



Printing Subsequences whose sum is K



☰ L7. All Kind of Patterns in Recursion | Print All | Print one | Count

arr \rightarrow {1, 2, 1}

Sum = 2

{1, 1}

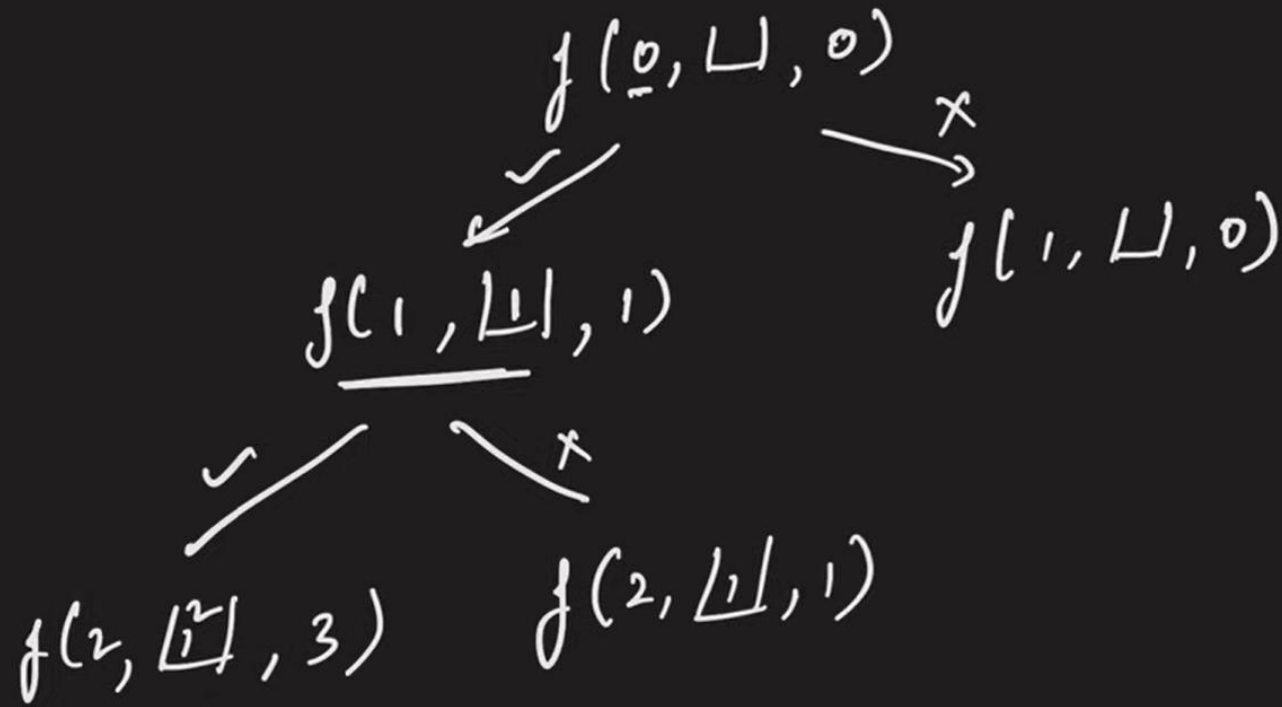
{2}



TUF

[2]

