# 8.抽象的dfs

## 1、K个数的和（一）

```cpp
#include <iostream>
using namespace std;
int n,k,sum,ans;
int a[40];
//i表示当前正在选取第几个数，cnt表示选取了几个数，s表示选取数的和
void dfs(int i, int cnt, int s)
{
  if (i==n)
  {
    if (cnt == k && s == sum)
    {
      ans++;
    }
    return;
  }
  dfs(i+1,cnt,s);
  dfs(i+1,cnt+1,s+a[i]);
}

int main()
{
    cin >> n >> k >> sum;
    for (int i = 0; i < n; i ++)
    {
      cin >> a[i];
    }
    ans = 0;
    dfs(0,0,0);
    cout << ans << endl;
    return 0;
}

#include <iostream>
using namespace std;
int n,k,sum,ans;
int a[40];
bool xuan[40];
//cnt表示选取了几个数，s表示选取数的和
void dfs(int s, int cnt)
{
```

```
41        if (cnt == k && s == sum)
42        {
43          ans++;
44        }
45         for (int i= 0; i < n; i++)
46         {
47           if (!xuan[i])
48           {
49             xuan[i] = i;
50             dfs(s+a[i],cnt+1);
51             xuan[i] = 0;
52           }
53         }
54 }
55
56 int main()
57 {
58     cin >> n >> k >> sum;
59     for (int i = 0; i < n; i ++)
60     {
61       cin >> a[i];
62     }
63     ans = 0;
64     dfs(0,0);
65     cout << ans << endl;
66     return 0;
67 }
```

## 2、等边三角形

```
1  #include <iostream>
2  using namespace std;
3  int p[15];
4  int vis[15];
5  int n,sum=0;
6  bool f;
7  void dfs(int cnt,int s,int st)
8  {
9      if (f)
10         return;
11     if (cnt==3)
12     {
13         f = true;
14         return;
15     }
16     if (s == sum/3)
17     {
18         dfs(cnt+1,0,0);
19         return;
20     }
21     for (int i = 0; i < n; i++)
```

```
22        {
23            if (!vis[i])
24            {
25                vis[i] = true;
26                dfs(cnt,s + p[i],i+1);
27                vis[i] = false;
28            }
29        }
30    }
31    int main()
32    {
33
34        scanf("%d",&n);
35        for (int i = 0; i < n; i++)
36        {
37            scanf("%d",&p[i]);
38            sum+=p[i];
39        }
40        if (sum%3 != 0)
41            printf("no\n");
42        else
43        {
44            dfs(0,0,0);
45            if (f)
46                printf("yes\n");
47            else
48                printf("no\n");
49        }
50        return 0;
51    }
```

## 3、八皇后?

```
1    #include <iostream>
2    using namespace std;
3    int ans;
4    bool col[10],x1[20],x2[20];
5
6    bool check(int r,int i)
7    {
8        return !col[i] && !x1[r+i] && !x2[r-i+8];
9    }
10   void dfs(int r)
11   {
12       if ( r== 8)
13       {
14           ans++;
15           return;
16       }
17       for (int i = 0; i < 8; i++)
18       {
```

```cpp
        if(check(r,i))
        {
            col[i] = x1[r+i] = x2[r-i+8] = true;
            dfs(r+1);
            col[i] = x1[r+i] = x2[r-i+8] = false;
        }
    }
}
int main()
{

    dfs(0);
    cout <<ans <<endl;
    return 0;
}
```