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#include <stdio.h>
void merge(int arr[], int beg, int mid, int end)
{
    int n1 = mid - beg;
    int n2 = end - mid + 1;
    int left[n1], right[n2];

    int k = beg;

    for(int i=0;i<n1;i++)
        left[i] = arr[k++];
    for(int i=0;i<n2;i++)
        right[i] = arr[k++];

    k = beg;
    int i = 0;
    int j = 0;

    while(i < n1 && j < n2)
    {
        if(left[i] < right[j])
        {
            arr[k] = left[i++];
        }
        else
        {
            arr[k] = right[j++];
        }
        k++;
    }

    while(i < n1)
    {
        arr[k++] = left[i++];
    }
    while(j < n2)
    {
        arr[k++] = right[j++];
    }
}

void mergeSort(int arr[], int beg, int end)
{
    if(beg < end)
    {
        int mid = (beg + end) / 2;

        mergeSort(arr, beg, mid);
        mergeSort(arr, mid + 1, end);

        merge(arr, beg, mid+1, end);

        sleep(1);
    }
}

void bubbleSort(int arr[], int n)
{
    for(int i=0;i<n-1;i++)
    {
        for(int j=0;j<n-i-1;j++)
        {
            if(arr[j] > arr[j + 1])
            {
                int tmp = arr[j];
                arr[j] = arr[j+1];
                arr[j+1] = tmp;
            }
        }
        sleep(1);
    }
}

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

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        printf("\n");
    }

int main()
{
    printf("\nMain Parent: %d\n", getppid());

    int p_n = 10;
    int c_n = 4;
    int p_arr[10] = {9,6,3,7,4,1,8,5,2,10};
    int c_arr[4] = {4,3,1,2};

    int id = fork();

    if(id == 0)
    {
        printf("\nChild: Starting\n");
        printf("\nChild: Parent ID: %d\n", getppid());
        printf("\nChild: My ID: %d\n", getpid());
        printf("\nChild: Started Sorting\n");

        bubbleSort(c_arr, c_n);

        printf("\nChild: Sorting Complete\n");
        printarr(c_arr, c_n);

        printf("\nChild: Became Zombie\n");
    }
    else
    {
        printf("\nParent: Starting\n");
        printf("\nParent: Parent ID: %d\n", getppid());
        printf("\nParent: My ID: %d\n", getpid());
        printf("\nParent: Started Sorting\n");

        mergeSort(p_arr, 0, p_n -1);

        printf("\nParent: Sorting Complete\n");
        printarr(p_arr, p_n);

        wait(NULL);

        printf("\nParent: Exiting\n");
    }
    return 0;
}

/*OUTPUT-
Main Parent: 2691

Parent: Starting

Parent: Parent ID: 2691

Parent: My ID: 7640

Parent: Started Sorting

Child: Starting

Child: Parent ID: 7640

Child: My ID: 7641

Child: Started Sorting

Child: Sorting Complete
1 2 3 4

Child: Became Zombie

Parent: Sorting Complete
1 2 3 4 5 6 7 8 9 10

Parent: Exiting

*/
/*OUTPUT TOP-
Tasks: 168 total, 1 running, 131 sleeping, 0 stopped, 1 zombie
*/

```