0 1 2





$$\underline{f(1, [1], 1)}$$



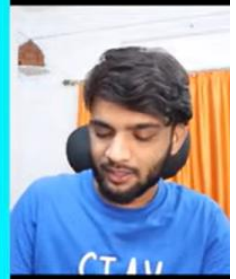
$$f(2, [1], 3)$$

$$f(2, [1], 1)$$



$$\underline{f(3, [1], 4)}$$

$$f(3, [1], 3)$$





$f(1)$
 $f(1) \Rightarrow$
 $f(1) \rightarrow$

$f(1, [1], 1)$



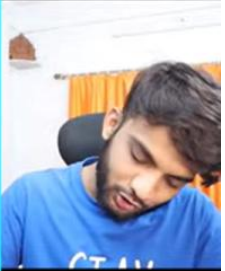
$f(2, [1, 2], 3)$

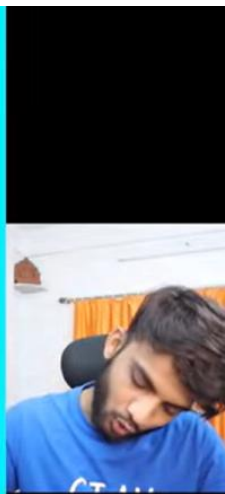
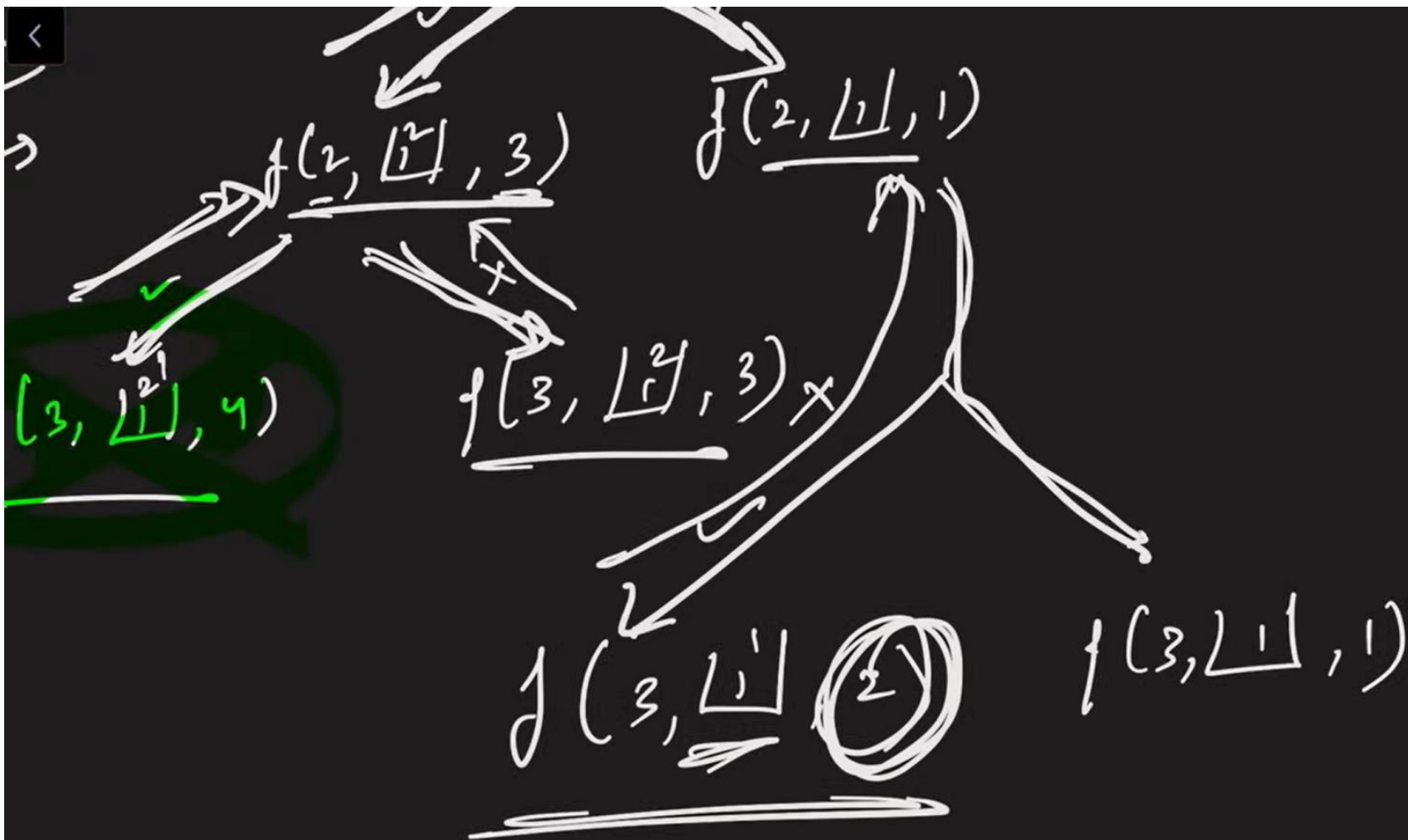
$f(2, [1], 1)$

