

Lab 11: NPC and Approximation

In this lab you are to find an APPROXIMATE but FAST solution to the following problem:

Input: a set S which has sets $s(i)$ as its elements such that each $s(i)$ includes some integers between 1 and n

Output: output minimum number of subset of elements of S that includes all the numbers between 1... n

Example: $n=11$

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S={  
    s(1)={1,3,5,7,10,11},  
    s(2)={1,2,4,5,11},  
    s(3)={4,8,9},  
    s(4)={1,3,5,8,9,10},  
    s(5)={2,6,10}  
}
```

A solution for this example would be $s(1)$, $s(3)$, and $s(5)$

Q1 [10pnts] implement a polynomial time algorithm

Q2:[10pnts] what is the time complexity of your algorithm n^2

Q3:[20pnts] how good is the solution found by your algorithm (i.e., is it optimum? If not what is the approximation ratio?) $\log(n)$

Hint: be greedy.