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CSE F

LAB PROGRAMS

1)/* Insertion sort ascending order */

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

```
int main()
```

```
{
```

```
    int n, array[1000], c, d, t, flag = 0;
```

```
    printf("Enter number of elements\n");
```

```
    scanf("%d", &n);
```

```
    printf("Enter %d integers\n", n);
```

```
    for (c = 0; c < n; c++)
```

```
        scanf("%d", &array[c]);
```

```
    for (c = 1 ; c <= n - 1; c++) {
```

```
        t = array[c];
```

```
        for (d = c - 1 ; d >= 0; d--) {
```

```
            if (array[d] > t) {
```

```
                array[d+1] = array[d];
```

```
                flag = 1;
```

```
            }
```

```

        else
            break;
    }
    if (flag)
        array[d+1] = t;
}

printf("Sorted list in ascending order:\n");

for (c = 0; c <= n - 1; c++) {
    printf("%d\n", array[c]);
}

return 0;
}

```

2) // Selection sort in C

```

#include <stdio.h>

// function to swap the the position of two elements
void swap(int *a, int *b) {
    int temp = *a;
    *a = *b;
    *b = temp;
}

void selectionSort(int array[], int size) {
    for (int step = 0; step < size - 1; step++) {
        int min_idx = step;

```

```

for (int i = step + 1; i < size; i++) {

    // To sort in descending order, change > to < in this line.
    // Select the minimum element in each loop.
    if (array[i] < array[min_idx])
        min_idx = i;
}

// put min at the correct position
swap(&array[min_idx], &array[step]);
}
}

// function to print an array
void printArray(int array[], int size) {
    for (int i = 0; i < size; ++i) {
        printf("%d ", array[i]);
    }
    printf("\n");
}

// driver code
int main() {
    int data[] = {20, 12, 10, 15, 2};
    int size = sizeof(data) / sizeof(data[0]);
    selectionSort(data, size);
    printf("Sorted array in Ascending Order:\n");
    printArray(data, size);
}

```

3) /* Implementing Bubble sort in a C Program

* Written by: Chaitanya.

*/

#include<stdio.h>

int main(){

int count, temp, i, j, number[30];

printf("How many numbers are u going to enter?: ");

scanf("%d",&count);

printf("Enter %d numbers: ",count);

for(i=0;i<count;i++)

scanf("%d",&number[i]);

/* This is the main logic of bubble sort algorithm

*/

for(i=count-2;i>=0;i--){

for(j=0;j<=i;j++){

if(number[j]>number[j+1]){

temp=number[j];

number[j]=number[j+1];

number[j+1]=temp;

}

}

}

```

printf("Sorted elements: ");
for(i=0;i<count;i++)
    printf(" %d",number[i]);

return 0;
}

```

4) /* C program for Merge Sort */

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

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

```
// Merges two subarrays of arr[].
```

```
// First subarray is arr[l..m]
```

```
// Second subarray is arr[m+1..r]
```

```
void merge(int arr[], int l, int m, int r)
```

```
{
```

```
    int i, j, k;
```

```
    int n1 = m - l + 1;
```

```
    int n2 = r - m;
```

```
    /* create temp arrays */
```

```
    int L[n1], R[n2];
```

```
    /* Copy data to temp arrays L[] and R[] */
```

```
    for (i = 0; i < n1; i++)
```

```
        L[i] = arr[l + i];
```

```
    for (j = 0; j < n2; j++)
```

```
        R[j] = arr[m + 1 + j];
```

```
/* Merge the temp arrays back into arr[l..r]*/
```

```
i = 0; // Initial index of first subarray
```

```
j = 0; // Initial index of second subarray
```

```
k = l; // Initial index of merged subarray
```

```
while (i < n1 && j < n2)
```

```
{
```

```
    if (L[i] <= R[j])
```

```
    {
```

```
        arr[k] = L[i];
```

```
        i++;
```

```
    }
```

```
    else
```

```
    {
```

```
        arr[k] = R[j];
```

```
        j++;
```

```
    }
```

```
    k++;
```

```
}
```

```
/* Copy the remaining elements of L[], if there
```

```
are any */
```

```
while (i < n1)
```

```
{
```

```
    arr[k] = L[i];
```

```
    i++;
```

```
    k++;
```

```
}
```

```

/* Copy the remaining elements of R[], if there
are any */
while (j < n2)
{
    arr[k] = R[j];
    j++;
    k++;
}
}

```

```

/* l is for left index and r is right index of the
sub-array of arr to be sorted */
void mergeSort(int arr[], int l, int r)
{
    if (l < r)
    {
        // Same as (l+r)/2, but avoids overflow for
        // large l and h
        int m = l+(r-l)/2;

        // Sort first and second halves
        mergeSort(arr, l, m);
        mergeSort(arr, m+1, r);

        merge(arr, l, m, r);
    }
}

```

```

/* UTILITY FUNCTIONS */

```

```
/* Function to print an array */
void printArray(int A[], int size)
{
    int i;
    for (i=0; i < size; i++)
        printf("%d ", A[i]);
    printf("\n");
}

/* Driver program to test above functions */
int main()
{
    int arr[] = {12, 11, 13, 5, 6, 7};
    int arr_size = sizeof(arr)/sizeof(arr[0]);

    printf("Given array is \n");
    printArray(arr, arr_size);

    mergeSort(arr, 0, arr_size - 1);

    printf("\nSorted array is \n");
    printArray(arr, arr_size);
    return 0;
}
```