

Group : 3

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Exercise 1:

$$a=3$$

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

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

$$f(2) = 4$$

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

$$f(3) = 6$$

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

$$f(4) = 9$$

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

$$f(5) = 13$$

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

1.) prove that $n=1$ works

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

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

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

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

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

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

$$\square \rightarrow \frac{k^2 + k + 6}{2} \rightarrow t(1) = t(2)$$

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

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

$$t(k+1) = t(k) + k$$

$$t(1) = 3 + 1 = 4 = t(2)$$

$$\frac{8 + (n_2)}{2} = 7 \leftarrow + (2)$$

iii) Explain in your own words how the ~~prop~~ 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 - Exercise 2

Group 3 (Gifty Emea Akaglah, Ibrahim Mohamed, Anne-daine Koch)

Function nicklas(n):

if $n = 1$ then Nicklas $\leftarrow 1$

if $n = 2$ then Nicklas $\leftarrow a$

if $n > 2$ then Nicklas $\leftarrow a \cdot \text{Nicklas}(n-2) + n$

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 Nicklas on hold and repeat the step.
- This time $n = 1$, we know that if $n = 1$ then Nicklas $\leftarrow 1$, so we assign the value 1 to Nicklas.
- we then plug in Nicklas'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 Gifty Emeba Akaglah)

Input m

$t_1 \leftarrow 2, 3$

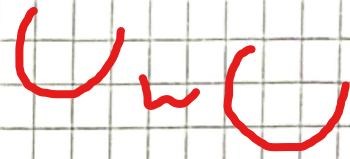
Output t_1, t_2

If $m > 1$ then

for $n = 6$ till m do

$t \leftarrow t - t - n$

Output t



$$t(n+1) = t(n-2) - 1$$

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~~ and then output t which is the final result.