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
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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) $\dfrac{2a}{c}-\dfrac{3b}{a^2}-\dfrac{c}{4b}$
  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]

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