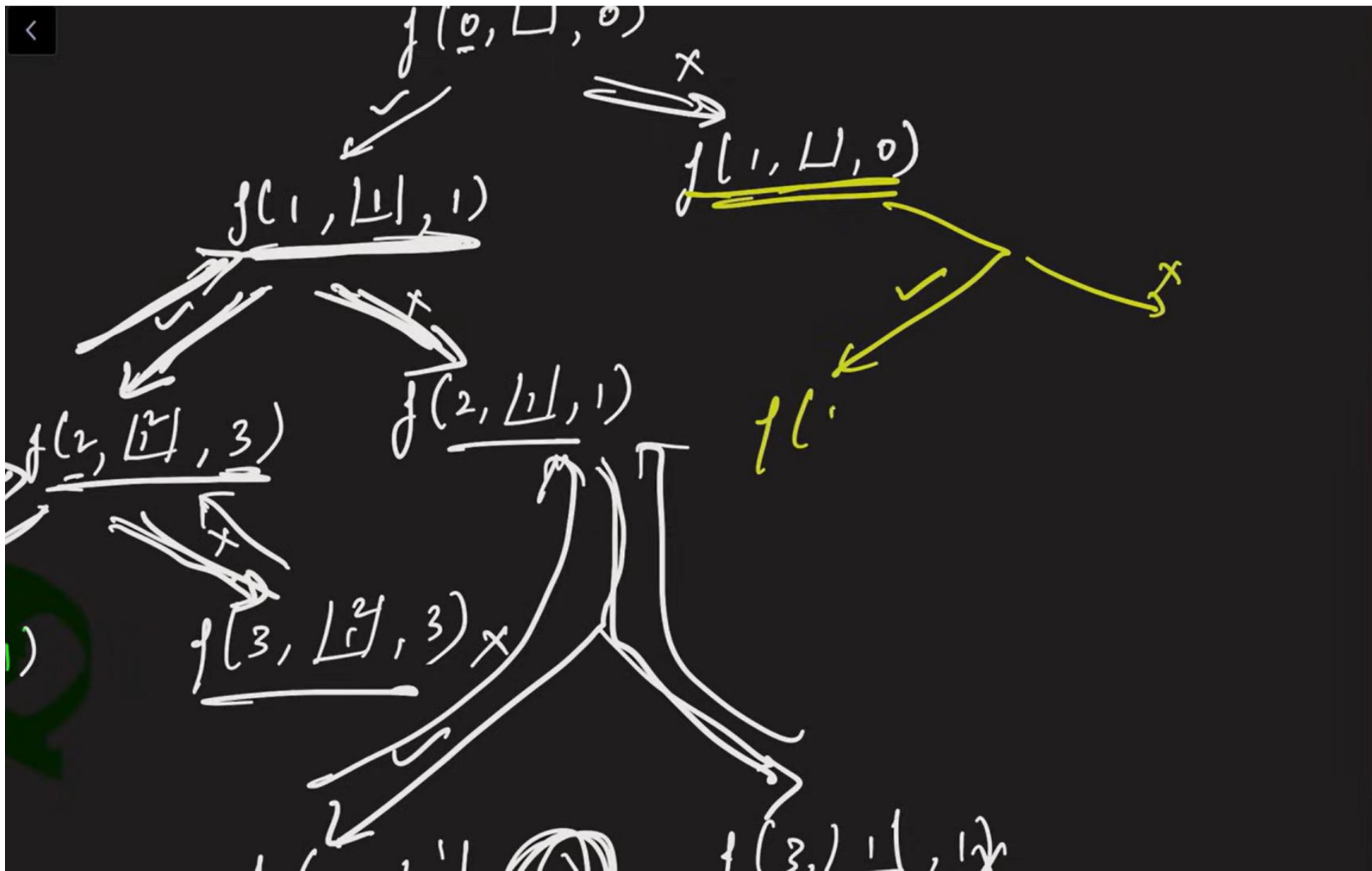


$f(3, [1, 2, 3], 4)$

$f(3, [1, 2], 3)$ \times

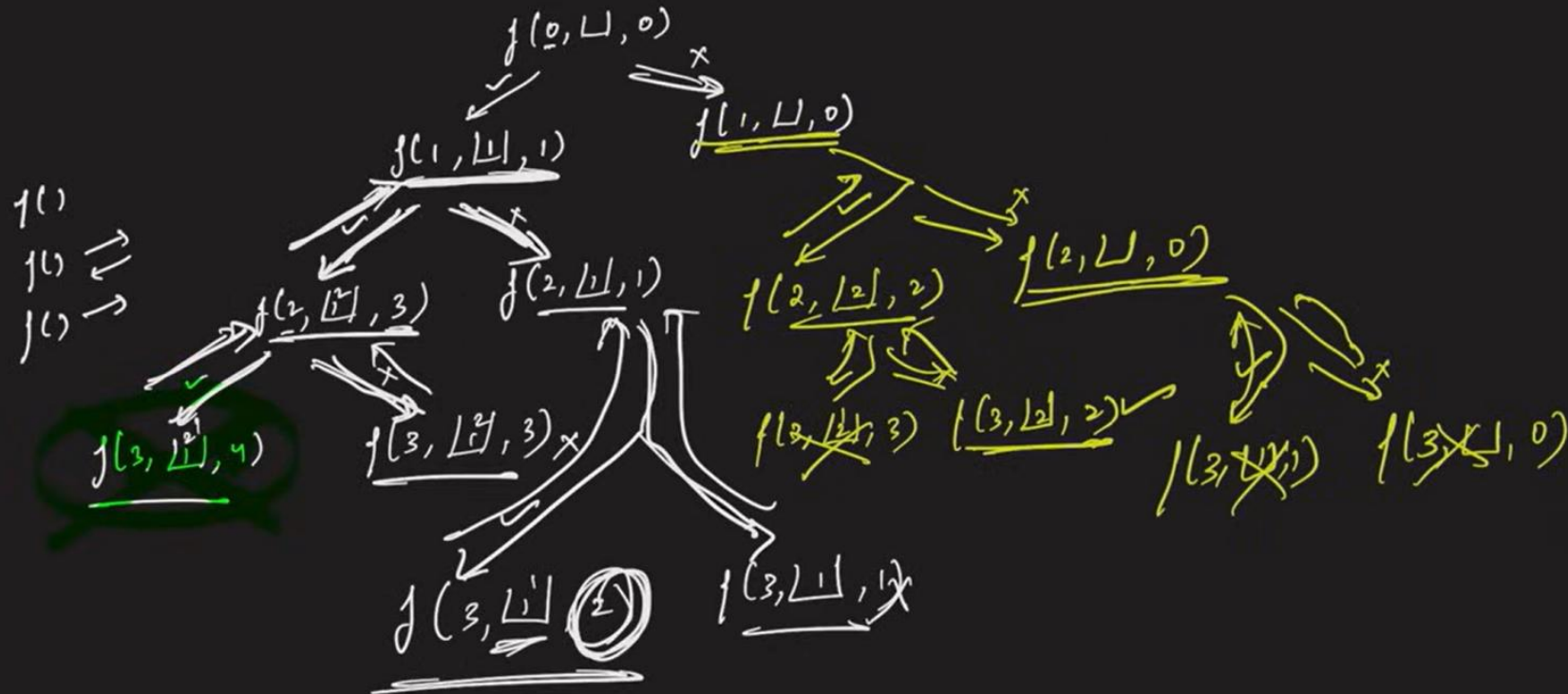






$$\begin{aligned} & \{1, 17\} \\ & \{2\} \end{aligned}$$

over $\rightarrow \begin{matrix} 1 & 2 & 17 \\ 0 & 1 & 2 \end{matrix}$

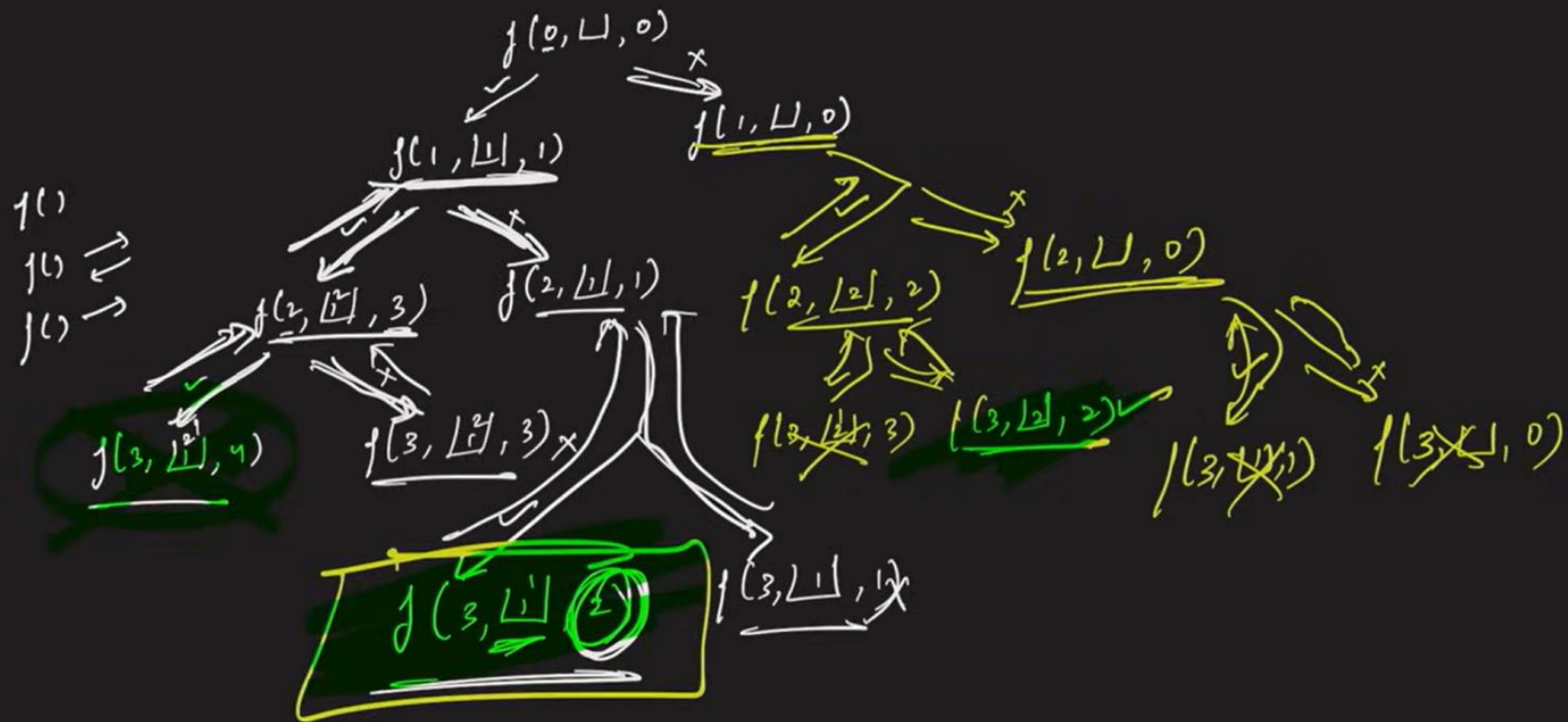

$$\frac{1, 1}{2}$$

TUF



$\{1, 17\}$
 $\{2\}$

ans $\rightarrow \{1, 2, 17\}$
