Apex College

BCIS Program

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Data Structure & Algorithms
Lab Report
15
Implementation of MergeSort Algorithm
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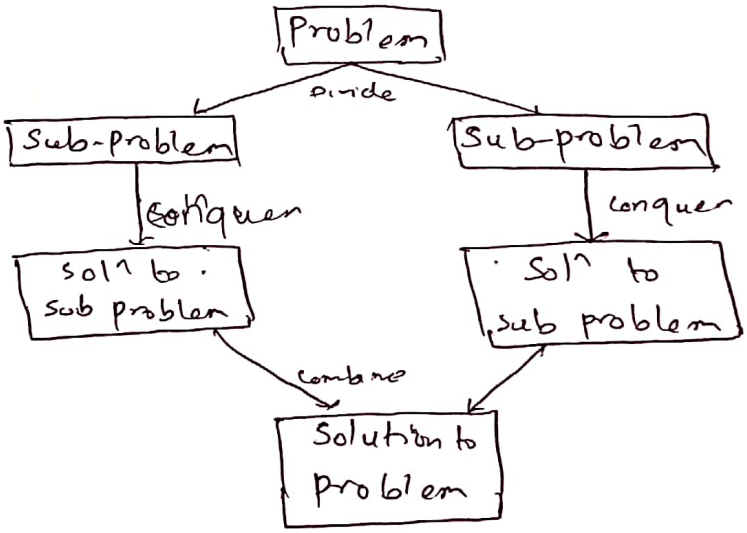
#Lab 5 Objectives

- To implement MergSort

#Introduction

MergSort is a divide and conquer algorithm that divides the inputs into two halves, iteratively until get single element and then merge those element in a sorted form for a single list.

It is one of the most respected sorting algorithms with worst case time complexity of O(n log n)



#Source Code

```
#include <stdio.h>
#include <stdlib.h>

void printArray (int arr[], int size){
    int i;
    for (i=0; i<size; i++)
        printf ("%d ", arr[i]);
    printf("\n");
}
```

```
void merg (int arr[], int l, int m, int r){
    int i, brr[10];
    int k = l;
    int y = m;
    int x = l;
    while (x < m && y <= r){
        if (arr[x] < arr[y]){
            brr[k] = arr[x];
            k++;
            x++;
        }
        else {
            brr[k] = arr[y];
            k++;
            y++;
        }
    }
    while (x < m) {
        brr[k] = arr[x];
        k++;
        x++;
    }
    while (y <= r) {
        brr[k] = arr[y];
        k++;
        y++;
    }
    for (i = l; i <= r; i++)
        arr[i] = brr[i];
}
```

```
void mergSort (int arr[], int l, int r){
    int m;
    if (l < r){
        m = (l + r) / 2;
        mergSort (arr, l, m);
        mergSort (arr, m+1, r);
        merg (arr, l, m+1, r);
    }
}

int main (){
    int arr[] = {64, 34, 25, 12, 11, 90};
    int n = sizeof (arr) / sizeof (arr[0]);
    mergSort (arr, 0, n-1);
    printf ("Sorted array list using Merg sort: \n");
    printArray (arr, n);

    return 0;
}
```

Activities

In this lab we performed divide, conquer and combine technique to practice Merg sorting.

Conclusion

I learned about MergeSort and implementation as well as the divide and conquer technique.