

# GREEDY ALGORITHM

Write a program to take value V and we want to make change for V Rs, and we have infinite supply of each of the denominations in Indian currency, i.e., we have infinite supply of { 1, 2, 5, 10, 20, 50, 100, 500, 1000} valued coins/notes what is the minimum number of coins and/or notes needed to make the change.

Input Format:

Take an integer from stdin.

Output Format:

print the integer which is change of the number.

Example Input :

64

Output:

4

Explanaton:

We need a 50 Rs note and a 10 Rs note and two 2 rupee coins.

**Answer:** (penalty regime: 0 %)

```
1 #include <stdio.h>
2
3 int main() {
4     int denominations[] = {1000, 500, 100, 50, 20, 10, 5, 2, 1};
5     int n = sizeof(denominations) / sizeof(denominations[0]);
6     int V;
7     scanf("%d", &V);
8     int count = 0;
9     for (int i = 0; i < n; i++) {
10         while (V >= denominations[i]) {
11             V -= denominations[i];
12             count++;
13         }
14     }
15     printf("%d\n", count);
16     return 0;
17 }
18
```

	Input	Expected	Got	
✓	49	5	5	✓

Passed all tests! ✓

**Correct**

Marks for this submission: 1.00/1.00.

Assume you are an awesome parent and want to give your children some cookies. But, you should give each child at most one cookie.

Each child  $i$  has a greed factor  $g[i]$ , which is the minimum size of a cookie that the child will be content with; and each cookie  $j$  has a size  $s[j]$ . If  $s[j] \geq g[i]$ , we can assign the cookie  $j$  to the child  $i$ , and the child  $i$  will be content. Your goal is to maximize the number of your content children and output the maximum number.

#### Example 1:

##### Input:

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

##### Output:

```
1
```

Explanation: You have 3 children and 2 cookies. The greed factors of 3 children are 1, 2, 3.

And even though you have 2 cookies, since their size is both 1, you could only make the child whose greed factor is 1 content.

You need to output 1.

##### Constraints:

$1 \leq g.length \leq 3 \times 10^4$

$0 \leq s.length \leq 3 \times 10^4$

$1 \leq g[i], s[j] \leq 2^{31} - 1$

Answer: (penalty regime: 0 %)

```
1 #include <stdio.h>
2
3 void bubbleSort(int arr[], int n) {
4     for (int i = 0; i < n - 1; i++) {
5         for (int j = 0; j < n - i - 1; j++) {
6             if (arr[j] > arr[j + 1]) {
7                 int temp = arr[j];
8                 arr[j] = arr[j + 1];
9                 arr[j + 1] = temp;
10            }
11        }
12    }
13 }
14
15 int main() {
16     int n, m;
17     scanf("%d", &n);
18     int g[n];
19     for (int i = 0; i < n; i++) {
20         scanf("%d", &g[i]);
21     }
22     scanf("%d", &m);
23     int s[m];
24     for (int i = 0; i < m; i++) {
25         scanf("%d", &s[i]);
26     }
27     bubbleSort(g, n);
28     bubbleSort(s, m);
29     int i = 0, j = 0, content = 0;
30     while (i < n && j < m) {
31         if (s[j] >= g[i]) {
32             content++;
33             i++;
34             j++;
35         } else {
36             j++;
37         }
38     }
39     printf("%d\n", content);
40     return 0;
41 }
42
43
```

	Input	Expected	Got	
✓	2	2	2	✓
	1 2			
	3			
	1 2 3			

Passed all tests! ✓

A person needs to eat burgers. Each burger contains a count of calorie. After eating the burger, the person has to run at least  $3^i * c$  kilometers to burn out the calories. If he has eaten  $i$  burgers with  $c$  calories each, then he has to run at least  $3^i * c$  kilometers to burn out the calories. For example, if he has eaten burgers with the count of calorie in the order: [1, 3, 2], the kilometers he needs to run are  $(3^0 * 1) + (3^1 * 3) + (3^2 * 2)$ . But this is not the minimum, so need to try out other orders of consumption and choose the minimum value. Note: He can eat burger in any order and use an efficient sorting algorithm. Apply greedy

#### Input Format

First Line contains the number of burgers

Second line contains calories of each burger which is  $n$  space-separate integers

