

Roll Number:

ANNA UNIVERSITY, CHENNAI
B.E (FULL TIME) DEGREE EXAMINATION, APR/MAY 2013
Information Technology
R-2012

IT8202 PROGRAMMING AND DATA STRUCTURES I

Duration: Three Hours

Answer All Questions

Max Marks: 100

Part A (10 x 2 =20 Marks)

1. Write the values of the following expressions
 - a. 'F' - 'C'
 - b. 2.0+(float)(5/3)
2. What value is assigned to the variable a?
#define N 10+10
a = N * N;
3. What is the purpose of the fclose() function? Is it mandatory to use this in a program that processes a data file?
4. What is the output of the following program.
main()
{
int a=555,*ptr=&a,b=*ptr;
printf("%d %d %d", ++a,--b,*ptr++);
}
5. What is an Abstract Data Type?
6. Convert the expression (A+B)/(C/D) into postfix expression and then evaluate it for A=10, B=20,C=15,D=5.
7. How is the deletion of a node with two children done in a binary search tree?
8. Mention a few applications of Hashing.
9. Using Radix Sort, sort [in descending order] the unsorted list {100 0 12 544}
10. List the advantages of Indexed Sequential Search?

PART B (5 x 16 = 80 Marks)

11. (i) The following is the skeleton of a C program that computes the number of each numeral in a string. Fill in the blanks with appropriate C constructs. (10)

```
#include <stdio.h>
#define base 10
main () /* This program outputs the numbers of 0's,1's, ..., 9's in an input string
ending in $ */
{
char b;
int i, a[base];
/* Initialize array elements to zero */
for ( _____; _____; _____ )
a[i] = 0;
printf("Input numeric characters ending with $\n" );
scanf("%c", &b); /* Scan next character */
```

```

/* Execute the loop as long as $ is not scanned */
while ( _____ ) {
printf("Processing the digit %c\n", b);
/* Increment the count for the new digit */
a[___];
scanf("%c", &b); /* Scan next character */
}
for ( i=0 ; i<=9 ; i=i+1 )
printf("There are %__ %__ 's\n", a[i], i);
}

```

(ii) Write a function **conv_cap** that takes a character string of arbitrary length as its input parameter and converts all the alphabets in the string to capital. Do not use any string or character library function. (6)

12.a. (i) Declare a global array named **studArr** consisting of 600 **student** structures, where each structure **student** has the following members: **Name**: string of 10 characters, **Address**: string of 20 characters, **Roll_number**: integer, **CGPA**: float. Write the code to read the student data for 600 students from terminal. Through call to the function **conv_cap** (Q.11 (ii) of the previous question) convert the names of all students to uppercase and print those names. (8)

(ii) With suitable examples differentiate Structures and Union (8)

(OR)

12.b. Explain File handling in C with suitable examples. (16)

13.a. (i) Write C functions for implementing the following stack operations. (12)

- **init** – which constructs and returns an empty stack (2)
- **empty** – which returns a value indicating whether a given stack is empty or not (2)
- **Push** – which pushes a given integer onto a given stack. (4)
- **top** – which returns the top element of a given stack. (2)
- **Delete** – which deletes the top element of a given stack. (2)

(ii) Give prototypes for the following functions on a queue of jobs (no need to write the function bodies. (4)

- **empty** – which returns a value indicating whether a given queue is empty or not,
- **enqueue** – which puts a given job in a given queue,
- **front** – which returns the job from the front of a given queue if the queue is not empty; otherwise it returns a job with a negative identification number,
- **dequeue** – which deletes the front of a given queue.

(OR)

13.b. Explain in detail the various applications of stack. (16)

14.a Give an overview of the various collision resolution strategies in Hashing along with its advantages and disadvantages. (16)

(OR)

14.b. i) Write a 'C' function to count the number of leaves in a binary tree. (10)
ii) What are applications of trees. (6)

15.a. What is Heapsort ? Apply heapsort on the given data. (16)

11	2	5	7	6	12	17	8	4	10	2
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Show the steps involved.

(OR)

15.b. What is a Binary Search Tree? Explain in detail the operations on a Binary Search Tree. (16)

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