

“Print all subsets of an array having size ‘r’ ”

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[“ Hello World ”]

Print all subsets

For Example,

Int a[4] =

0	1	2	3
3	2	5	1

In this case

Now, your task is :-

Print all subsets of this array

Total number of subset of an array of size 'n' = 2^n

$$2^n = 2^4 = 16$$

Let's prove above statement :-

Subset having size '0' = { }
Subset having size '1' = {3} {2} {5} {1}
Subset having size '2' = {3,2} {3,5} {3,1} {2,1} {2,5} {5,1}
Subset having size '3' = {3,2,5} {3,2,1} {5,2,1} {5,3,1}
Subset having size '4' = {3,2,5,1}

$$= 1$$

$$= 4$$

$$= 6$$

$$= 4$$

$$= 1$$

Total = 16

Print all subsets

For Example,

	0	1	2	3
Int a[4] =	3	2	5	1

Now, your task is :-

Print all subsets having size '3' of this array

Solution :-

We assume if there is a bit = '1' then we accept the elements

We assume if there is a bit = '0' then we decline the elements

Size of array = 4

Print all subsets

For Example,

Int a[4] =

0	1	2	3
3	2	5	1

All combinations of '0' and '1'

Now, Write $2^4 = 16$ In the binary format

1	→	0	0	0	0	1
2	→	0	0	0	1	0
3	→	0	0	0	1	1
4	→	0	0	1	0	0
5	→	0	0	1	0	1
6	→	0	0	1	1	0
7	→	0	0	1	1	1
8	→	0	1	0	0	0
9	→	0	1	0	0	1
10	→	0	1	0	1	0
11	→	0	1	0	1	1
12	→	0	1	1	0	0
13	→	0	1	1	0	1
14	→	0	1	1	1	0
15	→	0	1	1	1	1
16	→	1	0	0	0	0

Print all subsets

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0	1	2	3
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All combinations of '0' and '1'

Now, Write $2^4 = 16$ In the binary format

1	→	0	0	0	0	1	
2	→	0	0	0	1	0	
3	→	0	0	0	1	1	
4	→	0	0	1	0	0	
5	→	0	0	1	0	1	
6	→	0	0	1	1	0	
7	→	0	0	1	1	1	→ {2,5,1}
8	→	0	1	0	0	0	
9	→	0	1	0	0	1	
10	→	0	1	0	1	0	
11	→	0	1	0	1	1	→ {3,5,1}
12	→	0	1	1	0	0	
13	→	0	1	1	0	1	→ {3,2,1}
14	→	0	1	1	1	0	→ {3,2,5}
15	→	0	1	1	1	1	
16	→	1	0	0	0	0	

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Now, Write $2^4 = 16$ In the binary format

Procedure :-

We have to construct a loop from 1 to pow (2, n)

Here , 1 to 16

Now, convert each 'i' into binary :-

Let, suppose we convert a number 'i' = 1 to binary :-

Push into vector

v.size() = 1

We want size of '4' i.e. 'n'

Now we check int p = n - v.size() = 4-1 = 3

Push '0' in vector

Is it binary representation of '1'. —> NO

Reverse the vector

0	1	2	3
0	0	0	1

0	1	2	3
1	0	0	0

If number of 1's = 3 → Then, takes the value from array from respective index

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*“ If you feel any problem then comments in my video
I will reply as soon as possible “*

- Prince Agarwal