



INSTITUTE OF INFORMATION TECHNOLOGY
JAHANGIRNAGAR UNIVERSITY

Lab Exam : 01
Submission Date : 17/01/2022
Course Title : Algorithm Analysis and Design Lab
Course Code : ICT - 2202

Submitted To

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Submitted By

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Roll – 2023
2nd year 2st Semester
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Answer to the problem no - 1

```
Problem 1.cpp - Code::Blocks 17.12
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Start here x Problem 1.cpp x *problem 2.cpp x problem 3.cpp x

1 // Md. Shakil Hossain
2 // Roll - 2023
3 // Lab Test 1
4 #include<bits/stdc++.h>
5 #define ll long long
6 #define vr(v) v.begin(),v.end()
7 #define ff(i,a,b) for (int i=a;i<b;i++)
8 #define fast ios_base::sync_with_stdio(false);cin.tie(NULL)
9 using namespace std;
10 const int MAX=100;
11 const int MOD = 1e9+7;
12 const long long mn=1e15;
13 int solve(int b, int n, int co[], int we[])
14 {
15     int dp[b+1];
16     memset(dp, 0, sizeof dp);
17
18     for (int i=0; i<=b; i++)
19         for (int j=0; j<n; j++)
20             if (we[j] <= i)
21                 dp[i] = max(dp[i], dp[i-we[j]] + co[j]);
22
23     return dp[b];
24 }
25
26
```

Problem 1.cpp - Code::Blocks 17.12

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Start here x Problem 1.cpp x *problem 2.cpp x problem 3.cpp x

```
25
26
27  int main()
28  {
29      int n,b;
30      cout<<"n=";
31      cin>>n;
32      cout<<"B=";
33      cin>>b;
34
35      int we[n],co[n];
36      cout<<"Weights ="<<endl;
37      for(int i=0;i<n;i++){
38          cin>>we[i];
39      }
40      cout<<"Costs ="<<endl;
41      for(int i=0;i<n;i++){
42          cin>>co[i];
43      }
44      cout << "Maximum Cost="<<solve(b, n, co, we)<<endl;
45      cout<<"weight="<<b<<endl;
46
47      return 0;
48  }
49
```

"D:\Github\Algorithm-Analysis-and-Design-Lab\Exam\Exam 1\Code\Problem 1.exe"

```
n= 5
B= 1000
Weights: 21 23 24 22 24
Costs: 23 25 24 24 22

Maximum Cost=1094
weight=1000
```

Answer to the problem no - 2

```
*problem 2.cpp - Code::Blocks 17.12
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Start here X Problem 1.cpp X *problem 2.cpp X problem 3.cpp X

1 // Md. Shakil Hossain
2 // Roll - 2023
3 // Lab Test 1
4 #include<bits/stdc++.h>
5 using namespace std;
6 vector<int>v1,v2;
7 int n,T;
8 int x[100],y[100];
9 bool knap(int i,int j,int k)
10 {
11     if(i==n+1)
12     {
13         if(j+k==T)
14             return true;
15         else
16             return false;
17     }
18     bool p1=knap(i+1,x[i]+j,k);
19     if(p1)
20     {
21         if(i!=0)
22             v1.push_back(x[i]);
23         return true;
24     }
25     bool p2=knap(i+1,j,k+y[i]);
26     if(p2)
27     {
28         if(i!=0)
29             v2.push_back(y[i]);
30         return true;
31     }
32     return false;
33 }
```

*problem 2.cpp - Code::Blocks 17.12

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Start here × Problem 1.cpp × *problem 2.cpp × problem 3.cpp ×

```
36  main()
37  {
38      int i,j,k,l,m;
39      cout <<"n= ";
40      cin>>n;
41      cout<<"A= ";
42      for(i=1; i<=n; i++)
43          cin>>x[i];
44      cout<<"B= ";
45      for(i=1; i<=n; i++)
46          cin>>y[i];
47      cout<<"T= ";
48      cin>>T;
49      if(knap(0,0,0))
50      {
51          cout<<"\nSolution Exists"<<endl;
52          cout<<"A : ";
53          int sum1=0,sum2=0;
54          for(i=v1.size()-1; i>=0; i--)
55          {
56              cout<<v1[i]<<" ";
57              sum1+=v1[i];
58          }
59          cout<<endl;
60          cout<<"B : ";
61          for(i=v2.size()-1; i>=0; i--)
62          {
```

