CAP539: ALGORITHM DESIGN AND ANALYSIS - LABORATORY

CONTINUOUS ASSESSMENTS (C.A)-1

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```cpp
#include<iostream>
using namespace std;

void merge(int arr[], int left, int mid, int right){
    int a1 = mid - left + 1;
    int a2 = right - mid;

    int L[a1], R[a2];

    for(int i = 0; i < a1; i++)
        L[i] = arr[left + i];

    for (int j = 0; j < a2; j++)
        R[j] = arr[mid + 1 + j];

    int i = 0;
    int j = 0;
    int k = left;

    while(i < a1 && j < a2){
        if(L[i] <= R[j]){
            arr[k] = L[i];
            i++;
        }
        else{
            arr[k] = R[j];
            j++;
        }
```

```
        k++;
    }
    while (i < a1){
        arr[k] = L[i];
        i++;
        k++;
    }
    while (j < a2){
        arr[k] = R[j];
        j++;
        k++;
    }
}

void mergeSort(int arr[], int left, int right){
    if(left < right){
        int mid = left + (right - left) / 2;

    mergeSort(arr, left, mid);
    mergeSort(arr, mid + 1, right);
    merge(arr, left, mid, right);
    }
}

void printArray(int arr[], int size){
    for (int i = 0; i < size; i++)
        cout << arr[i] << " ";
    cout << endl;
}

int main(){
    int arr[] = {21, 1, 15, 3, 51, 16, 27, 20};
    int arr_size = sizeof(arr) / sizeof(arr[0]);

    cout << "Given array is \n";
    printArray(arr , arr_size);
```

```
    mergeSort(arr , 0, arr_size - 1);

    cout << "Sorted array is \n";
    printArray(arr , arr_size);
    return 0;
}
```