

Question 3

Assume we have three activities a, b, c and N days-vacation. D_a represent the enjoyment value of activity a at day D and $(D - 1)_a$ represent the enjoyment value of activity a at the day before day D . Obviously, $D \leq N$.

For each day, find the optimal solution of each activities which is the maximum number of enjoyment gain. Thus, for the first day of vacation

1. $opt(D) = \max(D_a, D_b, D_c)$ where D is first day of value

For the rest days, the optimal solution of each activities depends on the activity from yesterday which is not the activity same as itself. For example, the $opt(D_a)$ can be represented by following equation.

$$opt(D_a) = D_a + \max(opt((D - 1)_b), opt((D - 1)_c))$$

In such way, we recursively calculate the optimal solution for each activity at each day. The maximum total enjoyment can be represented by such equation

$$maximum = \max(opt(N_a), opt(N_b), opt(N_c))$$

which is the maximum number of the optimal solution of each activity.