CS232 Exam: Collatz Sequence Stored in a Linked List

Determine which term generates the longest Collatz sequence based on the user entry

User requirements:

- The Collatz sequence is a generated group of numbers were the next term is generated based on the following function:
    - n -> n/2 (if n is even)
    - n -> 3n + 1 (if n is odd)
- The Collatz conjecture is that regardless of the starting value of n the sequence will always reach 1.
- For example, if we start with the number 13 the sequence of Collatz terms based on the function above is as follows.
    - 13 -> 40 -> 20 -> 10 -> 5 -> 16 -> 8 -> 4 -> 2 -> 1
- Create a program (as seen below) that asks the user to enter a whole number. Based on that whole number determine which of the numbers less than or equal to the user number produces the longest Collatz sequence.

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Enter an integer 100 or less: 10
The number 9 produces the longest Collatz sequence of 20 terms.
Here are those terms
9->28->14->7->22->11->34->17->52->26->13->40->20->10->5->16->8->4-
>2->1
```

Figure 1: Sample run of the program

Software Requirements

- You must create an integer linked list using a struct called ***collatzNode*** that contains an integer called ***item*** and a pointer called ***link*** to another collatzNode node.
- You must store the longest Collatz sequence in an integer linked list.
- You must read from the integer linked list to display the Collatz terms by traversing the list.