0 1 2



$f(1)$
 $f(1) \Rightarrow$
 $f(1) \rightarrow$

$\frac{1, 1}{2}$

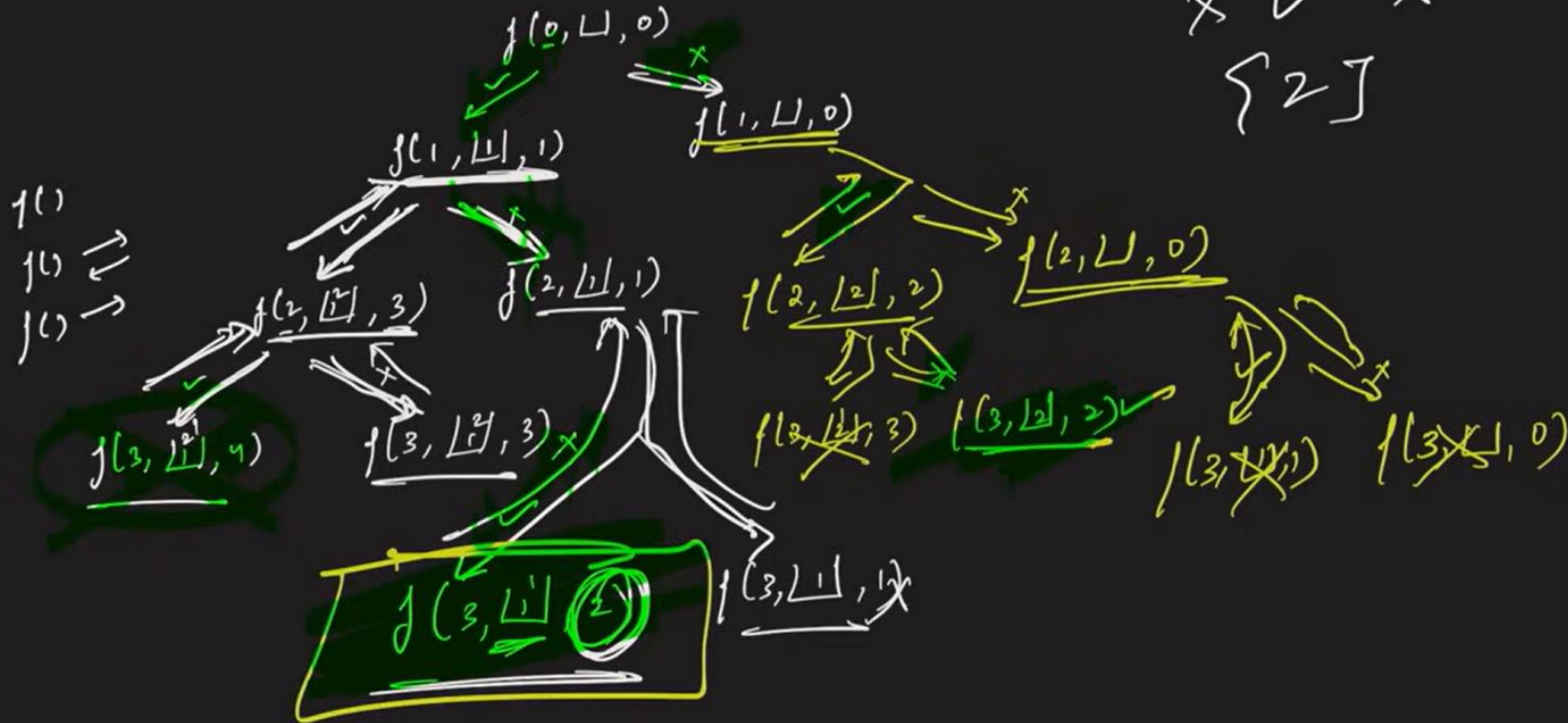




$\{1, 1\}$
 $\{2\}$

array $\rightarrow \begin{matrix} 1 & 2 & 1 \\ 0 & 1 & 2 \end{matrix}$

$\times \checkmark \times$
 $\{2\}$



$\frac{1, 1}{2}$

$\checkmark \times \checkmark$
 $\{1 \quad 1\}$



<

 $f(i, L, s)$ $\{$
if ($i == n$) if ($s == sum$)

print(ds)

return ;

