

Title: Sentinel Controlled While Loop

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Date: October 8

Course & Section: CSC 109-101W

Description: Repeatedly asks the user to enter a grade or -1 . When the user enters -1 , computes the average of the grades entered and then displays that average.

Initial Algorithm:

1. Get number
2. Increase counter
3. Determine whether the user wants to stop
4. Add to the total or calculate the average grade
5. Display the average grade

Data Requirements:

Input:

- Grade

Output:

- Average

Additional Data:

- Counter
- Total

Formulas:

- $\text{Counter} = \text{Counter} + 1$
- $\text{Total} = \text{Total} + \text{Grade}$
- $\text{Average} = \text{Total} / \text{Counter}$

Refined Algorithm:

1. Initialize Counter to 0
2. Initialize Total to 0
3. Input first Grade value
4. WHILE Grade doesn't equal -1
 - a. Increase Counter
 - $\text{Counter} = \text{Counter} + 1$
 - b. Add to the running total
 - $\text{Total} = \text{Total} + \text{Grade}$
 - c. Input next Grade value

5. END WHILE
6. IF Counter > 0 THEN
 - a. Calculate the average grade
 - $\text{Average} = \text{Total} / \text{Counter}$
 - b. Display the average grade
7. ELSE
 - a. Display error saying "no grades were entered"
8. END IF