =""
            for int j=k, j<staff[i].length
                  assembled+=disAssemble[j]
                næxt j
              if assembled startsWith ss
                    list[numberFound]=i
                    numberFound++
                    break
                end if
      next k
next i
return list
```

PostConditions	Array of integers which indicate index of the array will be returned.

Name	Sort
Description	Sorts array in ascending numerical order.
Preconditions	Array that holds time values (in milliseconds), is out of order

Parameters	**Local Variable**			**Return values**
	Name	**Type**	**Vaulue**	
int[] time	Swap	int	0	int[]

Code

```
for k=0,k<length
      for int i=0,i<length
            if time[k]<time[i]
                  swap = time[k]
                  time[k] = time[i]
                  time[i] = swap
                  end if
         next i
next k
return data
```

PostConditions	Array will be sorted in ascending order.

Name	Delete	
Description	Deletes an index from array, and decrease size of the array by 1	
Preconditions		
Parameters	**Local Variable** **Name** **Type** **Value**	**Return values**
int index Reservation[] original int arraySize	overwrited Reservation[] null	Reservation[]

Code	`for int i=0,i<index`
	`      overwrited[i] = original[i]`
	`next i`
	`for int j=index, j<arraySize-1`
	`      overwrited[j] = original[j+1]`
	`next j`
	`return staffOverwrite`	

PostConditions	Data in array at particular index will be deleted and size of the array will be decreased by 1.	

Name	allignToMiddle			
Description	Aligns String to the middle of given amount of spaces			
Preconditions				
Parameters	**Local Variable** **Name**	 **Type**	 **Value**	**Return values**
String message Int space	ss	String	“”	String

Code	`int blank=distance-a.length;`
	`if blank%2!=0`
	`     ss+=" "`
	`end if`
	`for int i=0,i<(blank/2)`
	`     ss+=" "`
	`next i`
	`ss+=` message
	`for int i=0;i<(blank/2)`
	`     ss+=" "`
	`next i`
	`return ss`			

PostConditions	Message is aligned at the center of given space.			

Name	Pad			
Description	Allocates String and leaves space until the given points			
Preconditions				
Parameters	**Local Variable** **Name**	 **Type**	 **Value**	**Return values**
String message Int space	ss	String	“”	String

Code	`do`
	`       ss+=" ";`
	`while ss.length<space`
	`return ss`			

PostConditions				

Name	validateIfTableIsEmpty	
Description	Validates if chosen table or tables are empty at specific time. The method returns true if the table or tables are available to be used at specific time. Customer who reserved a table is given 2 hous to finish their meal	
