* **Due** Thursday by 1:35pm
* **Points** 50
* **Submitting** a file upload
* **File Types** doc, docx, txt, and pdf
* **Available** until Nov 29 at 2pm

Watch the videos for the dynamic programming problem examples (for problems 1, 2, 7, and 10) at:

https://people.cs.clemson.edu/~bcdean/dp\_practice/

For each problem, submit the following (I am giving you the solutions for problem 1):

a) An English description of a problem instance, e.g. for the max contiguous subsequence problem:

**M(j) = max sum over all windows that end at index j**

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b) A recurrence relation that expresses the solution to a problem instance in terms of sub-problems of the same type, e.g.:

**M(j) = 0 if j = 0**

**M(j) = max(M(j-1) + A[j], A[j]) if j > 0**

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c) An expression that gives the solution to the original problem in terms of the defined problem instances, e.g.:

**max (M(i)) for i in [1..n]**

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Note: There will be a quiz on Thursday that will ask you to produce these values for one of the problems.

1a. M(j) = max sum over all windows that end at index j

1b. M(j) = 0 if j = 0

M(j) = max(M(j-1) + A[j], A[j]) if j > 0

1c. max (M(i)) for i in [1..n]

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2a. M(j) = minimum number of coins required to make change for amount of money j.

2b. M(j) = min{M(j-vi)} + 1

2c. M(j) = min{M(j-vi)} + 1

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7a. P(i,j) = 1 if a subset of {A1, … ,Ai} has a sum of j, 0 if otherwise.

7b. P(i,j) = max{P(i-1,j), P(i-1,j-Ai)}

7c. min{s-i:P(n,i) = 1}, over all i <= S

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10a. V(i,j) = max value we can definitely win if its our turn and only coins vi...vj remain.

10b. V(i,j) = max{min{V(i+1,j-1),V(i+2, j)} + Vi, min{V(i,j-2),V(i+1, j-1)} + Vj}

10c. V(1, n)