Consider a scheduling problem where the 6 jobs have a profit of (10,34,67,45,23,99) and corresponding deadlines (2,3,1,4,5,3). Obtain the optimum schedule. What is the time complexity of your algorithm? Can you improve it?

JOB SEQUENCING WITH DEADLINES ALGORITHM SIMULATION

Ordering the jobs be nonincreasing order of profit:

Jobs   = (99, 67, 45, 34, 23, 10)

Job No.   =(6,   3,   4,   2,   5,   1)

Deadlines   =(2,   3,   1,   4,   5,   3)

New job no.   =(I,   II, III. IV, V, VI)

Job I is allotted slot [0,1]

New Job no.	I					
Ordered by deadlines	2					
Job no.	6					

Job II is allotted slot [1,2], the deadlines are in increasing length.

New Job no.	I	II				
Ordered by deadlines	2	3				
Job no.	6	3				

Job III is being considered. Deadline is 1, so we have to shift jobs I and II upward

New Job no.	I ⟶	II ⟶				
Ordered by deadlines	2	3				
Job no.	6	3				

New Job no.	III	I	II			
Ordered by deadlines	1	2	3			
Job no.	4	6	3			

The deadlines are in increasing order.

New Job no.	III	I	II			
Ordered by deadlines	1	2	3			
Job no.	4	6	3			

Job IV has a deadline of 4, so it can be allotted slot [3,4]

New Job no.	III	I	II	IV		
Ordered by deadlines	1	2	3	4		
Job no.	4	6	3	2		

Job V has a deadline of 5, so it can be allotted slot [4,5]

New Job no.	III	I	II	IV	V	
Ordered by deadlines	1	2	3	4	5	
Job no.	4	6	3	2	5	

Job VI has a deadline of 3 but we cannot shift the array to the left, so we reject job VI.
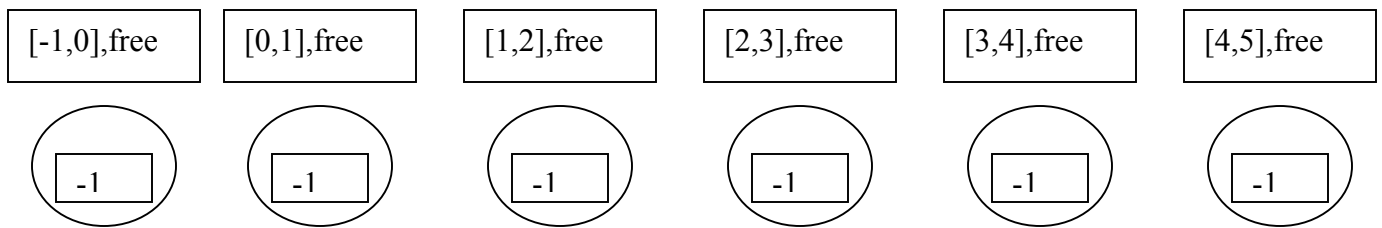
The above is a the schedule.

FAST Job Sequencing with deadlines.

Consider a scheduling problem where the 6 jobs have a profit of (10,34,67,45,23,99) and corresponding deadlines (2,3,1,4,5,3). Obtain the optimum schedule. What is the time complexity of your algorithm? Can you improve it?
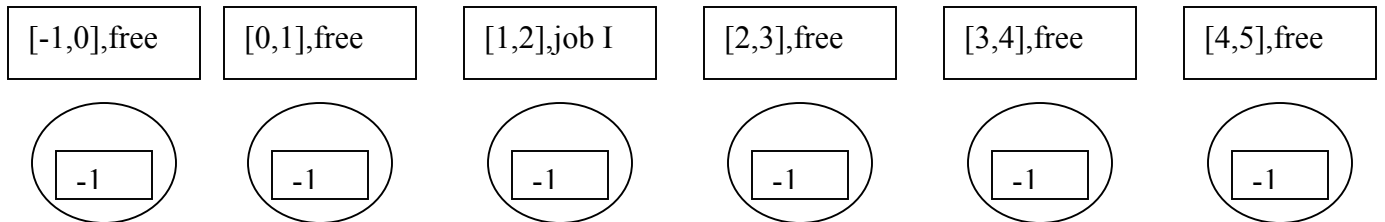
Sort jobs in nondecreasing order of profit:

