Aim : Write a program to implement job sequencing with deadline

Theory :

* In this problem we have n jobs j1, j2, … jn each has an associated deadline d1, d2, … dn and profit p1, p2, ... pn.
* Profit will only be awarded or earned if the job is completed on or before the deadline.
* We assume that each job takes unit time to complete.
* The objective is to earn maximum profit when only one job can be scheduled or processed at any given time.

## Example

Let us consider a set of given jobs as shown in the following table. We have to find a sequence of jobs, which will be completed within their deadlines and will give maximum profit. Each job is associated with a deadline and profit.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Job** | **J1** | **J2** | **J3** | **J4** | **J5** |
| Deadline | 2 | 1 | 3 | 2 | 1 |
| Profit | 60 | 100 | 20 | 40 | 20 |

## Solution

To solve this problem, the given jobs are sorted according to their profit in a descending order. Hence, after sorting, the jobs are ordered as shown in the following table.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Job** | **J2** | **J1** | **J4** | **J3** | **J5** |
| Deadline | 1 | 2 | 2 | 3 | 1 |
| Profit | 100 | 60 | 40 | 20 | 20 |

From this set of jobs, first we select ***J2***, as it can be completed within its deadline and contributes maximum profit.

* Next, ***J1*** is selected as it gives more profit compared to ***J4***.
* In the next clock, ***J4*** cannot be selected as its deadline is over, hence ***J3*** is selected as it executes within its deadline.
* The job ***J5*** is discarded as it cannot be executed within its deadline.

Thus, the solution is the sequence of jobs (***J2, J1, J3***), which are being executed within their deadline and gives maximum profit.

Total profit of this sequence is **100 + 60 + 20 = 180**.

Algorithm:

1) Sort all jobs in decreasing order of profit.

2) Initialize the result sequence as first job in sorted jobs.

3) Do following for remaining n-1 jobs

.......a) If the current job can fit in the current result sequence

without missing the deadline, add current job to the result.

Else ignore the current job.