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B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2014

Information Technology

Semester II

IT8202 & Programming and Data Structures I

(Regulation 2012)

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. What does static variable mean?
2. What is a macro, and how do you use it?
3. What is indirection? Write a snippet code to explain.
4. What would be printed of this code?
void main()
{
int a2[2][3] = {{3, 4, 5}, {6, 7, 8}};
int (*ap)[3];
ap = a2;
printf("%d %d\n", (*ap)[0], (*ap)[1]);
ap++;
printf("%d %d\n", (*ap)[0], (*ap)[1]);
}
5. Define ADT.
6. Suppose a queue is maintained by a circular array QUEUE with N=12 memory cells. Find the number of elements and positions of FRONT and REAR in QUEUE if FRONT = 9 and REAR = 5 and then four elements are deleted. Show the QUEUE.
7. Define depth and height of a tree.
8. What is extendible hashing? What is the need for it?
9. What is a bubble sort and how do you perform it? Give an example.
10. Given a sorted array of N distinct elements. Find a key in the array using least number of comparisons.

Part - B (5 x 16 = 80 marks)

- 11.i) Write the C code that computes x^n using the three loop functions (for, while and do - while). Consider n to be an integer. (8)
- ii) How can you pass an array to a function by value or by reference? Give example code to explain. (8)
12. a) i) Write a program that will stores the personal information of a student (such as name, date of birth, address) in a structure that you will define, read and then

prints the record on the screen. Name can be defined using pointers such as `char *name`. (10)

- a) ii) Write a simple code that uses a pointer to navigate an array of values and print it. (6)

(OR)

- b) i) Write a C program to copy contents from one file to another file. (10)

- b) ii) How do you use a pointer to a function? Illustrate with an example. (6)

13. a) i) Formulate an ADT to implement Stack using arrays. (10)

- a) ii) Simulate using Stack to convert the infix expression to postfix expression
 $A * (B + D) / E - F * (G + H / K)$ (6)

(OR)

- b) i) Write the routines `InitializeCursor()`, `cursorAlloc()`, `cursorFree()` and `Insert()` in a cursor implementation of linked list. (10)

- b) ii) Write the routine to Insert a node in a sorted doubly linked list.
`void InsertInSorted(List L, ElementType x)` (6)

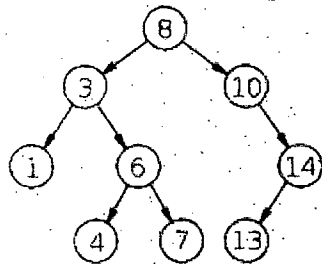
14. a) i) Write the algorithm to insert and delete in a Binary Search Tree. (10)

- a) ii) Consider inserting the keys 10, 22, 31, 4, 15, 28, 17, 88, 59 into a hash table of length $m = 11$ using open addressing with the primary hash function $h'(k) = k \bmod m$. Illustrate the result of inserting these keys using linear probing, using quadratic and using double hashing with $h2(k) = 1 + (k \bmod (m - 1))$. (6)

(OR)

- b) i) Write the algorithm to implement open addressing hash table with operations, `InitializeTable()`, `Insert()`, `Delete()` and `Find()`. (10)

- b) ii) Traverse the tree in preorder, inorder and postorder. (6)



15. a) i) Write the algorithm to sort using Quicksort. (10)

- a) ii) Sort the given set of values using Shell sort.
24, 12, 56, 34, 19, 5, 76, 26, 11, 9, 10, 4. (6)

(OR)

- b) i) Write the algorithm to sort an array of integers using Mergesort. (10)

- b) ii) Show how Heapsort processes the input 142, 543, 123, 65, 453, 879, 572, 434, 111, 242, 811, 102, 125, and 146. (6)