Profits   =   (99, 67, 45, 34, 23, 10)
Job no.   =   (6, 3,   4, 2, 5, 1)
New no   =   (I, II, III, IV, V, VI)
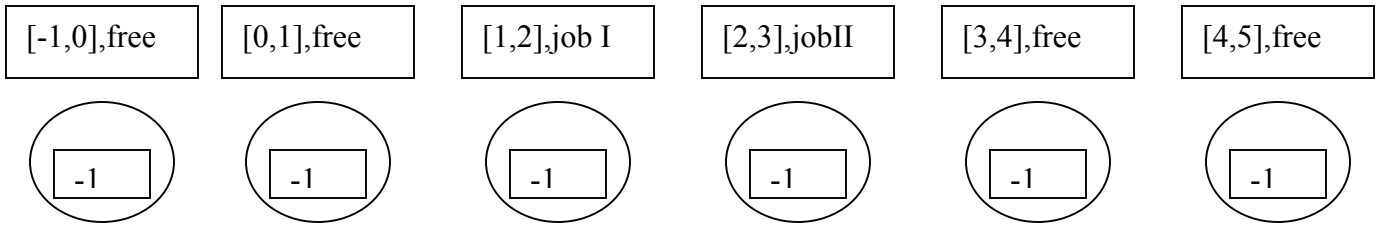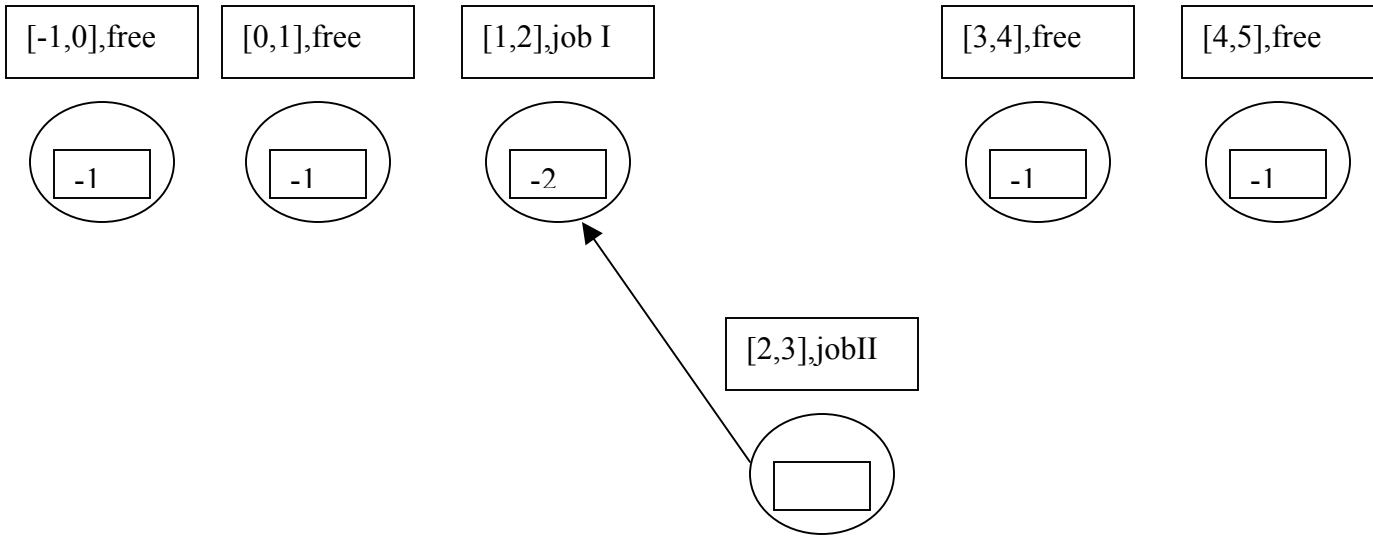Deadline   =   (2,   3,   1, 4, 5, 3)

Start with all slots free.

| [-1,0],free | [0,1],free | [1,2],free | [2,3],free | [3,4],free | [4,5],free |
| -1 | -1 | -1 | -1 | -1 | -1 |

Job I considered, do it in [1,2] slot which is free.

| [-1,0],free | [0,1],free | [1,2],job I | [2,3],free | [3,4],free | [4,5],free |
| -1 | -1 | -1 | -1 | -1 | -1 |

Job II is considered, do it in [2,3] slot.

[-1,0],free	[0,1],free	[1,2],job I	[2,3],jobII	[3,4],free	[4,5],free
-1	-1	-1	-1	-1	-1

Take Union of [1,2] and new [2,3] slot.

