COMP9101 Ass03
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3. In a pond there is a sequence on n lily pads arranged in a straight line: $1, 2, 3 \ldots n$. On lily pad i there are $f_i \geq 0$ flies. On lily pad 1 there is a frog sitting. The frog can only jump forward from a lily pad i to either lily pad $i+3$ or lily pad $i+4$. Find the largest number of flies that the frog can catch. (20 pts)
   Hint: be careful: not all lily pads are accessible to the frog; the frog can only jump from the starting lily pad 1 to lily pads 4 and 5 but cannot access lily pads 2 and 3. Also, for some i there might be no flies on that lily pad (i.e., $f_i = 0$). So you want to distinguish between lily pads without flies but which are accessible and lily pads which are not accessible.

3.

This problem similar to the Q1, we can also use dynamic programming to solve the question.

We use dp[i] to store when we get to the i lily pad, the most flies we have eaten

Therefore, the base case shows below:

when i=1, dp[1] = f_1;

when i=2, dp[2] = 0;

when i=3, dp[3] = 0;

when i=4, dp[4] = $f_1 + f_4$;

when i=5, dp[5] = $f_1 + f_5$;

when i=6, dp[6] = 0;

the recursion shows below:

dp[i] = max(dp[i-3]+ f_i, dp[i-4]+ f_i)

therefore, the time complexity of this problem is O(n);