#### Output Format

Print: Minimum number of kilometers needed to run to burn out the calories

#### Sample Input

```
3
5 10 7
```

#### Sample Output

```
76
```

For example:

Test	Input	Result
Test Case 1	3 1 3 2	18

Answer: (penalty regime: 0 %)

```
1 #include <stdio.h>
2 #include <math.h>
3
4 int main() {
5     int n;
6     int dist = 0;
7     scanf("%d", &n);
8     int arr[100];
9     for (int i = 0; i < n; i++) {
10         scanf("%d", &arr[i]);
11     }
12     for (int i = 0; i < n; i++) {
13         for (int j = 0; j < n; j++) {
14             if (arr[i] > arr[j]) {
15                 int temp = arr[i];
16                 arr[i] = arr[j];
17                 arr[j] = temp;
18             }
19         }
20     }
21     for (int i = 0; i < n; i++) {
22         dist += pow(n, i) * arr[i];
23     }
24     printf("%d", dist);
25 }
```

	Test	Input	Expected	Got	
✓	Test Case 1	3 1 3 2	18	18	✓
✓	Test Case 2	4 7 4 9 6	389	389	✓
✓	Test Case 3	3 5 10 7	76	76	✓

Passed all tests! ✓

Given an array of N integer, we have to maximize the sum of  $arr[i] * i$ , where  $i$  is the index of the element ( $i = 0, 1, 2, \dots, N$ ). Write an algorithm based on Greedy technique with a Complexity  $O(n \log n)$ .

Input Format:

First line specifies the number of elements- $n$ .

The next  $n$  lines contain the array elements.

Output Format:

Maximum Array Sum to be printed.

Sample Input:

5

2 5 3 4 0

Sample output:

40

Answer: (penalty regime: 0 %)

```
1 #include <stdio.h>
2 #include <stdlib.h>
3
4 int compare(const void* a, const void* b) {
5     return (*(int*)a - *(int*)b);
6 }
7
8 int main() {
9     int n;
10    scanf("%d", &n);
11    int arr[n];
12    for (int i = 0; i < n; i++) {
13        scanf("%d", &arr[i]);
14    }
15    qsort(arr, n, sizeof(int), compare);
16    int sum = 0;
17    for (int i = 0; i < n; i++) {
18        sum += arr[i] * i;
19    }
20    printf("%d\n", sum);
21    return 0;
22 }
```

	Input	Expected	Got	
✓	5	40	40	✓
	2			
	5			
	3			
	4			
	0			
✓	10	191	191	✓
	2			
	2			
	2			
	4			
	4			
	3			
	3			
	5			
	5			
	5			
✓	2	45	45	✓
	45			
	3			

Given two arrays array\_One[] and array\_Two[] of same size N. We need to first rearrange the arrays such that the sum of the product of pairs( 1 element from each) is minimum. That is  $\text{SUM}(A[i] * B[i])$  for all i is minimum.

For example:

Input	Result
3 1 2 3 4 5 6	28

Answer: (penalty regime: 0 %)

```

1  #include <stdio.h>
2  #include <stdlib.h>
3
4  int asc(const void* a, const void* b) {
5      return (*(int*)a - *(int*)b);
6  }
7
8  int desc(const void* a, const void* b) {
9      return (*(int*)b - *(int*)a);
10 }
11
12 int main() {
13     int n;
14     scanf("%d", &n);
15     int A[n], B[n];
16     for (int i = 0; i < n; i++) {
17         scanf("%d", &A[i]);
18     }
19     for (int i = 0; i < n; i++) {
20         scanf("%d", &B[i]);
21     }
22     qsort(A, n, sizeof(int), asc);
23     qsort(B, n, sizeof(int), desc);
24     int sum = 0;
25     for (int i = 0; i < n; i++) {
26         sum += A[i] * B[i];
27     }
28     printf("%d\n", sum);
29     return 0;
30 }
31

```

	Input	Expected	Got	
✓	3 1 2 3 4 5 6	28	28	✓
✓	4 7 5 1 2 1 3 4 1	22	22	✓
✓	5 20 10 30 10 40 8 9 4 3 10	590	590	✓

Passed all tests! ✓