}

ds.add(arr[i]);

 $s += arr[i]$ $f(i+1, ,$ 

<

ds.add(arr[i]);

s += arr[i]

f(i+1, ds, s)

ds.remove(arr[i])

s -= arr[i];

ds



<

```
f(i, L, s)
{
    if (i == n)
    {
        if (s == sum)
            print(ds)
        return;
    }
    ds.add(arr[i]);
    s += arr[i];
    f(i+1, ds, s);
    ds.remove(arr[i]);
    s -= arr[i];
    f(i+1, ds, s);
}
```





ds.add(arr[i],

$S += arr[i]$

f(i+1, ds, s)

ds.remove(arr[i])

$S -= arr[i];$



$ds.remove(arr[i])$

$s = arr[i];$

$f(i+1, ds, s)$

}



```
code.cpp  stdc++.h  input.txt  x
1  #include<bits/stdc++.h>
2  using namespace std;
3  void printS(int ind, vector<int> &ds, int s, int sum, int arr[], int n) {
4      if(ind == n) {
5          if(s == sum) {
6              for(auto it : ds) cout << it << " ";
7              cout << endl;
8          }
9          return;
10     }
11
12     ds.push_back(arr[ind])
13 }
14 int main() {
15     #ifndef ONLINE_JUDGE
16     freopen("input.txt", "r", stdin);
17     freopen("output.txt", "w", stdout);
18     #endif
19     int arr[] = {1, 2, 1};
20     int n = 3;
21     int sum = 2;
22     vector<int> ds;
23     printS(0, ds, 0, sum, arr, n);
24
25     return 0;
26 }
```

input.txt

```
1 5
2 1 2 3 4 5
```

output.txt

```
1 {}
2 2
3 1
4 1 2
5 3
6 3 2
7 3 1
8 3 1 2
9
```

[Finished in 1.3s]




```
code.cpp      stdc++.h
4      if(ind == n) {
5          if(s == sum) {
6              for(auto it : ds) cout << it << " ";
7              cout << endl;
8          }
9          return;
10     }
11
12     ds.push_back(arr[ind]);
13     s += arr[ind];
14
15     printS(ind+1, ds, s, sum, arr, n);
16
17     s -= arr[ind];
18     ds.pop_back();
19
20     // not pick
21     printS(ind+1, ds, s, sum, arr, n);
22 }
23 int main() {
24     #ifndef ONLINE_JUDGE
25     freopen("input.txt", "r", stdin);
26     freopen("output.txt", "w", stdout);
27     #endif
28     int arr[] = {1, 2, 1};
29     int n = 3;
30     int sum = 2;
31     vector<int> ds;
32     printS(0, ds, 0, sum, arr, n);
33
34     return 0;
35 }
```

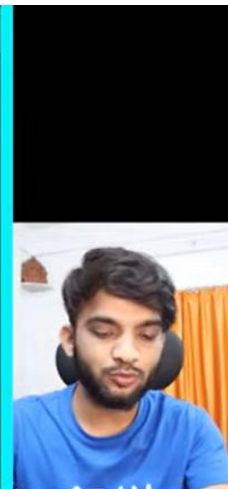
input.txt

```
1 5
2 1 2 3 4 5
```

output.txt

```
1 {}
2 2
3 1
4 1 2
5 3
6 3 2
7 3 1
8 3 1 2
9
```

[Finished in 1.3s]



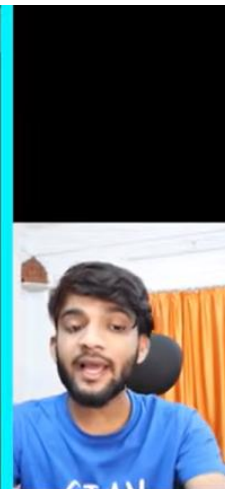
```
code.cpp x stdc++.h x
1 #include<bits/stdc++.h>
2 using namespace std;
3 void printS(int ind, vector<int> &ds, int s, int sum, int arr[], int n) {
4     if(ind == n) {
5         if(s == sum) {
6             for(auto it : ds) cout << it << " ";
7             cout << endl;
8         }
9         return;
10    }
11
12    ds.push_back(arr[ind]);
13    s += arr[ind];
14
15    printS(ind+1, ds, s, sum, arr, n);
16
17    s -= arr[ind];
18    ds.pop_back();
19
20    // not pick
21    printS(ind+1, ds, s, sum, arr, n);
22 }
23 int main() {
24     #ifndef ONLINE_JUDGE
25     freopen("input.txt", "r", stdin);
26     freopen("output.txt", "w", stdout);
27     #endif
28     int arr[] = {1, 2, 1};
29     int n = 3;
30     int sum = 2;
31     vector<int> ds;
32     printS(0, ds, 0, sum, arr, n);
33
34     return 0;
35 }
```

input.txt x

```
1 5
2 1 2 3 4 5
```

output.txt x

```
1 1 1
2 2
3
```



[Finished in 1.9s]

TUF

```
code.cpp  x  stdc++.h  x
1  #include<bits/stdc++.h>
2  using namespace std;
3  void printS(int ind, vector<int> &ds, int s, int sum, int arr[], int n) {
4      if(ind == n) {
5          if(s == sum) {
6              for(auto it : ds) cout << it << " ";
7              cout << endl;
8          }
9          return;
10     }
11
12     ds.push_back(arr[ind]);
13     s += arr[ind];
14
15     printS(ind+1, ds, s, sum, arr, n);
16
17     s -= arr[ind];
18     ds.pop_back();
19
20     // not pick
21     printS(ind+1, ds, s, sum, arr, n);
22 }
23 int main() {
24     #ifndef ONLINE_JUDGE
25     freopen("input.txt", "r", stdin);
26     freopen("output.txt", "w", stdout);
27     #endif
28     int arr[] = {1, 2, 1};
29     int n = 3;
30     int sum = 2;
31     vector<int> ds;
32     printS(0, ds, 0, sum, arr, n);
33
34     return 0;
35 }
```

