

What is a Loop in Programming?

Worksheet

A loop repeats a set of instructions until a condition is met or a fixed number of iterations completes, letting a program automate repetitive tasks efficiently.

Questions

1. A for loop runs from $i=0$ to $i=9$, step 1. How many times does it execute?
A) 9
B) 10
C) 11
D) 0
2. Which loop type is best when you don't know in advance how many times to repeat?
A) For loop
B) While loop
C) Do-nothing loop
D) Static loop
3. What causes an infinite loop?
A) The step size is too small
B) The stopping condition is never satisfied
C) The loop body is empty
D) The counter starts at 0
4. In the formula $n = (\text{endstart})/\text{step} + 1$, what does step represent?
A) The total iterations
B) The amount the counter changes each time
C) The starting value
D) The loop's name
5. A for loop runs from $i = 0$ to $i = 4$, increasing by 1 each time. How many times does it execute?
6. A while loop keeps running while $\text{count} < 20$, starting at $\text{count} = 0$ and adding 5 each time. How many iterations?
7. A for loop goes from $i = 1$ to $i = 10$, step 2. How many iterations?
8. Define: What is a loop?
9. Define: For loop vs while loop?
10. Define: What is an infinite loop?

Answer Key

1. B) $10 - n = (90)/1+1 = 10$ iterations.
2. B) While loop - A while loop repeats based on a condition, ideal when the count isn't known ahead of time.
3. B) The stopping condition is never satisfied - If the condition never becomes false, the loop never stops.
4. B) The amount the counter changes each time - Step is how much the counter increases (or decreases) on each pass.
5. start = 0, end = 4, step = 1 $n = (\text{end start})/\text{step} + 1$ $n = (4 - 0)/1 + 1 = 5$ The loop body runs 5 times (i = 0,1,2,3,4)
6. This matches a loop from start=0 to end just below 20 with step 5 Valid values: 0,5,10,15 (20 fails the condition) $n = (15 - 0)/5 + 1 = 4$ The loop runs 4 times
7. start = 1, end = 9 (last valid value 10 with step 2 from 1 is 9) $n = (9 - 1)/2 + 1 = 8/2 + 1 = 5$ The loop runs 5 times (i = 1,3,5,7,9)
8. A programming structure that repeats a block of code multiple times until a condition stops it.
9. A for loop repeats a known number of times; a while loop repeats as long as a condition is true.
10. A loop whose stopping condition is never met, so it repeats forever (usually a bug).

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