Assingment10

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10.2(b)

Dynamic programming algorithm time complexity: $\mathbf{O}(n^2)$

Here, Here in each level we have done comparison between left child and right child and added that one in the parent. So, and we have calculated path by the help of maxArray which takes the linear time.So, the time complexity to check the maximum in each sub tree is O(n) and the height of the tree is O(n) which leads to O(n^2).

If we had gone through brute force approach then we had o to check each path and their sum without following memoization technique which would lead to exponential time i.e. O)(2^n).

So, Dynamic programming is useful to reduce the time complexity from exponential to polynomial.

10.2(c)

Greedy approach solution:
As, we have our local optimal solution as top most element, so we would have approached next element by observing if the next element that we get is maximum or not. So, the solution would be $7 \rightarrow 8 \rightarrow 1 \rightarrow 7 \rightarrow 5$ i.e. 28.
This shows that locally optimal solution not always lead to globally optimal solution.

Reference: Dipak kandel and I had disscussed about the problem solving technique for all of the problems. However, we implemented on out own.