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COMP9101 (T2-2020)
Homework 4 – Q3

Let i denote the day and j denote the choice from three possible activities. So that i ranges from 0 to N and j ranges from 1 to 3. Now we solve the following subproblem: for each day i and each activity j, find optimal activities up to day i so that on day i we do activity j.

The base case is that $opt(0) = 0$. The state transfer function is as follow:

$$opt(i, j) = score(i, j) + \max\{opt(i - 1, k), k \neq j\}$$

Here, $score(i, j)$ is the enjoyment we obtain if we do activity j on day i. Since that we cannot do the same activity two days in a row, the activity we in the previous day k must not be the same as the current activity j.

Do this recursion until we solve $opt(N, j)$ for every activity j. The maximum value among these three numbers is the maximum total enjoyment possible.