**贪心算法解决背包问题**

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public class Test {

public static void main(String[] args) {

int[] a ={5,2,3,8,7,6,4,1};//重量

int[] b ={3,8,5,4,7,5,1,2};//价值

int max = 15;//背包重量 15

System.out.println("按价值最大先放入的总价值是：" + bigM(a,b,max));

System.out.println("按重量最小先放入的总价值是：" + smallW(a,b,max));

System.out.println("按价容比最大先放入的总价值是：" + bigB(a,b,max));

}

private static int bigB(int[] a, int[] b, int max) {

int sum = 0;

int[] c = new int[a.length];

//求得价容比

for (int i = 0; i < c.length; i++) {

c[i] = b[i]/a[i];

}

//根据价容比从大到小进行排序

for (int i = 0; i < c.length-1; i++) {

for (int j = i+1; j < c.length; j++) {

if (c[i] < c[j]) {

int y = c[i];

c[i] = c[j];

c[j] = y;

int temp = a[i];

a[i] = a[j];

a[j] = temp;

int x = b[i];

b[i] = b[j];

b[j] = x;

}

}

}

//从价容比最大的开始放

for (int i = 0; i < c.length; i++) {

if (a[i]<=max) {

sum +=b[i];

max =max -a[i];

}else {

break;

}

}

return sum;

}

private static int smallW(int[] a, int[] b, int max) {

int sum = 0;

int temp;

//先按重量排序 从小到大

for (int i = 0; i < a.length-1; i++) {

for (int j = i+1; j < b.length; j++) {

if (a[i]>a[j]) {

temp =a[i];

a[i] = a[j];

a[j] = temp;

//价值数组的下标也随之改变

int x = b[i];

b[i]=b[j];

b[j]=x;

}

}

}

//按照从重量最轻开始放

for (int i = 0; i < a.length; i++) {

if (a[i]<=max) {

sum +=b[i];

max =max -a[i];

}else {

break;

}

}

return sum;

}

private static int bigM(int[] a, int[] b, int max) {

int sum = 0;

int temp;

//先按价值排序 从大到小

for (int i = 0; i < a.length-1; i++) {

for (int j = i+1; j < b.length; j++) {

if (b[i]<b[j]) {

temp =b[i];

b[i] = b[j];

b[j] = temp;

//重量数组的下标也随之改变

int x = a[i];

a[i]=a[j];

a[j]=x;

}

}

}

//按照从价值最高开始放

for (int i = 0; i < b.length; i++) {

if (a[i]<=max) {

sum +=b[i];

max =max -a[i];

}else {

break;

}

}

return sum;

}

}

