ECSE210L: Design and Analysis of Algorithms

Lab 7 (Week 11: March, 16 - 20, 2020)

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1. Write a program to compute a^n with minimum number of multiplications (mathematical operations).
2. There are two students participating in DAA programming challenge as a team. Only one student can use the system at a time. Problem need to be solved on system only. Problems are divided into 'n' sub-problems. Both students consume different time in solving each sub-problem and they consume some time while switching the system from one to other. Write a program to find minimum time to solve the problem (by utilizing their performance and dynamic programming concepts).

   To validate you can use following example: Consider both consume fix time of 2s while settling down in the beginning before solving any sub-problem (column 0 entries) on system as mentioned in the table.

3.

Sub-problems	1	2	3	4	5	6	7	8
Time consumed by Teammate A	3	3	5	7	9	10	14	16
Time consumed by Teammate B	4	4	6	5	11	6	15	22

Sub-problems	0	1	2	3	4	5	6	7	8
Time in switching from B to A	2	1	2	2	3	2	4	3	1
Time in switching from A to B	2	1	3	3	2	1	3	3	2

Consider that each entry in table 2 represents the cost of switching teammates on system before solving that sub-problem. If the same person solves both 'i^{th} and $(i+1)^{th}$' sub-problem then the cost of switching will be zero for $(i+1)^{th}$ sub-problem.

Hint: If unable to think then look for 'assembly line problem'.