CSI2131, Winter 2004
Lab 11

Question 1. Extendable Hashing

Given the following extendable hashing structure (Bucket size = 2):

```
  +-----+       +-------+
0 |  ---|------>| 2, 6  |
  +-----+       +-------+
1 |  ---|------>| 3, 7  |
  +-----+       +-------+
```

Perform the following operations in order :

- Insert 10,15,4,8,12
- Delete 3,10,12,2,6

Note: The final structure obtained should be:

```
  +-----+       +-------+
0 |  ---|------>| 4, 8  |
  +-----+       +-------+
1 |  ---|------>| 7, 15 |
  +-----+       +-------+
```

Question 2. Hashing: Progressive Overflow

Consider the following Hash function:

```
int Hash(String Key) {
    int h;
    h = 2 * Key[0] + Key[1] + 3 * Key[2];
    return (h mod 6);
}
```

A) What values do keys 'PAL' and 'LAP' map into? [A copy of the ASCII Table can be found in Appendix B of the textbook].

B) Given the following mappings (VAL, 3), (LAV, 1), (MAP, 5), (PAT, 3), (PET, 1) and (SET, 1), show the content of the Hash table of size 6 after

VAL, LAV, MAP, PAT, PET and SET

have been added in this order.
Notes: A Hash table of size 6 contains addresses 0-5. Assume that only one key can be held at each address and that Progressive Overflow (or Linear Probing) is used to resolve collisions. Remember that if the end of the table is reached when inserting a new key, then the add procedure wraps around the table, starting at position 0.

C) What is the average search length in this table? Show your work.

Question 3. Hashing: Advanced Collision Resolution Methods

A) Show the result of Chained Progressive Overflow after loading (MAP, 5), (PAT, 3), (PET, 1), (SET, 1), (SAT, 3), (CAT, 3) in this order in a Hash table of size 6, using two-pass loading.
Notes: A Hash table of size 6 contains addresses 0-5. Assume that only one key can be held at each address. Remember that if the end of the table is reached when inserting a new key, then the add procedure wraps around the table, starting at position 0.

B) What is the average search length in the hash table you just built?

C) Show the result of Chaining with a Separate Overflow Area after loading (MAP, 5), (PAT, 3), (PET, 1), (SET, 1), (SAT, 3), (CAT, 3) in this order.