Preconditions		
Parameters	**Local Variable** **Name** **Type** **Vaulue**	**Return values**
Long time Reservation[] app Int[] tables		Boolean

Code

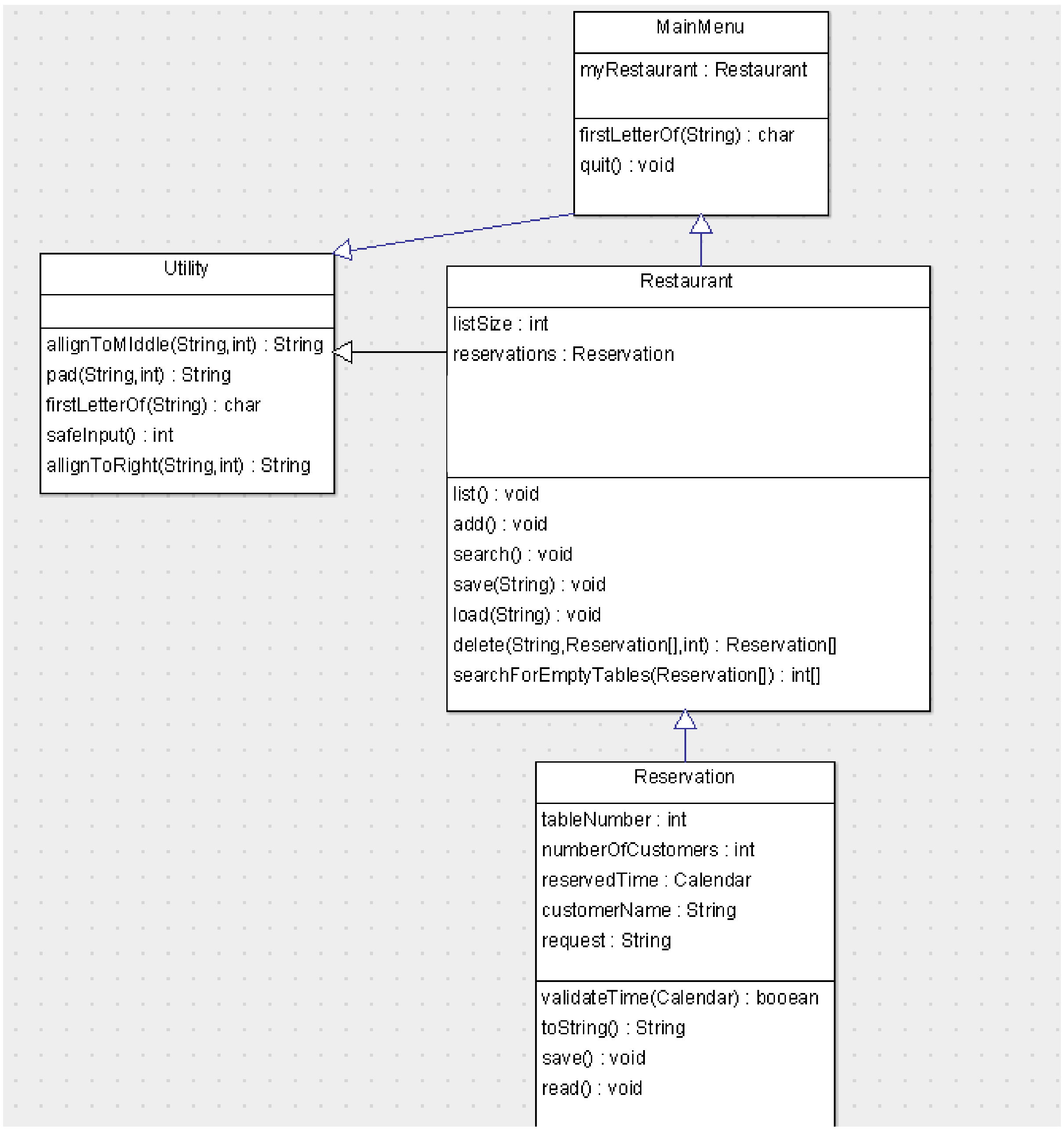
```
for i=0, i<app.length
   if app[i].reservationTime-time<3600000
       for j=0, j<tables.length
           for k=0, k<app[i].tableNumber.length
             if tables[j]=app[i].tableNumber[k]
                  return false
             end if
           next k
       next j
   end if
next i
return true
```

PostConditions	Program will indicate user if chosen tables are available at specific time

B3. Modular organization

B3.1 class diagrams and explanations

The program will have four classes, MainMenu, Restaurant, Utility and Reservation.



Class 1 :MainMenu

The MainMenu will be responsible for creating the restaurant class. It will also have to save the file, having an array to keep reservations saved. Main menu does not have any function except for quit().

Class 2 : Utility

This class is a collection of utility functions. Functions include aligning methods, input method that handles error and method that returns first character of the String. Class MainMenu and Resstaurant extends this class.

Class 3 : Restaurant

Restaurant class is collection class of reservations. This class is responsible for reading all reservations made and saved to the file. This class has two fields: reservations and size of reservation list. It has five functions that manages reservations: list, add, search, delete and function that validates if chosen table is empty at specific time. Other functions are save() and load().

Class 4 : Reservation

Reservation class is base class of the program and it holds data of one reservation. It has five fields to it, which is described at part B1. It has function of validating the range of time.

B3.2 linking to solutions to problems.

Legibility : List() function will print out list of reservations in clear and organized way. Utility functions at class Utility, such as AllignToMiddle() and pad() will make the list much clearer.

Sort : sorting algorithm will solve the problem of putting list out of order whenever modification is done. The program will automatically sort array whenever any action is done by user.

Search : Even if customer doesn’t spell out his/her name clearly, or if spelling of customer’s name is unclear, smartSort() method will allow user to find for names just by entering part of their names.