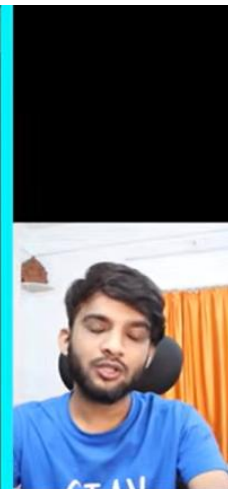
input.txt

```
1 5
2 1 2 3 4 5
```

output.txt

```
1 1 1
2 2
3
```

[Finished in 1.9s]



TUF

```
code.cpp  x  stdc++.h  x
1  #include<bits/stdc++.h>
2  using namespace std;
3
4  bool flag = false;
5  void printS(int ind, vector<int> &ds, int s, int sum, int arr[], int n) {
6      if(ind == n) {
7          if(s == sum && flag == false) {
8              flag = true;
9              for(auto it : ds) cout << it << " ";
10             cout << endl;
11         }
12         return;
13     }
14
15     ds.push_back(arr[ind]);
16     s += arr[ind];
17
18     printS(ind+1, ds, s, sum, arr, n);
19
20     s -= arr[ind];
21     ds.pop_back();
22
23     // not pick
24     printS(ind+1, ds, s, sum, arr, n);
25 }
26 int main() {
27     #ifndef ONLINE_JUDGE
28     freopen("input.txt", "r", stdin);
29     freopen("output.txt", "w", stdout);
30     #endif
31     int arr[] = {1, 2, 1};
32     int n = 3;
33     int sum = 2;
34     vector<int> ds;
35     printS(0, ds, 0, sum, arr, n);
36 }
```

input.txt

```
1 5
2 1 2 3 4 5
```

output.txt

```
1 1 1
2
```

[Finished in 1.9s]



TUF

<

Print any 1 subsequence whose sm is Sum.

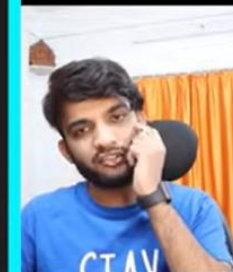
$f()$

{

~~$f()$~~ ~~True~~

\times $f()$ $\xrightarrow{\times}$

}



<
Subsequence where Sm is Sum.

(Technique to print
One answer)

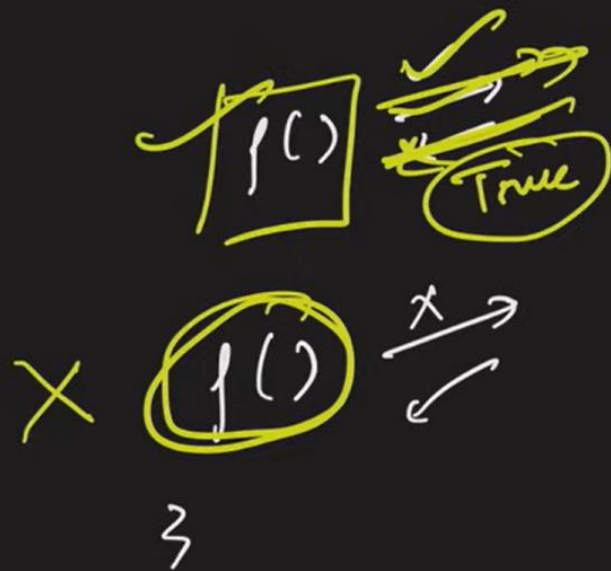
f()

{

f() ✓
True

× f() ✗

}



$f()$

$\{$

base case

cond \rightarrow satisfied
 return (true)
 \rightarrow x set
 return false

$y(f() == \text{true})$
 del



< any subsequence where Sm is Sm.

f()

{

f() ~~Time~~

X f() \xrightarrow{x}

}

(Technique to print
One answer)

f()

{

base case

cond \rightarrow satisfied
return (true)
 \rightarrow x set
return false

if (f() == true)
return;

f()




```
code.cpp      stdc++.h
1  #include<bits/stdc++.h>
2  using namespace std;
3
4
5  bool printS(int ind, vector<int> &ds, int s, int sum, int arr[], int n) {
6      if(ind == n) {
7          // condition satisfied
8          if(s == sum) {
9              for(auto it : ds) cout << it << " ";
10             cout << endl;
11             return true;
12         }
13         // condition not satisfied
14         else return false;
15     }
16
17     ds.push_back(arr[ind]);
18     s += arr[ind];
19
20     if(printS(ind+1, ds, s, sum, arr, n) == true) {
21         return true;
22     }
23
24     s -= arr[ind];
25     ds.pop_back();
26
27     // not pick
28     if(printS(ind+1, ds, s, sum, arr, n) == true) return true;
29
30     return false;
31 }
32 int main() {
33     #ifndef ONLINE_JUDGE
34     freopen("input.txt", "r", stdin);
35     freopen("output.txt", "w", stdout);
36     #endif
```

```
input.txt
1 5
2 1 2 3 4 5
```

```
output.txt
1 1 1
2
```

