

Date

Problem 1: The Launch Day puzzle - Project Scheduling

FutureTech has secured multiple, lucrative contracts, each representing a unique tech project. Every project requires exactly one full day to complete.

However, due to limited resources (only one project can be done per day), & looming deadlines from clients, you must schedule these projects wisely.

Each project has:

- A deadline $D[i]$ (latest day by which it must be completed)
- An associated profit $P[i]$.

The CEO has made it clear: "We don't have the bandwidth to do every project. Pick the most profitable combination - as long as each is completed before or on its deadline."

Example Input

Number of Projects: $N = 3$

Project: (Deadline, Profit) = (2, 100), (1, 19), (2, 27)

Expected Output: 127

Approach

- ① Sorting by profit (& then deadline)
if profit are equal, sort in descending order of deadline.

② Scheduling

Create array, where index represents the day & the value represents the project scheduled on that day.

Pseudocode

```

class project {
    int deadline;
    int profit;
}

function solve(project) {
    // Sort project.
    descending order by project.profit
    if project.profit equal then descending project.deadline

    int arr[] = new int[max deadline];
    // Initialize schedule array.
    for (i = 1; i < max deadline; i++) {
        arr[i] = 0;
        if (deadline < i) {
            arr[i] = profit;
            i++;
        }
    }
}

```

```

int totalProfit = 0
for(int i=0; i < currLength; i++) {
    totalProfit += totalProfit[i];
}
return totalProfit;

```

DRY RUN

Example Input :=

Number of project: $N = 3$

Project (Deadline, Profit) = (2, 100), (1, 19), (2, 27)

↓ ↓ ↓

Project. A B C

Sorted project (by profit).

[A, C, B].

$\max \text{deadline} = \text{MAX}(2, 1, 2) = 2$.

day = [false, false, false]

✓ Schedule project A = [false, false, true] totalProfit = 0 + 100
 ✓ Schedule project C = [index 2 is true so make it at index 1]

~~Schedule project B = [false, true, true] - totalProfit = 100 + 27~~
~~index 1 is true so make it at index 0 = 127~~
~~at index 0, it means day 0 will not be there & no project B will not be done.~~
 Total Profit = 127

