
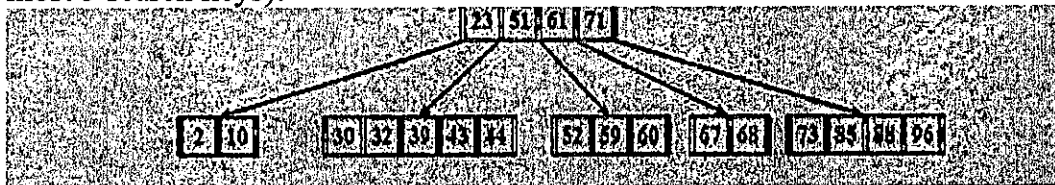
	DEPARTMENT OF MATHEMATICS TANTA UNIVERSITY FACULTY OF SCIENCE (Computer Science Division)		
	<b>EXAMINATION FOR PROSPECTIVE STUDENTS (2<sup>ND</sup> YEAR)</b>		
DATE: 15-03-2021	TERM: I	TOTAL ASSESSMENT MARKS: 150	COURSE CODE: CS2105 TIME ALLOWED: 2 HOURS

**Question 1: (35 marks)**

- a- Define the file, record, and a disk block? (6 marks)
- b- Why do we use files? (5 marks)
- c- Explain and draw the memory hierarchy? (6 marks)
- d- List the types of allocation method? (3 marks)
- e- In heap file organization, list the steps for the insertion of a new record and the removing of a record in a file? (10 marks)
- f- List the several criteria which are important in choosing of a file organization? (5 marks)

**Question 2: (35 marks)**

- a- What is the difference between clustered and unclustered indexes? (5 marks)
- b- In static hashing, list the steps for the insertion of a new record and the removing of a record in a file? (10 marks)
- c- Insert the nodes with search keys 25, 80, 53, and 70 in the following tree (each node has at most 5 search keys): (10 marks)



- d- List and explain the types of hash functions? (5 marks)
- e- What are the difference between Main Memory and Secondary Memory? (5 marks)

**Question 3: (30 marks)**

- a- List the steps when the disk read is requested? (5 marks)
- b- We have a fixed-length records (number f records =600, size of record =512B , sector size = 512B , sector/track=40, track/ cylinder=6, track/surface=100, A.S.T.=40 msec, and R.T.=100 msec) (10 marks)
  - 1- How many cylinders and platters are needed?
  - 2- How many copies of data to full the disk?
  - 3- Compute the access time with randomly access for sectors base organization?
- c- If there are 9 buckets, the binary representation of the  $i^{\text{th}}$  character is assumed to be the integer I, and the hash function returns the sum of the binary representations of the characters modulo 9. (10 marks)  
Find the number of buckets of this data: Perryridge and Brighton?
- d- What is the main problem with static hashing and the solution for this problem? (5 marks)

Look at next page

**Question 4: (50 marks)**

(12 marks)

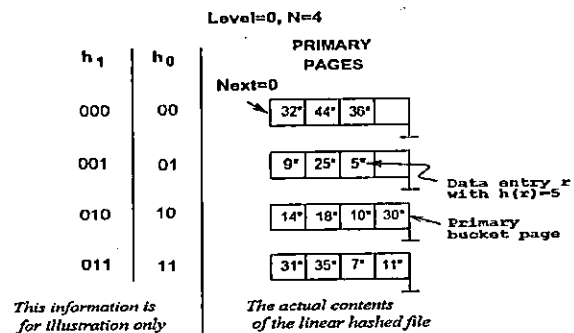
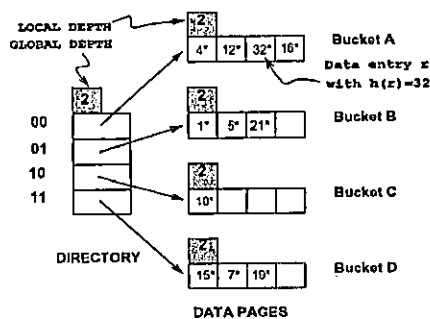
a- Choose the correct answer:

- 1- Data is stored on disk in units called \_\_\_\_\_.  
a) disk blocks   b) bytes   c) tracks   d) clusters
- 2- \_\_\_\_\_ implements commands to read or write a sector by moving the arm assembly and transferring data to and from the disk surfaces.  
a) disk controller   b) disk head   c) disk block   d) disk arm
- 3- In tape organization, we can directly access to any location on tape.  
a) true   b) false
- 4- Operations on files can usually be grouped into \_\_\_\_\_ operations.  
a) retrieval and update   b) insert and delete   c) find and modify
- 5- Sparse index contains 80 data entries for file with 100 records.  
a) true   b) false
- 6- The depth of a tree is the maximum number of children allowed per parent.  
a) true   b) false

b- Put (✓) or (X) in end of each of the following sentences: (correct the error) (18 marks)

- 1- At the top of the memory hierarchy, we have secondary storage, which consists of cache and main memory, and provides very fast access to data.
- 2- There are three major types of storage devices.
- 3- Magnetic disk does not support direct access to a desired location.
- 4- Tracks can be recorded on one or both surfaces of a platter.
- 5- If we do not want to waste the unused spaces in the blocks, use any organization.
- 6- A dense index is guaranteed not to contain duplicates, but an index on other (collections of) fields can contain duplicate.

c- Insert the data with hash values 17,19,24,32 in the following extendible and linear hashing: (20 marks)



With my best wishes

EXAMINERS	DR/ HANAA ESSA	
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