

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
I B.TECH - REGULAR EXAMINATIONS, JUNE - 2010
C PROGRAMMING AND DATA STRUCTURES
(COMMON TO CE, EEE, ME, ECE, CSE, CHEM, EIE, BME, IT, MECT, E.COMP.E,
MMT, MEP, AE, ICE, BT, AME)

Time: 3hours

Max.Marks:75

Answer any FIVE questions
All questions carry equal marks

- - -

- 1.a) What is an algorithm? List and explain the properties of algorithm.
 b) A utility company charges its customers based on their monthly utilization in terms of units as follows:

Description	charge
First 100 units	Rs.10 per unit
Next 200 units	Rs. 9 per unit
Next 200 units	Rs.8 per unit
Next units	Rs.7 per unit

Write flowchart that reads monthly units of a customer and output the charge amount.
[7+8]

- 2.a) Write minimal C- expressions for the following:
- i) $6b^4 + 3b^3 - 5b^2 + 6b + 15$
 - ii) $\frac{2a}{c} - \frac{3b}{a^2} - \frac{c}{4b}$
 - iii) Increment x and then add to z
 - iv) Maximum of the values of 3 variables a, b and c
 - v) True if the value of character variable c is in uppercase, otherwise false
 - vi) Rightmost octal digit in the value of integer variable x
- b) What is the difference between the following C-words?
 i) 5 and '5' ii) if and ++
- c) Write C-program for generation of multiplication table for the given integer input x.
 For example, if input is 5, the program need to output
 5 X 1 = 5
 5 X 2 =10

 5 X10 =50
[6+2+7]

- 3.a) Consider the following recursive function
- ```
int bbb(int n,int r)
{
printf("%d %d\n",n,r);
if (r==0 || n==r)return 1;
else return bbb(n-1,r)+bbb(n-1,r-1);
}
```
- What output is printed for the function call bbb (4,2)? What does the function do?
- b) Write a C-program that reads the given n observations at input and computes average of n observations and find the number of observations above average value. The input is value of n followed by n observations.  
[8+7]

- 4.a) Consider the following C- program segment.
- ```
char*months[12]={"JANUARY","FEBRAURY","MARCH","APRIL",
"MAY","JUNE","JULY","AUGUST","SEPTEMBER","OCTOBER","NOVEMB
ER","DECEMBER"};
char **a= months;
char **b = a++;
```
- What are the values of the following expressions? Justify your answer.
- i) **a ii) (*(a+5)+3)
iii) *(a+7) iv) (*(a+9)+6)==*(a+11)+7)
v) *(++b) vi) *(b++ +3)
- b) Write C-function *void exchange (int *x, int *y)* that exchange the values pointed by x and y. In addition the function requires counter that count the number of times the function is invoked. [6+9]
5. Write C-structures for line diagram. The Line diagram has the following fields: diagram Name (dynamically allocated string), no of lines, lines(dynamically allocated structure). The line diagram can have 1 to 500 lines. Each line contains two end points, line thickness in pixels and color in the following set (red, black, blue, green, yellow, orange). Each point contains X-coordinate and Y-coordinate in pixels. Using this structure, write a function *int countlines (struct line_diagram *l, int c)* that returns the number of lines in the given color c. [15]
- 6.a) List and explain different format literals available in printf statement.
b) Write C-language program that reads a C-program file and outputs number of lines in the program. [7+8]
- 7.a) Write an algorithm or C-function for selection sort for sorting an array of integer in ascending order.
b) Demonstrate the selection sort results for each pass for the following initial array of elements.
21 6 3 57 13 9 14 18 2 [7+8]
- 8.a) Write an algorithm that convert the given infix expression in to post fix. Demonstrate your algorithm using stack for the expression $a + b * c$
b) Write C-structures for implementing queues using Linked Lists. Using these structures, write C-function for dequeue operation. [7+8]