Planning A Company Party

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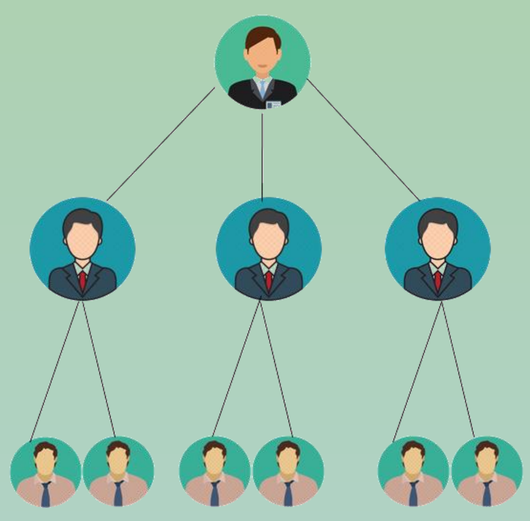
PROBLEM

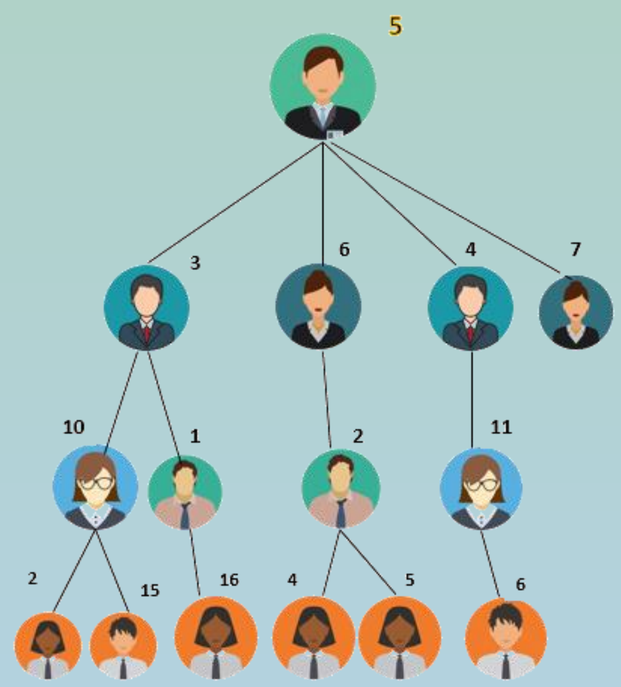
We have been assigned to solve the following problem:

Professor Stewart is consulting for the president of a corporation that is planning a company party. The company has a hierarchical structure; that is, the supervisor relation forms a tree rooted at the president. The personnel office has ranked each employee with a conviviality rating, which is a real number. In order to make the party fun for all attendees, the president does not want both an employee and his or her immediate supervisor to attend. He has to produce an invitation list with the highest possible conviviality rating

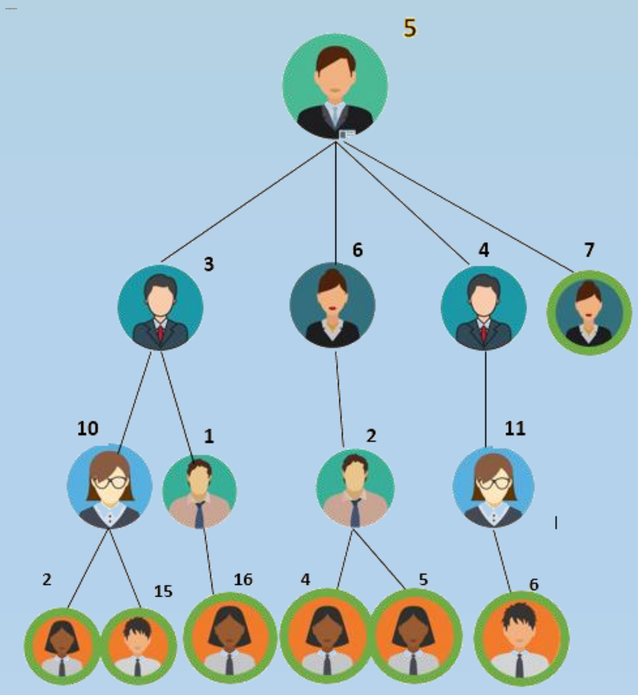
ILLUSTRATION



A Rooted tree with n children with CEO as the root of the tree



All nodes (employees and CEO) have been assigned conviviality ratings



According to the defined eligibility, highlighted nodes are to be invited in this company party

ALGORITHM

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Find-Max-Conv(Tree t)
  1  Let MC[ ] be an array of length n that contains max conviviality from this node down in the tree
  2  for i = Node n downto 1
  3      MC[i] = max(i.rating + Sum of all MC[i.grandchildren], Sum of all MC[i.children])
         (If node i has no grandchildren or children, replace i.grandchildren and/or i.children with 0)
  4  return MC[1]
```

References

- Introduction to Algorithms, Cormen, et al., McGraw Hill
- http://mypathtothe4.blogspot.com/2013/03/dynamic-programming-company-party.html