[Finished in 1.9s]



```
code.cpp x stdc++.h x
9 for(auto it : ds) cout << it << " ";
10 cout << endl;
11 return true;
12 }
13 // condition not satisfied
14 else return false;
15 }
16
17 ds.push_back(arr[ind]);
18 s += arr[ind];
19
20 if(printS(ind+1, ds, s, sum, arr, n) == true) {
21     return true;
22 }
23
24 s -= arr[ind];
25 ds.pop_back();
26
27 // not pick
28 if(printS(ind+1, ds, s, sum, arr, n) == true) return true;
29
30 return false;
31 }
32 int main() {
33     #ifndef ONLINE_JUDGE
34     freopen("input.txt", "r", stdin);
35     freopen("output.txt", "w", stdout);
36     #endif
37     int arr[] = {1, 2, 1};
38     int n = 3;
39     int sum = 2;
40     vector<int> ds;
41     printS(0, ds, 0, sum, arr, n);
42
43     return 0;
44 }
```

input.txt

```
1 5
2 1 2 3 4 5
```

output.txt

```
1 1 1
2
```

[Finished in 2.2s]



TUF

<

$$\text{sum} = 2$$

 $\{1, 2, 1\}$

$f(0, L, 0)$
{

ds.add()
 $\text{if (sum == 2)$
 f(1, L, 1)

ds.remove

$\text{sum} =$

$f(1, L, 0))$



<

$$sum = 2$$

$$\{1, 2, 1\}$$

$$f(1, \underline{11}, 1)$$

$$is(\cdot) \times$$

ds.add

$$is(f(2, \underline{1^2}, 3))$$

$$f(2, \underline{1^2}, 3)$$

$$is(\cdot) \times$$

ds.add

$$is(f($$

< {1, 2, 1}

1)

$f_s(2, \underline{1}, 3)$

$is()x$

ds.add s+=

$is(f(3, \underline{1}, 4))$

< {1, 2, 1}

1)

x

2, 3)

$f(2, \underline{1}, 3)$

$is() \times$

ds.add s +=

$is(f(3, \underline{1}, 4))$

$f(3, \underline{1}, \underline{4})$

$is() \checkmark$

$is(4 == 2) \times$

return false

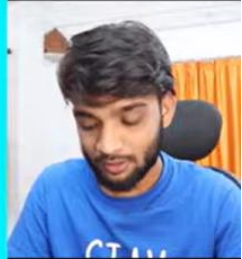
← false

< ≡ L7. All Kind of Patterns in Recursion | Print All | Print one | Count

→ Count the subsequences with sum = 12

{1, 2, 1} $k=2$

(2 subsequences)



TUF

⏮ ⏪ ⏩ ⏭ 23:57 / 34:11 • Modify >



< ≡ L7. All Kind of Patterns in Recursion | Print All | Print one | Count

→ Count the subsequences with sum = 12

{1, 2, 1} k = 2

(2 subsequences)



TUF

⏮ ⏪ ⏩ ⏭ 23:52 / 34:11 • Modify >



mt $f()$
{

base case

sub 1 \rightarrow condition satisfies

sub 0 \rightarrow condition not satisfied

$l = f()$

$r = f()$

sub $l+r$;

}



<

```
mt f()
```

```
{
```

base case

sub 1 \rightarrow condition satisfies

sub 0 \rightarrow condition not satisfied

$l = f()$

$r = f()$

sub $l+r$;

```
}
```



base case

sub 1 \rightarrow condition satisfies

sub 0 \rightarrow condition not satisfied

$$\left\{ \begin{array}{l} l = f() \\ r = j() \end{array} \right.$$

sub $l+r$;

}

$$s = 0$$

$$for (i = 1 \rightarrow n)$$

$$s += f();$$

sub s



base case

sub 1 \rightarrow condition satisfies

sub 0 \rightarrow condition not satisfied

$\left\{ \begin{array}{l} l = f(i) \\ r = j(i) \end{array} \right. \quad 2$
sub $l+r$;

$s = 0$
 $fn(i = 1 \rightarrow n)$
 $s += f(i)$;

sub s

}



base case

sub 1 \rightarrow condition satisfies

sub 0 \rightarrow condition not satisfied

$\left\{ \begin{array}{l} l = f() \\ r = g() \end{array} \right\}^2$
sub $l+r$;

$s = 0$
 $fn(i = 1 \rightarrow n)$
 $s += f();$ } N Queen
sub s

```
code.cpp  stdc++.h  input.txt  output.txt
5  int printS(int ind, vector<int> &ds, int s, int sum, int arr[], int n) {
6      if(ind == n) {
7          // condition satisfied
8          if(s == sum) {
9              return 1;
10         }
11         // condition not satisfied
12         else return 0;
13     }
14
15     ds.push_back(arr[ind]);
16     s += arr[ind];
17
18     int l = printS(ind+1, ds, s, sum, arr, n);
19
20     s -= arr[ind];
21     ds.pop_back();
22
23     // not pick
24     int r = printS(ind+1, ds, s, sum, arr, n);
25
26     return l + r;
27 }
28 int main() {
29     #ifndef ONLINE_JUDGE
30     freopen("input.txt", "r", stdin);
31     freopen("output.txt", "w", stdout);
32     #endif
33     int arr[] = {1, 2, 1};
34     int n = 3;
35     int sum = 2;
36     vector<int> ds;
37     printS(0, ds, 0, sum, arr, n);
38
39     return 0;
}

1  5
2  1 2 3 4 5

1  1 1
2
```

[Finished in 2.2s]

Line 8, Column 23 Tab Size: 4 C++



TUF

```
code.cpp x stdc++.h x
2 using namespace std;
3
4
5 int printS(int ind, int s, int sum, int arr[], int n) {
6     if(ind == n) {
7         // condition satisfied
8         if(s == sum) return 1;
9         // condition not satisfied
10        else return 0;
11    }
12
13
14    s += arr[ind];
15
16    int l = printS(ind+1, s, sum, arr, n);
17
18    s -= arr[ind];
19
20
21    // not pick
22    int r = printS(ind+1, s, sum, arr, n);
23
24    return l + r;
25 }
26
27 int main() {
28     #ifndef ONLINE_JUDGE
29     freopen("input.txt", "r", stdin);
30     freopen("output.txt", "w", stdout);
31     #endif
32     int arr[] = {1, 2, 1};
33     int n = 3;
34     int sum = 2;
35     cout << printS(0, 0, sum, arr, n);
36
37     return 0;
38 }

