1. The following sequence of numbers, called the Fibonacci sequence 1, 1, 2, 3, 5, 8, 13, 21, ..... has the property that each term after the first two is the sum of the two preceeding terms. Write a program ( FORTRAN or C language ) to generate the first 50 terms of this sequence.     ( 10% )

2. Given two lists of number $X = ( x_1 , x_2 , ..... x_n )$ and $Y = ( y_1 , y_2 , ...y_m )$ , develop an algorithm to create a single list $Z = ( z_1 , z_2 , ..... z_k )$ which contains each distinct element of X and Y , with no repetition, and arranged in ascending order. For example if $X = ( 5,2,6,2,6 )$ and $Y = ( 1,5,2,5,3,5 )$ then $Z = ( 1,2,3,5,6 )$.   ( 15% )

3. Write an algorithm that will search a subject string with length N for a specified target substring with length M, where N is always greater than M. The algorithm will determine whether or not the substring is present and the position of its first occurrence if found.  ( 15% )

4. (a) What is called single-address machine ?
   (b) Define some assembler instructions ( only necessary instruction ) for a single-address machine to implement the following arithmetic statement
      $X = a + b * c - d/e$          ( 15% )

5. Describe how to manage the problem of fragmentation in storage allocation.
   ( 15% )

6. (a) Using diagrams and words, describe the processes of insertion for a doubly linked list.
   (b) What are the advantages and disadvantages of a doubly linked list.  ( 15% )

7. Suppose a binary tree was scanned by INORDER sequence with the result :
   D  B  H  E  A  F  C  I  G  J
   (a) Draw the binary tree using graph representation.  And draw the internal memory representation ( array representation ) using the following representations.
   (b) sequential node number.
   (c) linked.
   (d) threaded linked.     ( 15% )

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