进制穷举

1. **背包问题**(knapsack.cpp)

【问题描述】

　　小明有一个最多只能装 10 斤重的网袋，现有白菜 5 斤、猪肉 2 斤、鱼 3.5 斤，酱油连瓶重 1.7 斤、白糖 1 斤、土豆 5.1 斤。设计一个程序，使小明的网袋里装的物品的总重最大。

【参考程序一】{普通版}

```cpp
#include <cstdio>
#include <iostream>
using namespace std;

int main()
{
   float w[7], maxv=0, weight;
   int baicai, zhurou, yu, jiangyou, baitang, tudou;

   w[1] = 5; w[2] = 2;  w[3] = 3.5;
   w[4] = 1.7; w[5] = 1; w[6] = 5.1;

   for (baicai=0; baicai<=1; baicai++)
     for(zhurou=0; zhurou<=1; zhurou++)
       for(yu=0; yu<=1; yu++)
         for(jiangyou=0; jiangyou<=1; jiangyou++)
           for(baitang=0; baiting<=1; baiting++)
             for(tudou=0; tudou<=1; tudou++)
             {
               weight=baicai*w[1]+zhurou*w[2]+yu*w[3]+\
                      jiangyou*w[4]+baitang*w[5]+tudou*w[6];
               if (weight <= 10 && weight > maxv)
                   maxv = weight;
             }

   cout << maxv << endl;
   return 0;
}
```

【参考程序二】{推广版}

　　背包的重量、物品的件数、各物品的重量都是输入的。

```cpp
#include <cstdio>
#include <iostream>
using namespace std;
```

```cpp
int main()
{
   float beibao;
   int n;

   cin >> beibao >> n;
   float w[n+1], sum, maxv=0;
   int b[n+1], i;

   for (i=1; i<=n; i++)  cin >> w[i];   //10, 4, 2, 3, 4, 5

   for(i=0; i<=n; i++)    b[i] = 0;

   while (b[0] == 0)
   {
      j = n;
      while ( b[j]==1)
      {
         b[j]=0;
         j--;
      }
      b[j] = 1;
      sum = 0;
      for (i=1; i<=n; i++)
         sum += w[i] * b[i];

      if (sum<=beibao && sum>maxv) maxv = sum;
   }

   cout <<  maxv << endl;
   return 0;
}
```