Exercise 6

CSE2012 DAA Lab

Slot: L31+L32

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1. MyFibonacci series is one which is defined as follows:

fiba(1) = 0

fiba(2) = 1

fiba(3) = 2

fiba(n) = fiba(n-1) + fiba(n-2) + fiba(n-3)

Given value of ‘n’, use top-down dynamic programming to find fiba(n).

2. In rod cutting problem, you will be given a rod of length ‘n’ and prices of rods of length 1 to n. You have find out the maximum revenue that can be generated by cutting the rods. You are allowed have rod as it is of length ‘n’ without cutting or cut it into multiple pieces also. For example, given a price table as below:

length i	1	2	3	4	5	6	7	8	9	10
price p_i	1	5	8	9	10	17	17	20	24	30

If a rod of length ‘4’ is given then best way to cut is to make two pieces each of length 2. If a rod of length 10 is given then keep it as it is to get maximum revenue.

Given a rod of length ‘n’ and prices of rods of length from 1 to n,

write a recursive procedure to print the maximum revenue that can be generated

3. Use dynamic programming by top down approach for solving rod cutting problem. Make an analysis of the recursive code and DP code written using top down approach for inputs of different sizes like 10, 100, 1000, 10000, 100000, 1000000.

4. Use dynamic programming by bottom up approach for solving rod cutting problem. Make an analysis of the DP code written using top down approach and bottom up approach for inputs of different sizes like 10, 100, 1000, 10000, 100000, 1000000.

5. If a company decides to cut only rods of even size, given the length of the rod and price of each size, modify your dynamic programming code (both top-down and bottom-up) to find the maximum revenue that shall be generated. There is no penalty for wastage.

6. Modify the dynamic programming code written to solve problem 4 to print the size of the pieces that we should cut the rod to get maximum revenue and the maximum revenue as well

7. A variation of rod cutting problem is one in which length of the rod will be of length greater than or equal to 8 and you can make cuts of rods of length 3 or 5 only. For each unit of wastage a penalty of Rs.1 should be given. Write an recursive algorithm and

implement it to find the maximum revenue that may be generated.

8. A rod cutting company streling corporation will cut rods of specific lengths only. Given a list of lengths by which this company will make rods, a rod of length ‘n’ and list of prices of each piece of rod that shall be cut by the company, write an algorithm and implement it using top down dynamic programming to find maximum revenue that shall be generated. In that case, give a penalty of Rs 10 for each meter of the residue.