

## CS3402 Tutorial 6:

1. If the database consists of 512 records and the blocking factor is 8. On average, how many blocks needed to be searched to if the records are in unordered format and ordered format?
2. Suppose that we use hashing to organize a *PRODUCT* file containing records with the following product# values: 2369, 3760, 4692, 4871, 5659, 1821, 1074, and 7115.
  - (a) Let the hash function be  $h(\text{product\#}) = \text{product\#} \bmod 5$ , show the *static hash* structure for this file. Assuming that each bucket can hold at most three records as shown below, and records in each bucket is unordered.

Bucket *i*

	pointer

- (b) Some new records are inserted into the file with product# values: 1620, 2428, 3945, 4759, 6975, 4981, and 9206. Show the updated hash structure for this file when using *chaining for collision resolution*. That is, if collision occurs, new records are inserted in overflow bucket and pointers are set from the original buckets to the overflow buckets. Assuming that each overflow bucket can hold at most three records, as shown below.

Overflow bucket

	pointer
	pointer
	pointer

3. In extendible hashing, how many hash codes can you have in maximum if the global depth is 3?
4. Consider a disk with block size  $B = 1024$  bytes. A file has  $r = 1000$  STUDENT records of fixed length. Each record has following fields: SName (40bytes), SID (8bytes), Department (4 bytes), Address (65 bytes), Phone (8 bytes), Birthdate (8 bytes), Sex (1 byte), CourseId (7 bytes), SemesterId (6 bytes), SectionId (2 bytes). An additional byte is used as a deletion marker.
  - a) Calculate the record size  $R$  in bytes.
  - b) Suppose the file is stored with an unspanned organization. Calculate the blocking factor.
  - c) How many hard disk blocks does this file occupy?