*problem 2.cpp - Code::Blocks 17.12

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Start here × Problem 1.cpp × *problem 2.cpp × problem 3.cpp ×

```
48     cin>>T;
49     if(knap(0,0,0))
50     {
51         cout<<"\nSolution Exists"<<endl;
52         cout<<"A : ";
53         int sum1=0,sum2=0;
54         for(i=v1.size()-1; i>=0; i--)
55         {
56             cout<<v1[i]<<" ";
57             sum1+=v1[i];
58         }
59         cout<<endl;
60         cout<<"B : ";
61         for(i=v2.size()-1; i>=0; i--)
62         {
63             cout<<v2[i]<<" ";
64             sum2+=v2[i];
65         }
66         cout<<endl;
67         cout<<"Sum1 : "<<sum1<<endl;
68         cout<<"Sum2 : "<<sum2<<endl;
69     }
70     else
71         cout<<"NO"<<endl;
72
73     return 0;
74 }
75
```

```
"D:\Github\Algorithm-Analysis-and-Design-Lab\Exam\Exam 1\Code\problem 2.exe"
n= 10
A= 79 -89 -85 94 74 12 -84 70 -21 22
B= -87 -10 62 -33 -39 23 15 30 72 48
T= 123

Solution Exists
A : 79 -89 -85 74 12
B : -33 15 30 72 48
Sum1 : -9
Sum2 : 132

Process returned 0 (0x0)    execution time : 30.568 s
Press any key to continue.
```


Answer to the problem no - 3

```
*problem 3.cpp - Code::Blocks 17.12
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Start here X Problem 1.cpp X *problem 3.cpp X

1 // Md. Shakil Hossain
2 // Roll - 2023
3 // Lab Test 1
4 #include<bits/stdc++.h>
5 using namespace std;
6 vector<int>v;
7 int n;
8 int x[100],y[100];
9 bool knap(int i,int j,int k)
10 {
11     if(i==n+1)
12     {
13         if(j==k)
14             return true;
15         else
16             return false;
17     }
18     bool p1=knap(i+1,x[i]+j,k);
19     if(p1)
20     {
21         v.push_back(x[i]);
22         return true;
23     }
24     bool p2=knap(i+1,j,k+y[i]);
25     if(p2)
26     {
27         v.push_back(y[i]^-1);
28         return true;
29     }
30     return false;
31 }
```



```
*problem 3.cpp - Code::Blocks 17.12
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Start here x Problem 1.cpp x *problem 3.cpp x
33
34 main()
35 {
36     int i,j,k,l,m;
37     cout<<"n= ";
38     cin>>n;
39     cout<<"X= ";
40     for(i=1; i<=n; i++)
41         cin>>x[i];
42     cout<<"Y= ";
43     for(i=1; i<=n; i++)
44         cin>>y[i];
45     if(knap(0,0,0))
46     {
47         cout<<"\nSolution Exists"<<endl;
48         cout<<"Z= ";
49         for(i=0; i<n; i++)
50             cout<<v[i]<<" ";
51         cout<<endl;
52     }
53     else
54         cout<<"NO"<<endl;
55
56
57
58
59     return 0;
60 }
61
```

```
"D:\Github\Algorithm-Analysis-and-Design-Lab\Exam\Exam 1\Code\problem 3.exe"
n= 10
X= 34 31 26 11 58 39 83 62 81 95
Y= 53 72 43 27 46 6 32 55 56 37

Solution Exists
Z= -37 81 -55 -32 39 58 11 -43 31 -53

Process returned 0 (0x0)    execution time : 19.697 s
Press any key to continue.
```

THE END