

# Programming Assignment:

## Calculating the numbers of ways for a team to score a certain number of points

A football team can score two points for a safety, three points for a field goal, six points for a touchdown without conversion and seven points for a touchdown with conversions. If during a game a team has scored 20 points, it could have achieved this with: ten safeties, two field goals and seven safeties, four field goals and 4 safeties, six field goals and one safety, one touchdown without conversion and seven safeties, one touchdown without conversion, two field goals, and 4 safeties, ... We want to write a program that counts how many ways a certain score can be achieved. Notice, that we are distinguishing between the order of the event. This means that if a team first scores two touchdowns with conversion and then two field goals, this counts as one. Scoring a field goal, then a touchdown with conversion followed by another field goal and then a final touchdown with conversion does not add to the count. Assume we want to give this number for scores between 1 and 120. (Remember Ohio State in the pre-season in 1986? Those large scores do happen.)

The easiest method is dynamic programming. To achieve 120 point with one touchdown with conversion gives us 120-7 ways of scoring 113 with only safeties, field-goals, and touchdowns without conversion. We add to this number the way to achieve 120 points with two touchdowns with conversion, i.e. the number of ways to score 106 points with only safeties, field-goals, and touchdowns without conversion.

Obviously, we best keep the possibilities in a two dimensional table.

	Safeties only	Safety and field goals	safeties, field goals, and TD without conv.	safeties, field goals, TDs wo conv and TDs with conv
0	0	0	0	0
1	0	0	0	0
2	1	1	1	1
3	0	1	1	1
4	1	1	1	1
5	0	1	1	1
6	1	1	1	1
7	0	1	1	1
8	1	2	3	3

### Hand-In:

Your code and a printout of the result

A printout of the result if we change the points for a field goal to 4.