# *Homework 5*

*100 Points*

# *Heaps*

An airline company uses the formula shown below to determine the priority of the passengers on the waiting list for overbooked flights.

Priority number = A / 1000 + B – C

where
A is the customer's total mileage in the past year
B is the number of years in her or his frequent flier program
C is the sequence number representing the customer's arrival position when s/he booked the flight (the first customer's sequence number is 1, second in the file is 2, and so on).

Given the **`overbooked.txt`** customers, write a program that reads the file and determines each customer's priority number and prints a list of waiting customers (name and their priority and serial numbers) in priority sequence, including the number of customers.

Requirements:

- Array representation of the heap
- Implement **`reheapUp`** and **`reheapDown`** as recursive functions

A line in the input file contains the name of the customer, total mileage in the past year and the number of years in the frequent flier program:

```
Robert Hill 53000 5
Mary Lou Gilley 17000 1
```

The customer structure contains the following fields:

- name
- mileage
- years
- priority
- serial number = priority * 1000 + (1000 – number of customers)
  // build the heap based on the serial number

A more challenging variation of this project is to build a heap of queues (no serial number needed in this case). Each queue will contain customers with the same priority number.

**Grading**

| | |
|---|---|
| 1. Determine Priority & Serial Numbers | – 10 |
| 2. Build Heap | – 35 |
| 3. Print number of customers | – 10 |
| 4. Print list in priority sequence | – 35 |
| 5. main() | – 10 |