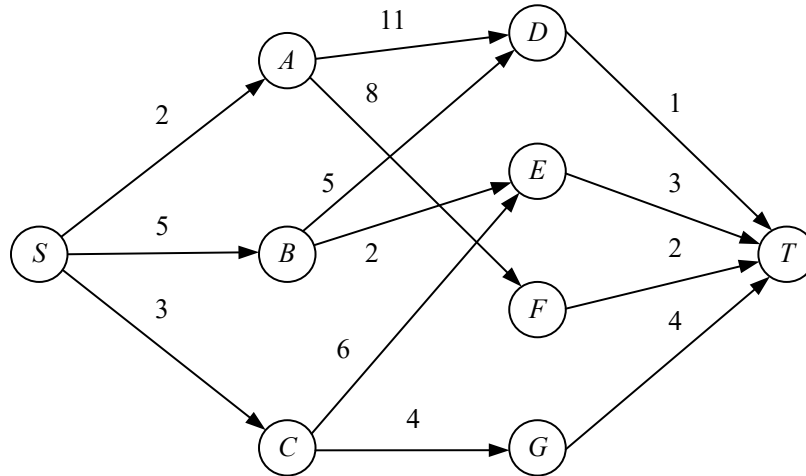


Homework 6 (計算方法設計 · Design and Analysis of Algorithms)

Due date: June 15, 2022

- (25%) Consider the following graph. Find the shortest route from S to T by using the dynamic programming approach.



- (25%) For the following profit matrix, find an optimal allocation of resources to maximize the total profit for those three projects and four resources by using the dynamic programming method.

Project \ Resource	1	2	3	4
1	7	3	12	10
2	4	2	9	8
3	2	1	9	6

- (25%) Find an optimal binary tree for a_1, a_2, \dots, a_6 by using the dynamic programming method, if the identifiers, in order, have probabilities 0.2, 0.3, 0.05, 0.2, 0.1, 0.15 respectively and all other identifiers have zero probability.
- (25%) Given a list (a_1, a_2, \dots, a_n) of n real numbers, please design a dynamic programming algorithm, whose time complexity is better than $O(n^3)$, to find a contiguous sub-list $(a_i, a_{i+1}, \dots, a_j)$, where $1 \leq i \leq j \leq n$, such that the sum of all its numbers is maximum (15%). For instance, if the given list is $(-4, 5, -1, 3, -2)$, then the solution of the above problem is $(5, -1, 3)$. Please also analyze the time complexity of your algorithm (10%).