Group : 3

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Exercise 1:

$a = 3$

i) $f(1) = 3$ $\quad f(n-1) + n - 1 \quad (n > 1)$

$f(2) = f(2-1) + 2 - 1 = 3 + 2 - 1 = 4$

$f(2) = 4$

$f(3) = f(3-1) + 3 - 1 = 4 + 3 - 1 = 6$

$f(3) = 6$

$f(4) = f(4-1) + 4 - 1 = 6 + 4 - 1 = 9$

$f(4) = 9$

$f(5) = f(5-1) + 5 - 1 = 9 + 5 - 1 = 13$

$f(5) = 13$

ii) $f(n) = \dfrac{n^2 - n + 2 \cdot a}{2}$

1.) prove that $n = 1$ works

$$f(1) = \frac{1^2 - 1 + 2 \cdot 3}{2} = \frac{6}{2} = 3$$

$$f(2) = \frac{2^2 - 2 + 2 \cdot 3}{2} = 4$$

2.) Assume that $n = k$ works. Then, using this assumption, prove that $n = k+1$ works

$$f(k) = \frac{k^2 - k + 2 \cdot a}{2}$$

$$f(k+1) = \frac{(k+1)^2 - (k+1) + 2 \cdot a}{2} =$$

$$\frac{k^2 + 2k + 1 - (k+1) + 2 \cdot 3}{2} =$$

$$\frac{k^2 + k + 6}{2}$$

$f(1) = f(2)$

$f(2) = f(3)$

$f(k) = f(k-1) + k - 1$

$f(k+1) = f((k+1) - 1) + (k+1) - 1$

$f(k+1) = f(k) + k$

$f(1) = 3 + 1 = 4 \; f(3)$

$\frac{8}{2} = 4 \leftarrow t(2)$ $t(n)$

iii) Explain in your own words how the ~~proof~~ proof works.

Answer) we assume $n=k$ and $n=(k+1)$ then we need to prove that they are true. We start by assuming $n=k$ and if it was true we then test $n=(k+1)$ to make sure its true.

Home assignment - Exercice 2

Group 3 (Gifty Enefa Akaglah, Ibrahim Nchawed, Anne-claire Koch)

Function nicklas (n):

if n = 1 then Nicklas ← 1

if n = 2 then Nicklas ← a

if n > 2 then Nicklas ← a · Nicklas(n - 2) + n

nicklas (2 + a) from main program. / a = 3

COPY 1		COPY 2		COPY 3	
n	NICKLAS	n	NICKLAS	n	NICKLAS
(2 + a)	3. hold + 5	n = (n - 2)	3. hold + 3	n = (n - 2)	
(2 + 3)	3. 6 + 5	(5 - 2)	3. 1 + 3	(3 - 2)	1
n = 5	= 23	n = 3	= 6	n = 1	

- We start by getting the n value and plugging in our a in nicklas (2+3) which is 5.
- Since we cannot solve, we place Nicklas on hold and calculate the next index (term) by removing 2 due to the Nicklas (n-2) since n > 2 because it's 5.
- The new value for n is 3; since 3 > 2 we place Nichlas on hold and repeat the step.
- This time n = 1, we know that if n = 1 then Nichlas ← 1, so we assign the value 1 to Nichlas.
- we then plug in Nichlas's value to Copy 2 which results in 6
- we then plug in 6 for copy 1 and that equals to 23.

Home assignment 1 Exercise 3

Group 3: (Ann-Claire Koch, Ibrahim Mohamed and Getty Emefa Akaglah)

```
input m
t1 ← 2·3
t2 ← 3
output t1, t2
if m > 1 then
    for n = 6 till m do
        t ← t - t · n
    output t
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$t(n+1) \cdot t(n-2)$

Explanation:

- We begin by giving an input, in this case m.
- We make 6 the value of t.
- t is outputted
- Then the if condition states that, if m is greater than 1 then n is equal to any value between 6 till m. If the condition is true, assign t - t - n to the output and then output t which is the final result.