```

[Finished in 1.5s]

Line 19, Column 5; Reloading ~/Desktop/SublimeFolder/output.txt

Tab Size: 4 C++

```
input.txt
1 5
2 1 2 3 4 5

output.txt
1 2

```



TUF

< }

{1, 2, 1}

$f(0, 0)$
{
 $y()$ x

$l = f(1, 1)$ ✓

$n = f(1, 0)$ x

return $l + n$;

}

$f(1, 1)$
{
 $y()$ x

$l = f(\underline{2}, 3)$ ✓

$n = f(2, 1)$ x

return $l + n$;

}

$f(2, 3)$
{
 $y()$ x

 $l = f($



<
 $f(1,1)$ ✓

$f(1,0)$ ✗

$l + n$;

$l = f(\underline{2,3})$ ✓

$n = f(\underline{2,1})$ ✗

return $l + n$;

}

$l = f(\underline{2,3})$ ✓

$n = f(\underline{2,1})$ ✗

return $l + n$;

}

$f(2,1)$
{
 ...
}

$f(3)$
{
 ...
}



mt $f()$
{

base case

sub 1 \rightarrow condition satisfies

sub 0 \rightarrow condition not satisfied

$\left\{ \begin{array}{l} l = f() \\ r = f() \end{array} \right.$

sub $l+r$;

$s = 0$
 $for (i = 1 \rightarrow n)$
 $\quad s += f();$

NO over

sub s

$\{ \}$
 $\{ \underline{1} \times \underline{1} \} \{ \underline{1}, \underline{2}, \underline{1} \}$

$f(2, 3)$

mt $f()$
 $\{$

base case

sub 1 \rightarrow condition satisfies

sub 0 \rightarrow condition \wedge satisfies

$\left\{ \begin{array}{l} l = f() \\ r = f() \end{array} \right.$

sub $l+r$;

$s = 0$
 $for (i = 1 \rightarrow n)$
 $\quad s += f();$ } No Over

sub s

$\{$
 $\textcircled{1} \times \textcircled{1}$ $\{1, 2, 1\}$

$f(2, 3)$



mt $f(l)$
 $\{$

base case

sub 1 \rightarrow condition satisfies

sub 0 \rightarrow condition \wedge satisfies

$\left\{ \begin{array}{l} l = f(l) \\ r = f(r) \end{array} \right\}$

sub $l+r$;

$s = 0$

$\ln(i = 1 \rightarrow n)$
 $s += f(l)$

sub s

No Over

$\{ \}$
 $\{ 1, 2, 1 \}$

$f(2, 3)$

<

$$\underbrace{2}_{\quad} \underbrace{2}_{\quad} \underbrace{2}_{\quad} \underbrace{2}_{\quad} \underbrace{2}_{\quad} \approx \underbrace{2^n}_{\quad}$$



```
code.cpp  stdc++.h  input.txt  output.txt
2  using namespace std;
3
4
5  int printS(int ind, int s, int sum, int arr[], int n) {
6
7      // condition not satisfied
8      // stri
9      if(s > sum) return 0;
10     if(ind == n) {
11         // condition satisfied
12         if(s == sum) return 1;
13         // condition not satisfied
14         else return 0;
15     }
16
17     s += arr[ind];
18
19     int l = printS(ind+1, s, sum, arr, n);
20
21     s -= arr[ind];
22
23
24     // not pick
25     int r = printS(ind+1, s, sum, arr, n);
26
27     return l + r;
28 }
29
30 int main() {
31     #ifndef ONLINE_JUDGE
32     freopen("input.txt", "r", stdin);
33     freopen("output.txt", "w", stdout);
34     #endif
35     int arr[] = {1, 2, 1};
36     int n = 3;
37     int sum = 2;
38 }
39
40 [Finished in 0.8s]
```




```
code.cpp  stdc++.h  input.txt  output.txt
2  using namespace std;
3
4
5  int printS(int ind, int s, int sum, int arr[], int n) {
6
7      // condition not satisfied
8      // strictly done if array contains positives only
9      if(s > sum) return 0;
10     if(ind == n) {
11         // condition satisfied
12         if(s == sum) return 1;
13         // condition not satisfied
14         else return 0;
15     }
16
17     s += arr[ind];
18
19     int l = printS(ind+1, s, sum, arr, n);
20
21     s -= arr[ind];
22
23
24     // not pick
25     int r = printS(ind+1, s, sum, arr, n);
26
27     return l + r;
28 }
29
30 int main() {
31     #ifndef ONLINE_JUDGE
32     freopen("input.txt", "r", stdin);
33     freopen("output.txt", "w", stdout);
34     #endif
35     int arr[] = {1, 2, 1};
36     int n = 3;
37     int sum = 2;
38 }
39
40 [Finished in 0.8s]
```



TUF


```
code.cpp  stdc++.h  input.txt  output.txt
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4
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18      s += arr[ind];
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20      int l = printS(ind+1, s, sum, arr, n);
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28      return l + r;
29 }
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31 int main() {
32     #ifndef ONLINE_JUDGE
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36     int arr[] = {1, 2, 1};
37     int n = 3;
38 }
39
40 [Finished in 0.8s]
```



< 2 2 2 2 2 2 (2)

print

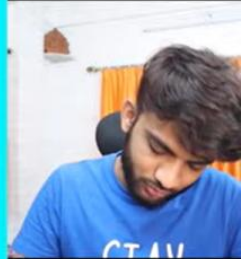
→ param

print 1

→ ret T/F &
avoid function

Recursion calls
if you get true

p



< 2 2 2 2 2 2 (2)

print → param

print 1 → ret T/F &
avoid function

Recursion calls
if you get done

Cont →

ret	1
ret	0



print

→ param

print 1

→ not T/F &
avoid function

Recursion calls
if you get true

Cont

→

sub 1
sub 0

add all f()

& sub

