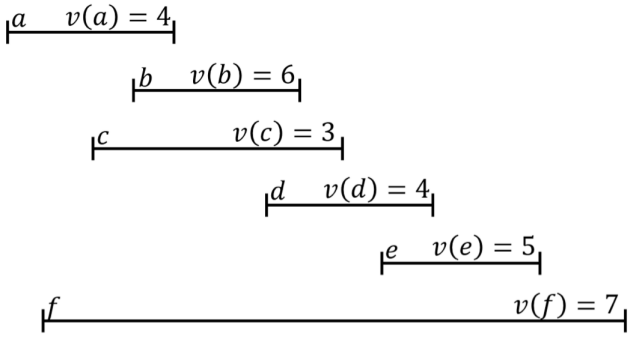
COSC 311: ALGORITHMS
MINI 7

Due Friday, November 1 in class

1. Weighted interval scheduling. Here's a set of intervals and their associated values:



Show what happens when the algorithm we discussed in class is run on this set of intervals. Your response should show both the optimal solution that our algorithm finds, and how the algorithm goes about finding it.

0. Initialization: the value of first 0 tasks is 0

0						

1. The opt. solution for the first job is taking a.

0	4					

2. The opt. solution for the first 2 jobs is taking b, because $v(b)+v(0) > v(1)$, $v(2) = v(b)+v(0) = 6$.

0	4	6				

3. The opt. solution for the first 3 jobs is taking b, because $v(c) + v(0) < v(2)$, $v(3) = v(2) = 6$.

0	4	6	6			

4. The opt. solution for the first 4 jobs is taking a and d, because $v(d) + v(1) > v(3)$, $v(4) = v(d) + v(1) = 8$.

0	4	6	6	8		

5. The opt. solution for the first 5 jobs is taking b and e, because $v(e) + v(3) > v(4)$, $v(5) = v(e) + v(3) = 11$.

0	4	6	6	8	11	

6. The opt. solution for the first 6 jobs is taking b and e, because $v(f) + v(0) < v(5)$, $v(6) = v(5) = 11$.

0	4	6	6	8	11	11

2. Dynamic programming. Explain in your own words the circumstances under which you'd use a dynamic programming algorithm.

We use dynamic programming when the problem has the following properties.

1. Optimal Substructure Property: Optimal solution of a given problem is constructed from optimal solutions to its subproblems
2. Overlapping Subproblems Property: Finding a solution to a given problem involves solving the same subproblem multiple times