|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **National University of Computer and Emerging Sciences, Lahore Campus** | | | | |
| final design | **Course:** | **Advance Database Concepts** | **Course Code:** | **CS451** |
| **Program:** | **BS(Computer Science)** | **Semester:** | **Spring 2019** |
| **Date:** | **14-Mar-2019** | **Total Marks:** | **10** |
| **Quiz** | **3 (Disk Storage & File Structures)** | **Weight:** |  |
| **Section** | **CS** | **Max. Time:** | **20 Minutes** |
|  |  |  |  |
|  |  | | | |

**Q1.** Suppose that we are using extendable hashing on a file that contains records with the following search-key values: 5, 7, 11, 17, 18, 19, 23, 27, 37, 39

Show the extendable hash structures for this file if the hash function is h(k) = k mod 8 and buckets can hold three records. Show your working.

**Q2.** Suppose you are building an extensible hash index on a table of 100,000 rows.  Key values are 8 bytes, a pointer (block/record) to a row is 8 bytes, and a disk block is 2048 bytes.  Assume all keys are distinct.

**a)** What is the (lowest possible) global depth? Provide valid reasons.

**b)** What is the average occupancy of a bucket, assuming all buckets have a local depth equal to the global depth from part (a)? Justify your answer.

**Ans:**

**Q1.**



**Q2.**

**a)** Bucket entries will be key/pointer pairs, so 16 bytes each. Floor(2048/16) = 128 entries / bucket. 100,000/128 = at least 782 buckets needed. Since the directory is always a power of 2 size, it will have at least 210 = 1024 entries, so the global depth is 10.

**b)** If all buckets have local depth equal to global depth, then every pointer in the directory points to a unique bucket. Thus, there are 1024 buckets. 1024 \* 128 = capacity of 131,072. 100,000/131,072 ~= 76.3% occupancy.