[-1,0],free	[0,1],free	[1,2],job I		[3,4],free	[4,5],free
-1	-1	-2		-1	-1

[2,3],jobII

Job III, considered.Deadline is 1. Allot [0,1] slot.

[-1,0],free	[0,1],III	[1,2],job I		[3,4],free	[4,5],free
-1	-1	-2		-1	-1

[2,3],jobII
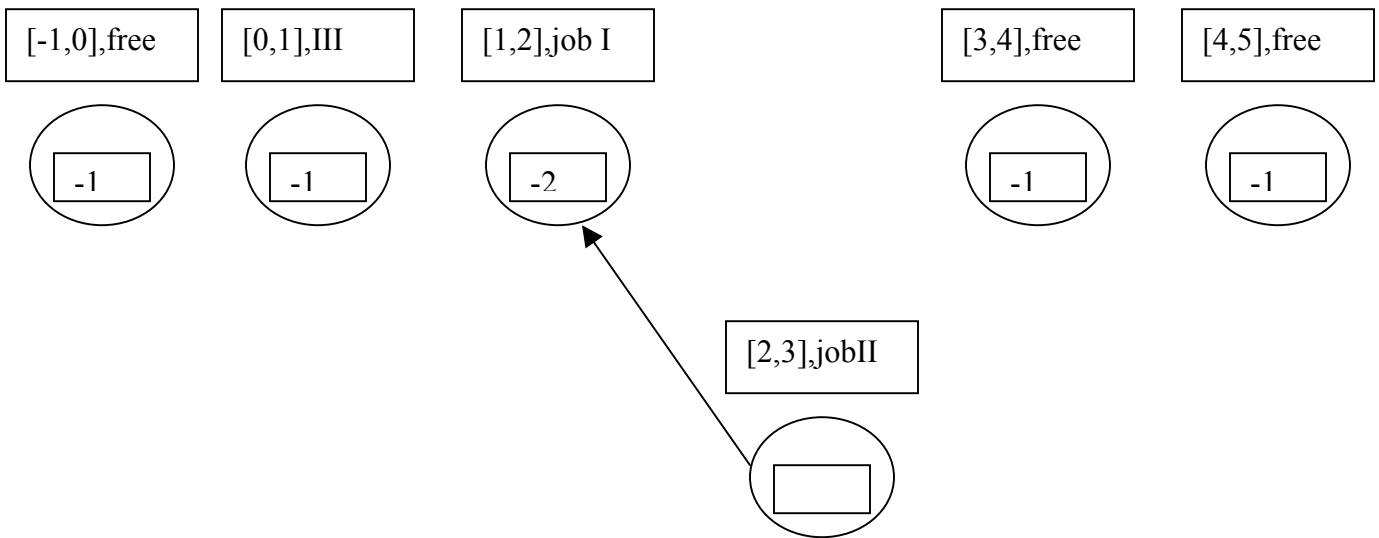
Take union of [1,2] and new [0,1] slot.

