#include<iostream>

#include<string>

using namespace std;

void knapsack(int[],int[],int,int);

int maximum(int,int);

void displayX(int[],int);

int main()

{

int num,p[10],w[10],m;

cout<<"Enter the number of objects"<<endl;

cin>>num;

for(int i=0;i<num;i++)

{

cout<<"Enter the weight of object "<<i+1<<endl;

cin>>w[i];

cout<<"Enter the price of object "<<i+1<<endl;

cin>>p[i];

}

cout<<"Enter the weight of the knapsack"<<endl;

cin>>m;

knapsack(p,w,num,m);

return 0;

}

void knapsack(int p[],int w[],int num,int m)

{

int v[num+1][m+1];

int i,j,k;

int x[num];

//initialize v

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

{

v[i][0] = 0;

}

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

{

v[0][i] = 0;

}

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

{

x[i] = 0;

}

//calculating the value of the table v for sequence of decisions

for(i=1;i<=num;i++)

{

for(j=1;j<=m;j++)

{

if(j<w[i-1])

{

v[i][j] = v[i-1][j];

}

else

{

v[i][j] = maximum(v[i-1][j],v[i-1][j-w[i-1]]+p[i-1]);

}

}

}

//making sequence of decisions based on the data in table v

k = v[num][m];

for(i=num;i>=1;i--)

{

for(j=1;j<=m;j++)

{

if(v[i][j]==k&&v[i-1][j]!=v[i][j])

{

x[i-1] = 1;

k = k-p[i-1];

break;

}

}

}

//function to display the table v after calculating the its values

cout<<"The calculated table v :"<<endl;

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

{

for(j=0;j<=m;j++)

{

cout<<v[i][j]<<" ";

}

cout<<endl;

}

displayX(x,num); //function to display the vector of included objects

}

int maximum(int x,int y)

{

if(x>y)

return x;

else

return y;

}

void displayX(int x[],int num)

{

cout<<"The included objects are :"<<endl;

int i;

cout<<"x = ( ";

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

{

cout<<x[i]<<" ";

}

cout<<")"<<endl;

}

OUTPUT:

