

1.3/Merge.h

```

1  /*----- File: Merge.c -----+
2  |Merge Sort                      |
3  |                               |
4  |                               |
5  | Implementado por Guilherme C. Pena em 08/11/2023 |
6  +-----+ */
7  #ifndef MERGE_H
8  #define MERGE_H
9
10
11 #include <stdio.h>
12 #include <stdlib.h>
13 #include <time.h>
14
15
16 int* copiaVetorMerge(int* v, int n){
17     int i;
18     int *v2;
19     v2 = (int*) malloc (n*sizeof(int));
20     for(i=0; i<n; i++) v2[i] = v[i];
21     return v2;
22 }
23
24 void imprimeVetorMerge(int* v, int n){
25     int i, prim = 1;
26     printf("[");
27     for(i=0; i<n; i++)
28         if(prim){ printf("%d", v[i]); prim = 0; }
29         else printf(", %d", v[i]);
30     printf("]\n");
31 }
32
33 void preencheAleatorioMerge(int* v, int n, int ini, int fim){
34     int i;
35     for(i=0; i<n; i++)
36         v[i] = ini + rand() % (fim-ini + 1);
37 }
38
39 void trocaMerge(int* a, int *b, long* mov){
40     int aux = *a;
41     *a = *b;
42     *b = aux;
43     (*mov)++;
44 }
45
46 void Merge(int *v, int ini, int meio, int fim, long* comp, long* mov){
47     int tam = fim - ini + 1;
48     // Vetor Auxiliar - A
49     int *A = (int*) malloc(tam * sizeof(int));
50     int i = ini, j = meio + 1, k = 0;
51
52     while (i <= meio && j <= fim) {
53         (*comp)++;
54         if (v[i] < v[j]) {
55             A[k] = v[i];
56             i++;
57         } else {

```

```
58         A[k] = v[j];
59         j++;
60     }
61     k++;
62 }
63
64 while (i <= meio) {
65     A[k] = v[i];
66     i++;
67     k++;
68 }
69
70 while (j <= fim) {
71     A[k] = v[j];
72     j++;
73     k++;
74 }
75
76 for (i = ini, k = 0; i <= fim; i++, k++) {
77     v[i] = A[k];
78     (*mov)++;
79 }
80
81 free(A);
82 }
83
84 void MergeSort(int *v, int ini, int fim, long* comp, long* mov){
85     if(ini < fim ){
86         int meio = (ini + fim)/2;
87         MergeSort(v, ini, meio, comp, mov);
88         MergeSort(v, meio+1, fim, comp, mov);
89         Merge(v, ini, meio, fim, comp, mov);
90     }
91 }
92
93 #endif
```