[-1,0],free

-1

[1,2],job I

-3

[3,4],free

-1

[4,5],free

-1

[2,3],jobII

[0,1],III
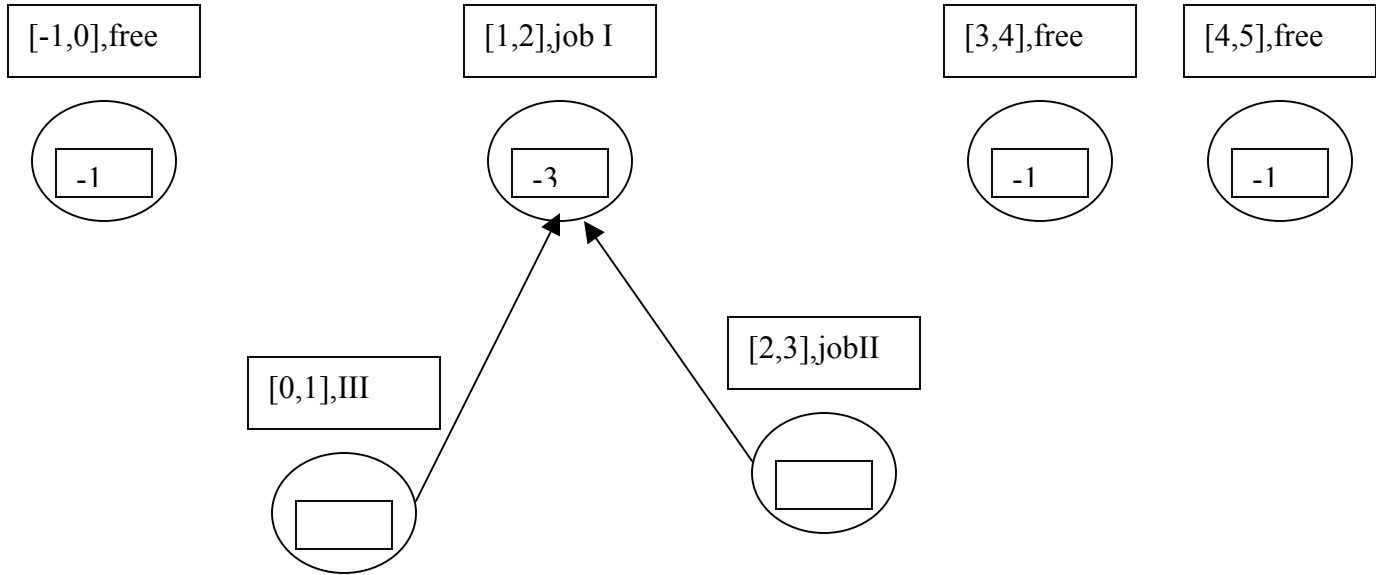
Consider job no IV. Deadline is 4, allot to [3,4] slot which is free.

[-1,0],free

-1

[1,2],job I

-3

[3,4], IV

-1

[4,5],free

-1

[2,3],jobII

[0,1],III
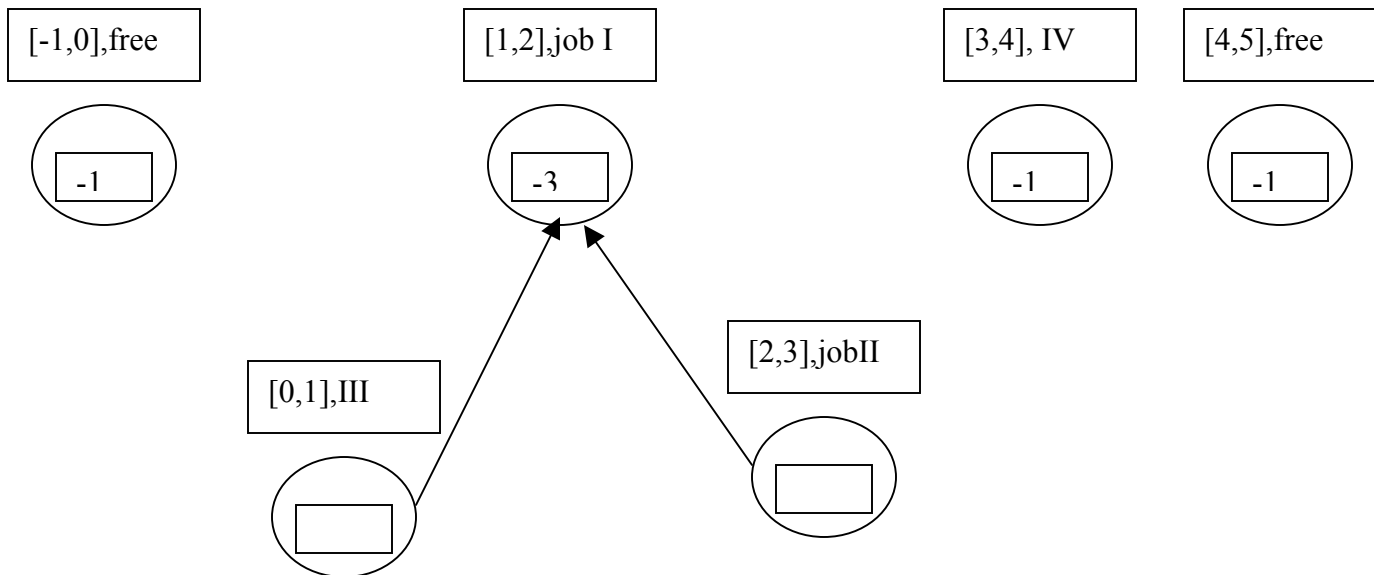
Take union of [1,2] and [3,4] slot.

