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Third Year --- Computers: Data Structures
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Sheet 4: Searching and Sorting

1) Write a recursive function to implement the Fibonacci sequence:

$$F(n)=\begin{cases}0 & n=0\\ 1 & n=1\\ F(n-1)+F(n-2) & n>1\end{cases}$$

2) Write a recursive function, BinPrint, with the following specifications:
   void BinPrint (int i, int length)

Where 'i' is an integer whose binary representation is 'length' digits long, for example, BinPrint(14,5) would print 01110.
To create the recursive function: if length=0, then do nothing. If length>0, then you first print the results of BinPrint(i/2, length-1). Write the function and a test driver to test the BinPrint function thoroughly.

3) Write a program which uses the class BinarySearch to search for certain name from array of strings containing the names of 10 persons. Let the class BinarySearch contain the function Out( ), which prints Last, First and Mid every time.

4) Write the function AddElement which adds a certain element to a sorted list in its correct place.

5) Improve the bubble sort by making it stop when the array is sorted.

6) Trace by hand the execution of the selection sort, and bubble sort on the array:

   A={44,77,55,99,33,22,88,77}