# Maximize Capital

Try to solve the Maximize Capital problem.

We'll cover the following


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## Statement

A busy investor with an initial capital, `c`, needs an automated investment program. They can select `k` distinct projects from a list of `n` projects with corresponding `capitals` requirements and expected `profits`. For a given project $i$, its capital requirement is $capitals[i]$ , and the profit it yields is $profits[i]$.

The goal is to maximize their cumulative capital by selecting a maximum of `k` distinct projects to invest in, subject to the constraint that the investor's current capital must be greater than or equal to the capital requirement of all selected projects.

When a selected project from the identified ones is finished, the pure profit from the project, along with the starting capital of that project is returned to the investor. This amount will be added to the total capital held by the investor. Now, the investor can invest in more projects with the new total capital. It is important to note that each project can only be invested once.

As a basic risk-mitigation measure, the investor wants to limit the number of projects they invest in. For example, if `k` is $2$, the program should identify the two projects that maximize the investor's profits while ensuring that the investor's capital is sufficient to invest in the projects.

Overall, the program should help the investor to make informed investment decisions by picking a list of a maximum of `k` distinct projects to maximize the final profit while mitigating the risk.

**Constraints:**

- $1 \leq$ `k` $\leq 10^5$
- $0 \leq$ `c` $\leq 10^9$
- $1 \leq$ `n` $\leq 10^5$
- `k` $\leq$ `n`
- `n` $==$ `profits.length`
- `n` $==$ `capitals.length`
- $0 \leq$ `profits[i]` $\leq 10^4$
- $0 \leq$ `capitals[i]` $\leq 10^9$

## Examples

### Sample example 1

Input

**Input**

```
n = 4, k = 2, c = 1
```

Capitals

| 1 | 2 | 2 | 3 |
|---|---|---|---|

Profits

| 2 | 4 | 6 | 8 |
|---|---|---|---|

---

Selected capitals = 1, 3

Selected profits = 2, 8

Maximum capital = 1 + 2 + 8 = 11

**Output**

```
Maximum capital = 11
```



## Understand the problem

Let's take a moment to make sure you've correctly understood the problem. The quiz below helps you check if you're solving the correct problem:

Maximize Capital

**1** What is the maximum capital for the following input?

`k` = 2

`c` = 1

`capitals` = [1, 2, 3]

`profits` = [2, 3, 5]

A) 6

B) 5

C) 8

D) 10

Submit Answer

Question 1 of 4
0 attempted

Reset Quiz

## Figure it out!

We have a game for you to play. Rearrange the logical building blocks to develop a clearer understanding of how to solve this problem.

Drag and drop the cards to rearrange them in the correct sequence.

Create a min-heap to store `capitals`.

Identify the projects that can be invested within the range of the current capital.

Select the project that yields the highest profit.

Add the profit earned to the current capital.

Repeat until `k` projects have been selected.

Reset | Show Solution | Submit

## Try it yourself

Implement your solution in the following coding playground:

Java

usercode > MaximizeCapital.java

```
1  import java.util.*;
2
3  public class MaximizeCapital{
7
8          return -1;
9      }
10 }
```

Powered by AI | Submit

Test Cases | Results

Case 1 | Case 2 | Case 3

Input #1

1

Input #2

2

Input #3

[1,2,2,3]

Input #4

[2,4,6,8]

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Mark as Completed