[-1,0],free

-1

[1,2],job I

-4

[4,5],free

-1

[3,4],IV

[2,3],jobII

[0,1],III
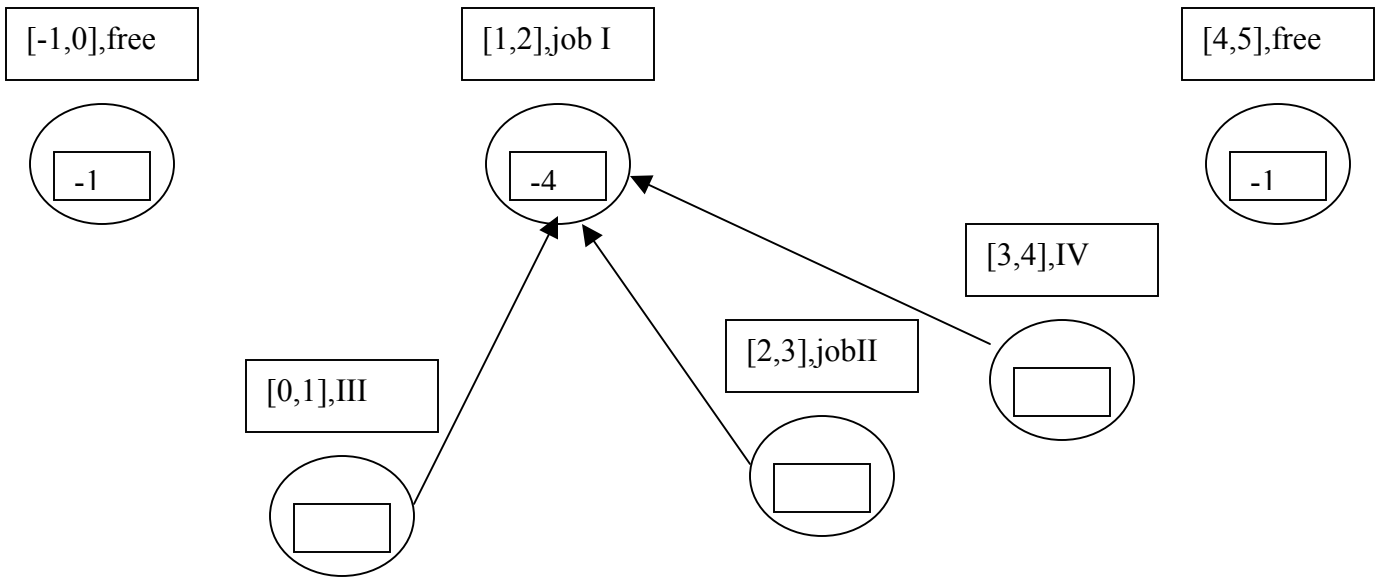
Job V has a deadline of 5, allot to [4,5] slot which is free.

[-1,0],free

-1

[1,2],job I

-4

[4,5],V

-1

[3,4],IV

[2,3],jobII

[0,1],III
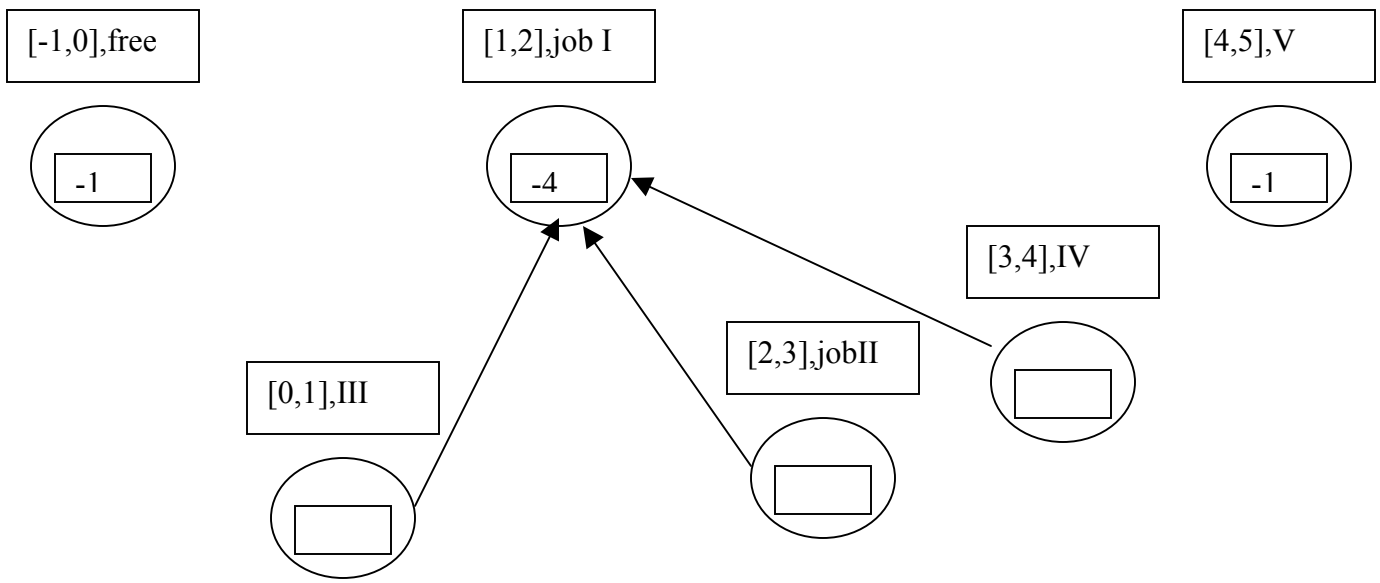
Take union of [1,2] and [4,5] slot that has been created.

