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#include<iostream>
using namespace std;

void bolha(int v[], int tam){
    int i,j;
    i=tam-1;
    while (i>=1){
        j=1;
        while(j<=i){
            if (v[j-1]>v[j]){
                swap(v[j-1],v[j]);
            }
            j++;
        }
        i--;
    }
}

void bolhaest(int v[], int tam){
    int i,j,mudou;
    i=tam-1;
    mudou=1;
    while ((i>=1)&&modou){
        j=1;
        mudou=0;
        while(j<=i){
            if (v[j-1]>v[j]){
                swap(v[j-1],v[j]);
                mudou=1;
            }
            j++;
        }
        i--;
    }
}

void inser(int v[], int n)
{
    int i, aux, j;
    for (i = 1; i < n; i++) {
        aux = v[i];
        j = i-1;
        while (j >= 0 && v[j] > aux) {
            v[j+1] = v[j];
            j = j-1;
        }
        v[j+1] = aux;
    }
}

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void selec (int v[], int tam) {
    int i,j,cor,inui;
    i=0;
    while (i<tam){
        cor=v[i];
        inui=i;
        j=i+1;
        while (j<tam){
            if (v[j]<cor){
                cor=v[j];
                inui=j;
            }
            j++;
        }
        swap(v[i],v[inui]);
        i++;
    }
}

void shell(int v[], int tam){
    int k,h,i,j,x,m;
    int decr[3]={5,3,1}; // se quiser, pode alterar os tamanhos
    int tam2;
    tam2=sizeof(decr)/sizeof(decr[0]);
    for (k=0;k<tam2;k++){
        h=decr[k];
        i=h;
        while (i<tam){
            x=v[i];
            j=i;
            while ((j>=h) && (v[j-h]>x)){
                v[j]=v[j-h];
                j=j-h;
            }
            v[j]=x;
            i++;
        }
    }
}

void criaheap(int v[], int n, int i) {
    int maior = i;
    int l = 2*i + 1;
    int r = 2*i + 2;
    if (l < n && v[l] > v[maior]) {
        maior = l;
    }
    if (r < n && v[r] > v[maior]) {
        maior = r;
    }
    if (maior != i) {
        swap(v[i], v[maior]);
        criaheap(v, n, maior);
    }
}

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    }
}

void heapsort(int v[], int n) {
    for (int i = n / 2 - 1; i >= 0; i--) {
        criaheap(v, n, i);
    }
    for (int i=n-1; i>=0; i--) {
        swap(v[0], v[i]);
        criaheap(v, i, 0);
    }
}

void quick(int v[], int i, int f) {
    int ant, dep, mei;
    ant=i;
    dep=f;
    mei=v[(i+f)/2];
    do{
        while(v[ant]<mei){
            ant++;
        }
        while (v[dep]>mei){
            dep--;
        }
        if (ant<=dep) {
            swap(v[ant],v[dep]);
            ant++;
            dep--;
        }
    } while (ant<=dep);
    if (i<dep){
        quick(v, i,dep);
    }
    if (ant<f){
        quick(v,ant,f);
    }
}

int main(){
    int ve[]={7,3,1,9,11,23,6,6,19,10,33,44,55,23,24,25,26};
    int i,tam;
    tam = sizeof(ve)/sizeof(ve[0]);
    bolha(ve,tam);
    cout<<"bolha ";
    for (i=0;i<tam;i++){
        cout<<ve[i]<<' ';
    }
    int ve2[]={7,3,1,9,11,55,88,66,29,100,23,6,6,19,10};
    tam = sizeof(ve2)/sizeof(ve2[0]);
    bolhaest(ve2,tam);
    cout<<endl<<"bolhaestrela ";
    for (i=0;i<tam;i++){

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        cout<<ve2[i]<<' ';
    }
    int ve3[]={5,7,1,3,2,4,8,6,9};
    tam = sizeof(ve3)/sizeof(ve3[0]);
    inser(ve3,tam);
    cout<<endl<<"insercao ";
    for (i=0;i<tam;i++){
        cout<<ve3[i]<<' ';
    }
    int ve4[]={22,23,7,3,1,9,11,23,6,6,19,10};
    tam = sizeof(ve4)/sizeof(ve4[0]);
    cout<<endl<<"selecao ";
    selec(ve4,tam);
    for (i=0;i<tam;i++){
        cout<<ve4[i]<<' ';
    }
    int ve5[]={7,3,1,9,11,23,6,6,19,10,8,88,888};
    tam = sizeof(ve5)/sizeof(ve5[0]);
    cout<<endl<<"shell ";
    shell(ve5,tam);
    for (i=0;i<tam;i++){
        cout<<ve5[i]<<' ';
    }
    int ve6[]={7,3,1,88,888};
    tam = sizeof(ve6)/sizeof(ve6[0]);
    cout<<endl<<"heap ";
    heapsort(ve6,tam);
    for (i=0;i<tam;i++){
        cout<<ve6[i]<<' ';
    }
    int ve7[]={2,22,26,29,7,3,1,91,9,11,23,6,6,19,10};
    tam = sizeof(ve7)/sizeof(ve7[0]);
    cout<<endl<<"quick ";
    quick(ve7,0,tam);
    for (i=0;i<tam;i++){
        cout<<ve7[i]<<' ';
    }
}

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