HW1

6581030

1 Subtask I

Answer: The function will perform n steps.

2 Subtask II

The sum of the first n even numbers is:

$$S_n = \sum_{i=1}^{n} 2(i-1)$$

$$S_n = 0 + 2 + 4 + 6 + 8 + \ldots + 2(n-1)$$

which can be written as:

$$S_n = 0 + 2 + (2+2) + (2+2\times 2) + (2+3\times 2) + \ldots + 2(n-1)$$

or, in reverse:

$$S_n = (2(n-1)) + (2(n-1)-2) + (2(n-1)-2\times 2) + (2(n-1)-3\times 2) + \ldots + 2 + 0$$

Now, we add $S_n + S_n$:

$$S_n + S_n = 2(n-1) + (2+2(n-1)-2) + (2+2+2(n-1)-2\times 2) + \ldots + 2(n-1)$$

This simplifies to:

$$2S_n = 2(n-1) + 2(n-1) + 2(n-1) + \ldots + 2(n-1)$$

Thus, we have:

$$2S_n = n \times 2(n-1)$$

Therefore:

$$S_n = n(n-1)$$

Thus, the sum of the first n even numbers is $n(n-1)$.

3 Subtask III

Answer: If we use the formula $S_n = n(n-1)$, we only need two steps: one multiplication and one subtraction. Therefore, the number of steps is 2, no matter what n is.