[-1,0],free

-1

[1,2],job I

-5

[4,5],V

[3,4],IV

[2,3],jobII

[0,1],III
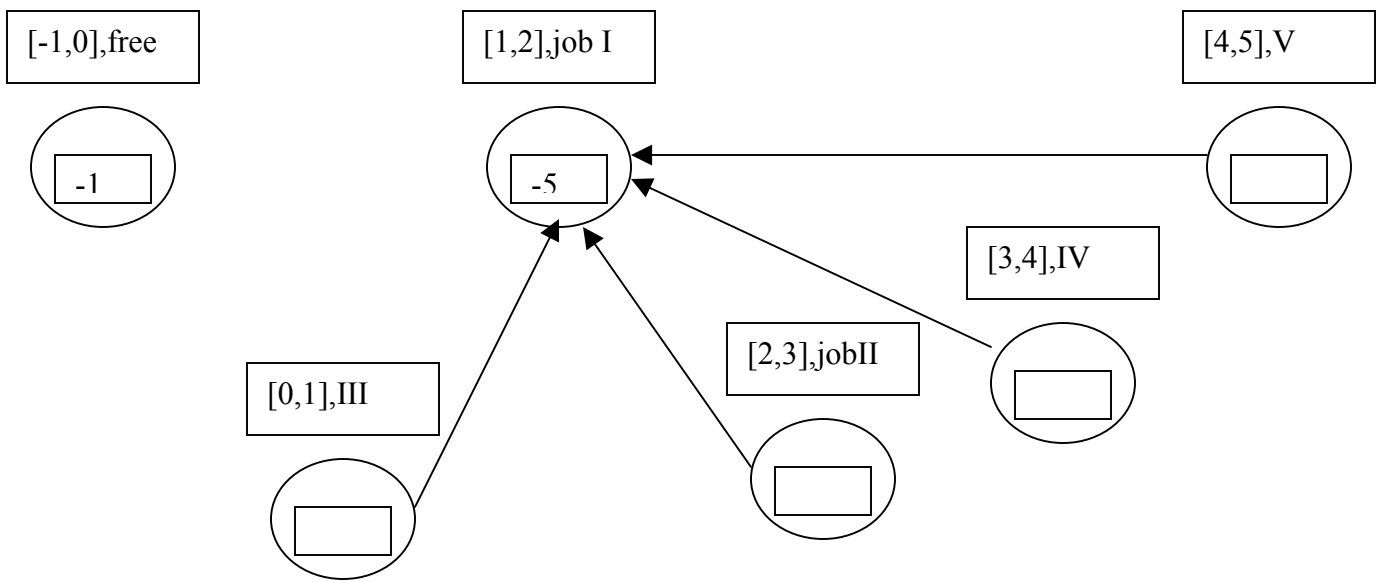
Job VI considered now. It has a deadline of 3. No slot except [-1,0] is free, counting down from [2,3]. So allot it to [-1,0] which is always free and means reject the job.

[-1,0],VI

-1

[1,2],job I

-5

[4,5],V

[3,4],IV

[2,3],jobII

[0,1],III

[-1,0],VI

[1,2],job I

[4,5],V

-6

[3,4],IV

[0,1],III

[2,3],jobII

ABOVE IS FINAL SCHEDULE.